

## CHAPTER 12 EDUCATION

In this chapter, following perspectives regarding the Education Sector are presented and analysed; 1) Institutional Framework, 2) Policies and Strategies, 3) Financial Resources, 4) the Operation and Maintenance System, 5) Facilities and Staffing, 6) Findings from Relevant Survey(s), 7) Programmes and Projects, and 8) Needs and Issues. And then in section, 9) development plans are formulated based on the present situation, needs and issues, and in 10) projects are proposed from technical point of view.

### 12.1 INSTITUTIONAL FRAMEWORK

In ROSS, the majority of adults and children have not had the opportunity to attend school due to decades of civil war. During this period, the development of basic services has been non-existent and accessing the education infrastructure was difficult. As a strategy for recovering education, The Ministry of General Education and Instruction (MOGEI) has constructed a parallel system of formal and alternative education systems.

The educational system in Republic of South Sudan (ROSS) consists of early childhood development, primary education, secondary education, alternative education technical schools and higher education. ROSS is following an 8-4-4 education system (8 years of basic education, four years of secondary education and four years of tertiary education). The State Ministry of Education (MoE), Upper Nile State (UNS) is responsible for the implementation of basic, secondary and technical education as well as sharing in the governance of the tertiary education.

Basic education and alternative education systems use the same curriculum though they have different systems for administering the syllabus. The MOGEI is also encouraging and supporting the community in establishing early childhood education to build a solid educational foundation before children join the formal education.

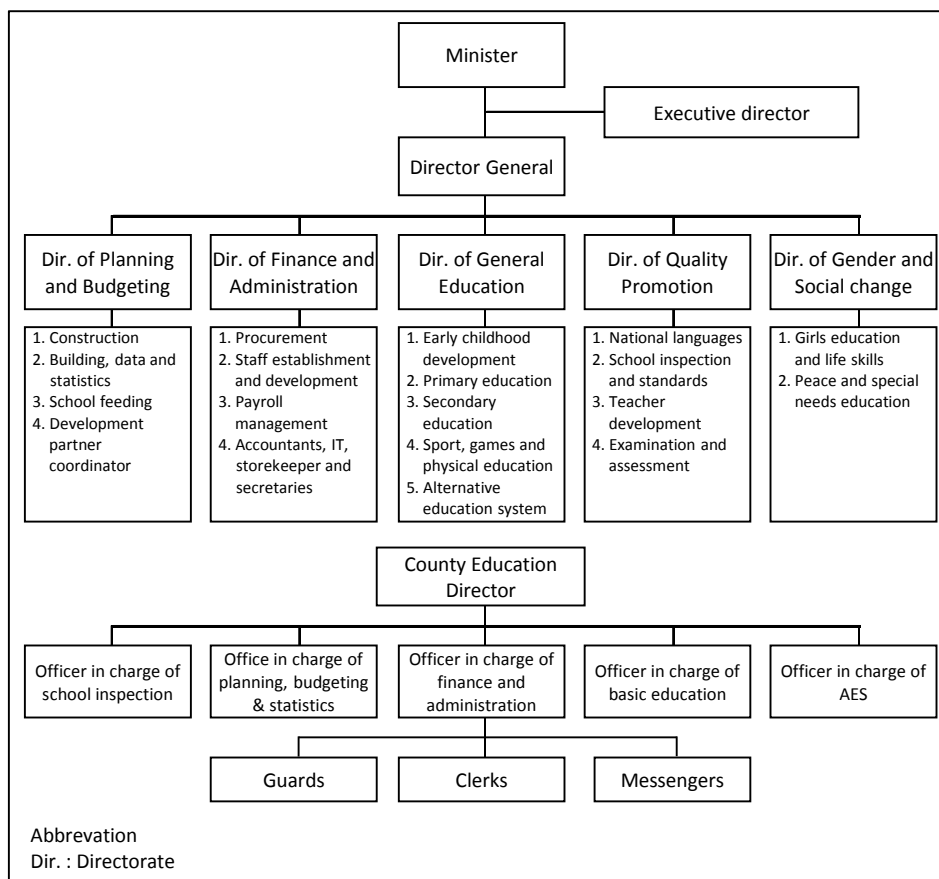
**Table 12.1-1 Education Ladder in ROSS**

(As of February 2013)

| Age       | 6                       | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14                        | 15 | 16 | 17 | 18                           | 19 | 20 | 21 |
|-----------|-------------------------|---|---|---|----|----|----|----|---------------------------|----|----|----|------------------------------|----|----|----|
| Year      | 1                       | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9                         | 10 | 11 | 12 | 13                           | 14 | 15 | 16 |
| Education | Primary school P1 to P8 |   |   |   |    |    |    |    | Secondary school S1 to S4 |    |    |    | Vocational training          |    |    |    |
|           |                         |   |   |   |    |    |    |    |                           |    |    |    | Pre-service teacher training |    |    |    |
|           |                         |   |   |   |    |    |    |    |                           |    |    |    | In-service teacher training  |    |    |    |
|           |                         |   |   |   |    |    |    |    |                           |    |    |    | University education         |    |    |    |

Source: "Education Statistics for Southern Sudan 2011", MoE, 2011

There are five departments in the MoE in UNS which are Planning & Budgeting, Finance & Administration, General Education, Quality Promotion and Gender & Social Change. Each department has sub-sections which carry out daily operations in each district. At the county level, there are subsidiary organizations which consist of a county education director and officers in various sectors. **Figure 12.1-1** shows the organizational chart in MoE.



Source: "Education Policy for Upper Nile State 2011", MoE, 2011

**Figure 12.1-1 Organizational Chart of MoE, UNS**

## 12.2 POLICIES AND STRATEGIES

The MoE in UNS is committed to providing free and compulsory basic education to the children of UNS, through cooperation and partnership with the following agencies; MOGEI of central government, education development partners, Parents and Teachers Associations, Education Managers, other line Ministries, the education institutions and parents. The State Ministry is committed to developing strategies that will:

- (i) Facilitate increased participation of parents, communities and organizations in working to support the education system in UNS;
- (ii) Increase the capacity of the education system to respond to the learning and cultural needs of the people of UNS;
- (iii) Provide quality programs, services and resources to help create learning opportunities for the people of UNS and support as to improved academic achievement and identity building; and
- (iv) Ensure the provision of curriculum that facilitates effective teaching and learning that creates self-reliant and responsible citizens

**Table 12.2-1** below shows the education sector target for 2013 designed by MOGEI. 63% enrolment rate is the target number for primary school enrolment. Primary teacher student ratio will be reduced from 1:117 to 1:50.

**Table 12.2-1 SSDP\* Education Sector Targets in ROSS**

(As of December 2011)

| Education Sector Target for 2013                         | Baseline 2010      | Source      | Responsible Spending Agency |
|--|--------------------|-------------|-----------------------------|
| 63% primary Net Enrolment Rate                           | 44%                | MOGEI: EMIS | MOGEI                       |
| 8% secondary Net Enrolment Rate                          | 1.6%               |             |                             |
| 1:50 qualified teacher: student ratio in primary         | 1:117              | MOGEI: EMIS | MOGEI                       |
| 1:16 qualified teacher: student ratio in secondary       | 1:24               |             |                             |
| 600,000 adult learners enrolled in AES literacy programs | 140,405 aged 16-26 | MOGEI: EMIS | MOGEI                       |
| 70,000 children/youth in AES literacy programs           | 42,529 aged 5-15   |             |                             |
| 80% of managers trained                                  | 20%                | MOGEI       | MOGEI                       |
| 25% ROSS budget allocated to MOGEI                       | 12%                |             |                             |

\*SSDP: South Sudan Development Plan 2011-2013

Source: "Republic of South Sudan Education Sector Strategic Plan 2012/3-2016/7", MoE, 2011

## 12.3 FINANCIAL RESOURCES

### 12.3.1 Budget Expenditure Item for MoE in UNS

**Table 12.3-1** below shows 2010 budget for MoE, UNS. There are three components which are salaries, operating and capital. Salaries accounts for a large portion of the budget. Salaries include basic salaries, job specific allowances, pension etc. Operating expenditure includes items such as contract employment and professional services, telecommunications and travel expenses. Capital is the main project cost including construction of schools, furniture and general equipment. The MoE does not have the enough budget from State Ministry of Finance and Economic Planning, UNS (MoF&EP).

**Table 12.3-1 2010 Budget by Item in MoE UNS**

(As of October 2010)

| Category  | 2010 Expenditure To end of September (SSP) | 2010 Budget (SSP) |
|-----------|--|-------------------|
| Salaries  | 14,060,776                                 | 25,751,072        |
| Operating | 144,420                                    | 1,312,602         |
| Capital   | 8,367,000                                  | 5,672,810         |
| Total     | 22,572,196                                 | 32,736,484        |

Source: "Sector Budget, Ministry of Education, Upper Nile 2011", MoE, 2011

### 12.3.2 Budget Flow from MOF to MoE

The budget originally comes from Ministry of Finance, ROSS (MOF, Central Level) to MoF&EP (State Level) and is based on project proposals from other Ministries (State level). MoF&EP (State Level) who distribute budget to each local administrative body.

### 12.3.3 Financial Structure in MoE

Each department makes a project list and submits it to the Planning and Budgeting Department.

The Planning and Budgeting Department examines the project lists and organize the projects in accordance with priority.

The Planning and Budgeting Department submits selected project list to the Director General.

The Director General of MoE approves the implementation plan of projects and returns it to the Planning and Budgeting Department.

The Planning and Budgeting Department gives it to administration and finance department.

Administration and Finance Department makes a budget request for projects to MoF&EP (district level).

MoF&EP (district level) decides to accept or reject the projects.

MoF&EP allocates the budget to each ministry for approved projects.

## 12.4 OPERATION AND MAINTENANCE SYSTEM

### 12.4.1 Primary School

#### (1) Current Situation

Although school enrolment numbers have shown a significant increase, the existing learning spaces in the school system are unable to meet the overwhelming demand. This has led to an unacceptably high student classroom ratio of 120 to 180 pupils per classroom which severely compromises the quality of teaching and learning. (the standard ratio is 1:50). This lack of quality is indicated in the percentage of students passing primary school. Moreover, the education manager; head teachers and their deputies do not have the minimum academic and professional qualifications and experience.

The primary school enrolment rate in Malakal Town is 70%. The situation is much better compared to that of UNS (60%) and ROSS (44.4%). **Table 12.4-1** also shows three indicators for school environment; Pupils Teacher Ratio (PTR), Pupil Classrooms Ratio (PCR) and Pupil Text book Ratio (PTextR). PTR measures the quality of human resources in terms of number of teachers against the number of pupils.

**Table 12.4-1 Overview of Primary Education in Malakal Town, UNS and ROSS**

(As of 2010)

| Area    | Literacy Rate | Primary GER | Primary NER | PTR  | PCR   | PTextR       |           | Trained teacher | Untrained teacher |
|---------|---------------|-------------|-------------|------|-------|--------------|-----------|-----------------|-------------------|
|         |               |             |             |      |       | English text | Math text |                 |                   |
| Malakal | 45%           | 90%         | 70%         | 37.5 | 103.0 | 3.2          | 2.0       | 54.7%           | 9.8%              |
| UNS     | 45%           | 89%         | 60%         | 37.5 | 103.0 | 4.2          | 4.0       | 44.9%           | 17.0%             |
| ROSS    | 28%           | 68.8%       | 44.4%       | 63.7 | 151.7 | 4.0          | 4.1       | 44.9%           | 27.5%             |

Note: 1. GER is gross enrolment rate.

2. NER is net enrolment rate.

3. PCR only accounts for permanent and semi-permanent classrooms.

4. About teacher training, except for unknown teachers about their training.

Source: "Education Statistics for Southern Sudan 2010", MoE, GOSS, 2011, "Education Statistics for Upper Nile 2010", MoE, 2011

**Table 12.4-2 Partner Lists in Education Sector**

(As of December 2011)

| Implementing Agency |   | Target Area                        | Description  |
|---------------------|---|------------------------------------|--|
| 1                   | United Nations Children's Fund (UNICEF)                                     | All Counties                       | <ul style="list-style-type: none"> <li>• Construction of (classrooms/teachers offices /bore holes/pit latrines).</li> <li>• Training of teachers, schools managers and PTAs.</li> <li>• Providing teaching and learning materials.</li> <li>• Supporting school in emergencies.</li> </ul> |
| 2                   | World Food Programme (WFP)  | All Counties                       | <ul style="list-style-type: none"> <li>• Providing meals to schools (Kindergartens/primary and secondary).</li> <li>• Training of PTAs.</li> </ul>   |
| 3                   | United Nations High Commissioner for Refugees (UNHCR)                       | All counties                       | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> </ul>   |
| 4                   | ICCO  | Maiwut / Nasir                     | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> <li>• Primary education teachers training and PTAs.</li> <li>• Capacity building for teachers/PTAs and stake holders.</li> </ul>  |
| 5                   | SNV   | Makal/Nasir and Maiwut             | <ul style="list-style-type: none"> <li>• Training of teachers and school managers.</li> </ul>  |
| 6                   | Food for the Hungry Sudan   | Ulang                              | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> <li>• Training of primary school teachers.</li> </ul>   |
| 7                   | Marcy Corps   | Renk. Malakal/Maiwut               | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> </ul>   |
| 8                   | Care International  | Malakal                            | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> </ul>   |
| 9                   | Save The Children   | Malakal                            | <ul style="list-style-type: none"> <li>• Construction of learning spaces.</li> </ul>   |
| 10                  | World Vision International  | Panyikang/ Fashoda/Makal and Manyo | <ul style="list-style-type: none"> <li>• Construction of classrooms.</li> <li>• Provision of school furniture.</li> <li>• Procurement and distribution of learning and teaching materials.</li> <li>• Facilitating distribution of food for education.</li> </ul>                          |
| 11                  | Turath Organization for Human Development                                   | Makal/Renk/Baliet /Nasir and Maban | <ul style="list-style-type: none"> <li>• Capacity building for teachers and managers</li> <li>• Awareness in HIV and AIDS.</li> </ul>  |
| 12                  | Norwegian Peoples Aid (NPA)   | Maban                              | <ul style="list-style-type: none"> <li>• Construction of vocational training centre.</li> </ul>  |
| 13                  | Relief International  | Maban and Longchuk                 | <ul style="list-style-type: none"> <li>• Construction and rehabilitation of schools.</li> <li>• Construction of water points in schools.</li> <li>• Establish school gardening.</li> <li>• Distribution of food for education.</li> </ul>  |
| 14                  | South Sudan Development Agency  | Not decided                        | <ul style="list-style-type: none"> <li>• Not decided</li> </ul>  |
| 15                  | Windle Trust International (WTI)  | Makal and Renk                     | <ul style="list-style-type: none"> <li>• Intensive English course for teachers</li> </ul>  |
| 16                  | Education Development Centre (EDC - SSIRI)                                  | Makal and Fashoda                  | <ul style="list-style-type: none"> <li>• Training of learning village teachers and radio based education for all (RABEA) facilitators</li> <li>• Provision of free play radios and digital devices</li> </ul>  |
| 17                  | Organized Mission through Integration for Education and Development (OMIED) | Renk, Maban, Meluth, Manyo         | <ul style="list-style-type: none"> <li>• Teacher training</li> <li>• PTA training</li> <li>• GEM</li> <li>• Intensive English course</li> <li>• Distribution of school materials</li> <li>• Lead partner for collecting data for returnees children in UNS</li> </ul>                      |
| 18                  | Adventist Relief Development Agency (ADRA)                                  | Nasir and Maiwut                   | <ul style="list-style-type: none"> <li>• Not decided</li> </ul>  |
| 19                  | Academy for Educational Development (AED)                                   | All Counties                       | <ul style="list-style-type: none"> <li>• Capacity building</li> </ul>  |

Source: "Education Policy for Upper Nile State 2011", MoE, 2011

The situation of PTR in Malakal Town is better compared to UNS and ROSS. PCR measures number of classrooms versus the size of the pupil population. In Malakal Town, 103 students attend classes in one classroom. PTextR measures the quality of available learning materials in terms of number of textbooks against the number of pupils. One English textbook is used by three students in Malakal Town.

Mathematics textbook is shared by two students. About primary teachers' professional qualifications, in Malakal Town 54.7% teachers have professional qualifications while 44.9% teachers in UNS and ROSS only have professional qualification. Teachers should have a university degree in terms of academic qualifications. However, most of them have secondary school degree (61.9%) and only 11.5% teachers have university degree in Malakal Town.

## (2) Primary School, Students and Teachers in Malakal Town

The educational situation in UNS is moderately recovering from the two decades of civil war. The enrolment of children in schools has greatly increased after the signing of the Comprehensive Peace Agreement (CPA) in 2005. The launching of the "Go to School Initiative", the declaration of the girls' education day and the influx of a large number of returnees from the north due to the referendum in South Sudan are among the key drivers for increasing school enrolment.

According to MoE statistics, enrolment trends have increased in 2010 and are expected to increase drastically with the coming of the returnees from the North. The number of primary school children in Malakal Town is shown in the table. The number of students increased more than 1.5 times from 2008 to 2010. The gender ratio has been almost 50:50 unlike UNS trends. Currently UNS gender ratio is Male 60%: Female 40%. The exact percentage of net enrolment rate is unknown.

There are 41 primary schools in Malakal Town in 2010. As seen in the **Table 12.4-3**, the number of primary schools in the Malakal Town has increased gradually since 2008. Private schools have played an important role in education in Malakal Town since the government has not had the capability of providing education for all areas. Private schools are mainly managed by religious organization and non-governmental organizations (NGOs) .

**Table 12.4-3** also indicates the number of teachers in Malakal Town from 2008 to 2010. As the number of students increase, the number of teachers also increases. The gender ratio of teachers is not balanced. There are more male teachers in primary schools in Malakal Town.

**Table 12.4-3 Primary Schools in Malakal Town, 2008 – 2010**

| Year | Total Number of Students | Male Students | Female Students | Total Number of Primary Schools | Public Schools | Private Schools | Total Number of Teachers | Male Teachers | Female Teachers |
|------|--------------------------|---------------|-----------------|---------------------------------|----------------|-----------------|--------------------------|---------------|-----------------|
| 2008 | 19,519                   | 9,287         | 10,232          | 34                              | 26             | 8               | 454                      | 295           | 159             |
| 2009 | 25,241                   | 12,417        | 12,824          | 39                              | 31             | 8               | 673                      | 431           | 242             |
| 2010 | 31,343                   | 16,357        | 14,986          | 41                              | 29             | 12              | 693                      | 487           | 206             |

Source: "Education Statistics for Upper Nile 2010", MoE, 2011

### (3) School Facilities

**Table 12.4-4** shows that primary schools do not have enough access to facilities such as drinking water, latrines and electricity. In terms of access to drinking water in Malakal Town, 53.7% schools have water points. The percentage with access to latrines is 14.6% which is better than UNS (4.0%) and ROSS (1.8%). Access to electricity in Malakal Town is 14.6% compared to 1.8% throughout ROSS.

**Table 12.4-4 Primary School Facilities in Malakal Town, UNS and ROSS in 2010**

| County  | Schools | Access for Drinking Water |         | No access for Drinking Water |         | Access for Latrine |         | No access for Latrine |         | Access for Electricity |         | No access for Electricity |         |
|---------|---------|---------------------------|---------|------------------------------|---------|--------------------|---------|-----------------------|---------|------------------------|---------|---------------------------|---------|
|         |         | No.                       | % Total | No.                          | % Total | No.                | % Total | No.                   | % Total | No.                    | % Total | No.                       | % Total |
| Malakal | 41      | 22                        | 53.7%   | 25                           | 61.0%   | 6                  | 14.6%   | 6                     | 14.6%   | 6                      | 14.6%   | 28                        | 68.3%   |
| UNS     | 371     | 169                       | 45.6%   | 144                          | 38.8%   | 15                 | 4.0%    | 15                    | 4.0%    | 15                     | 4.0%    | 265                       | 71.4%   |
| ROSS    | 3,349   | 2,048                     | 61.2%   | 1,605                        | 47.9%   | 61                 | 1.8%    | 61                    | 1.8%    | 61                     | 1.8%    | 1,953                     | 58.3%   |

Source: "Education Statistics for Southern Sudan 2010", MoE, GOSS, 2011 "Education Statistics for Upper Nile 2010", MoE, 2011

### (4) Primary School Language of Instruction

ROSS has decided that the official language is English. In spite of this, some teachers do not use English in class since they cannot speak English. 83.8% of teachers use English in class in P1 level while only 71.1% of teachers use English in class in P8 level.

## 12.4.2 Secondary Education

### (1) Current Situation of Secondary School

Secondary education was at a low quality during the war. This was due to under staffing and acute shortage of learning materials. During the war only community and church schools were functioning and with some difficulties.

**Table 12.4-5 Primary Schools Language of Instruction by Grade, 2010 (UNS)**

| Language      | P1    | P2    | P3    | P4    | P5    | P6    | P7    | P8    |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|
| English       | 306   | 305   | 294   | 267   | 181   | 121   | 77    | 59    |
|               | 83.8% | 84.5% | 85.7% | 89.3% | 88.3% | 83.4% | 73.3% | 71.1% |
| Arabic        | 33    | 32    | 27    | 17    | 21    | 22    | 27    | 24    |
|               | 9.0%  | 8.9%  | 7.9%  | 5.7%  | 10.2% | 15.2% | 25.7% | 28.9% |
| Mother Tongue | 26    | 24    | 22    | 15    | 3     | 2     | 1     | 0     |
|               | 7.1%  | 6.6%  | 6.4%  | 5.0%  | 1.5%  | 1.4%  | 1.0%  | 0.0%  |
| Total         | 365   | 361   | 343   | 299   | 205   | 145   | 105   | 83    |
|               | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  | 100%  |

\*This section only counted schools who responded to this question.

\*Not all primary schools P1-P8 system; the grade levels served vary across schools.

Source: "Education Statistics for Upper Nile 2010", MoE, 2011

Secondary education has not been supported by NGOs. In spite of its importance it has been given very little attention or funds to enable school construction, teachers training and school facilities. Secondary school enrolment rate in ROSS is only 4.2% from **Table 12.4-6**. This implies that students can not complete primary school or cannot enter the secondary school because of some

obstacles. With reference to PTR, one teacher is responsible for about 15 students in a class.

The percentage of PCR (59%) in Malakal Town is higher than those of UNS (50.3%) and ROSS (42.9%). About 3 students share a textbook in Malakal Town. With reference to professional qualification of teachers in secondary schools, the percentage of trained teachers in Malakal Town is 45.2% while that of ROSS is 61.4%. More than half the teachers in Malakal Town are untrained.

**Table 12.4-6 Overview of Secondary Education in Malakal Town, UNS and ROSS**

(As of 2010)

| Area    | Literacy Rate | Secondary GER | Secondary NER | PTR  | PCR  | PTextR       |           | Trained Teacher | Untrained Teacher |
|---------|---------------|---------------|---------------|------|------|--------------|-----------|-----------------|-------------------|
|         |               |               |               |      |      | English Text | Math Text |                 |                   |
| Malakal | 45%           | -             | -             | 15.0 | 59.0 | 3.4          | 3.8       | 45.2%           | 5.1%              |
| UNS     | 45%           | -             | -             | 15.7 | 50.3 | 2.1          | 2.4       | 52.4%           | 7.2%              |
| ROSS    | 28%           | 4.2%          | 1.6%          | 14.9 | 42.9 | 3.8          | 4.5       | 61.4%           | 13.9%             |

Source: "Education Statistics for Southern Sudan 2010", MoE, GOSS, 2011 "Education Statistics for Upper Nile 2010", MoE, 2011

## (2) Secondary School, Students and Teachers in Malakal Town

The number of children in secondary schools has consistently increased since 2008. In particular, female students dramatically increased from 2008 to 2009 because of a government policy for girls' education. However, female students are still less than male students. There are eleven secondary schools in Malakal Town. Six are public schools and five are private schools. It is remarkable that the number of private schools has increased since 2008.

As **Table 12.4-7** shows, the number of secondary school teachers increased from 2008 to 2010 consistently. In secondary schools, there are more male than female teachers.

**Table 12.4-7 Secondary School in Malakal Town, 2008 – 2010**

| Year | Total Number of Students | Male Students | Female Students | Total Number of Schools | Public Schools | Private Schools | Total Number of Teachers | Male Teachers | Female Teachers |
|------|--------------------------|---------------|-----------------|-------------------------|----------------|-----------------|--------------------------|---------------|-----------------|
| 2008 | 1,503                    | 1,077         | 426             | 9                       | 7              | 2               | 152                      | 115           | 37              |
| 2009 | 1,768                    | 1,384         | 384             | 12                      | 7              | 5               | 176                      | 155           | 21              |
| 2010 | 2,951                    | 1,821         | 1,130           | 11                      | 6              | 5               | 197                      | 167           | 30              |

Source: "Education Statistics for Upper Nile 2010", MoE, 2011

## (3) School Facilities

Unlike the situation of primary schools, 90% of secondary schools in Malakal Town have access to drinking water and latrines. The situation is the same in UNS and ROSS. Availability of electricity is less than 30% in Malakal Town.

**Table 12.4-8 Secondary School Facilities in Malakal Town, UNS and ROSS in 2010**

| County  | Schools | Access for Drinking Water |         | No access for Drinking Water |         | Access for Latrine |         | No access for Latrine |         | Access for Electricity |         | No access for Electricity |         |
|---------|---------|---------------------------|---------|------------------------------|---------|--------------------|---------|-----------------------|---------|------------------------|---------|---------------------------|---------|
|         |         | Count                     | % Total | Count                        | % Total | Count              | % Total | Count                 | % Total | Count                  | % Total | Count                     | % Total |
| Malakal | 11      | 10                        | 90.9%   | 1                            | 9.1%    | 10                 | 90.9%   | 0                     | 0.0%    | 3                      | 27.3%   | 3                         | 27.3%   |
| UNS     | 27      | 24                        | 88.9%   | 3                            | 11.1%   | 23                 | 85.2%   | 3                     | 11.1%   | 5                      | 18.5%   | 16                        | 59.3%   |
| ROSS    | 168     | 133                       | 79.2%   | 24                           | 14.3%   | 127                | 75.6%   | 23                    | 13.7%   | 30                     | 17.9%   | 65                        | 38.7%   |

Source: "Education Statistics for Southern Sudan 2010", MoE, GOSS, 2011 "Education Statistics for Upper Nile 2010", MoE, 2011



### 12.4.3 Alternative Education Systems (AES)

Education in UNS has been interrupted by the frequent recurrence of war in the ROSS (and in UNS in particular). As a result, the illiteracy rate is 90% among females and 80% among males. The majority of the illiterate population is composed of underprivileged young men, women and children who have had little or no access to formal education.

As a response to the educational needs of most out of school children and demobilized soldiers, Alternative Education Systems (AES) have been created. These are non-formal systems that are aimed to increase learning opportunities for specific targets groups, including adults (women and men between 30-60 years old), over-aged children and youths who missed out on basic education or dropped out of school (boys and girls between 12-30 years old).

These alternative forms of education include Basic Adult Literacy Programs (BALP), Accelerated Learning Program (ALP), Community Based Girls Schools (CBGS), intensive English Course, Interactive Radio Instruction (IRI), Agro-forestry Education (AFE) and Pastoralist Education (PEP). Currently, there are 43 AES centres in UNS with 2,411 students (1,809 males and 602 females) and 121 teachers (117 males and 4 females).

### 12.4.4 Higher Education

There is Upper Nile University (UNU) in Malakal Town which consists of eight faculties (Medicine, Animal Production, Agriculture, Forestry, Public Health, Veterinary Medicine, Education, Human Development and Economics). The UNU was founded in 1991 and started classes in 1994. The UNU is under Ministry of Higher Education (MOHE), central government. MOHE is responsible for selection of students and recruitment of teachers. **Table 12.4-9** shows the number of students and teachers by faculty. Medicine and Nursing moved to Khartoum because of the conflict. All courses are a four year program except Medicine (6 year) and Human Development (3 year, diploma program).

**Table 12.4-9 Overview of Faculties of UNU**

(As of March 2011)

| Faculty             | Number of Students | Number of Teachers |
|---------------------|--------------------|--------------------|
| Medicine, Nursing   | -                  | 24                 |
| Animal Production   | 115                | 34                 |
| Agriculture         | 250                | 30                 |
| Forestry            | 240                | 16                 |
| Public Health       | 250                | 12                 |
| Veterinary Medicine | 86                 | 12                 |
| Education           | 800                | 84                 |
| Human Development   | 1000               | 22                 |
| Economics           | Not start          | 10                 |

Source: UNU

### 12.4.5 Vocational Training Centre

There is a Vocational Training Centre (VTC) in Malakal Town under Public Service and Human Resource Development, Ministry of Labour. This VTC was established in 1976, and currently 28 instructors teach classes. Trainees must at least have graduated primary school to enter the VCT. The tuition fee is SSP (South Sudan Pounds) 125 per year.

**Table 12.4-10 Overview of VTC**

(As of March 2010)

| Name of Training Course            | Duration | Number of Trainee    |                      |                      |
|------------------------------------|----------|----------------------|----------------------|----------------------|
|                                    |          | 1 <sup>st</sup> year | 2 <sup>nd</sup> year | 3 <sup>rd</sup> year |
| Basic Training                     | 3 year   | 140                  | -                    | -                    |
| Auto- Mechanic (Petrol)            | 3 year   | -                    | 9                    | 10                   |
| Auto- Mechanic (Diesel)            | 3 year   |                      | 14                   | 12                   |
| Auto- Electricity                  | 3 year   |                      | 9                    | 8                    |
| Farm Machinery                     | 3 year   |                      | 5                    | 5                    |
| Machine Shop                       | 3 year   | -                    | -                    | -                    |
| Building and construction          | 3 year   | 8                    | 7                    | -                    |
| Carpentry                          | 3 year   | 1                    | 1                    |                      |
| Welding and Fabrication            | 3 year   | -                    | -                    | 3                    |
| Refrigeration and air conditioning | 3 year   | -                    | -                    | -                    |
| Food Processing and Agro-Business  | 3 year   | -                    | -                    | -                    |
| Tailoring and Sewing               | 3 year   | -                    | 1                    | -                    |
| Scientific glass blowing           | 3 year   | -                    | -                    | -                    |
| Plumbing and Pipe fitting          | 3 year   | -                    | -                    | -                    |
| General Electricity                | 3 year   | -                    | 13                   | 18                   |

Source: Malakal Vocational Training Centre

### 12.5 FACILITIES AND STAFFING

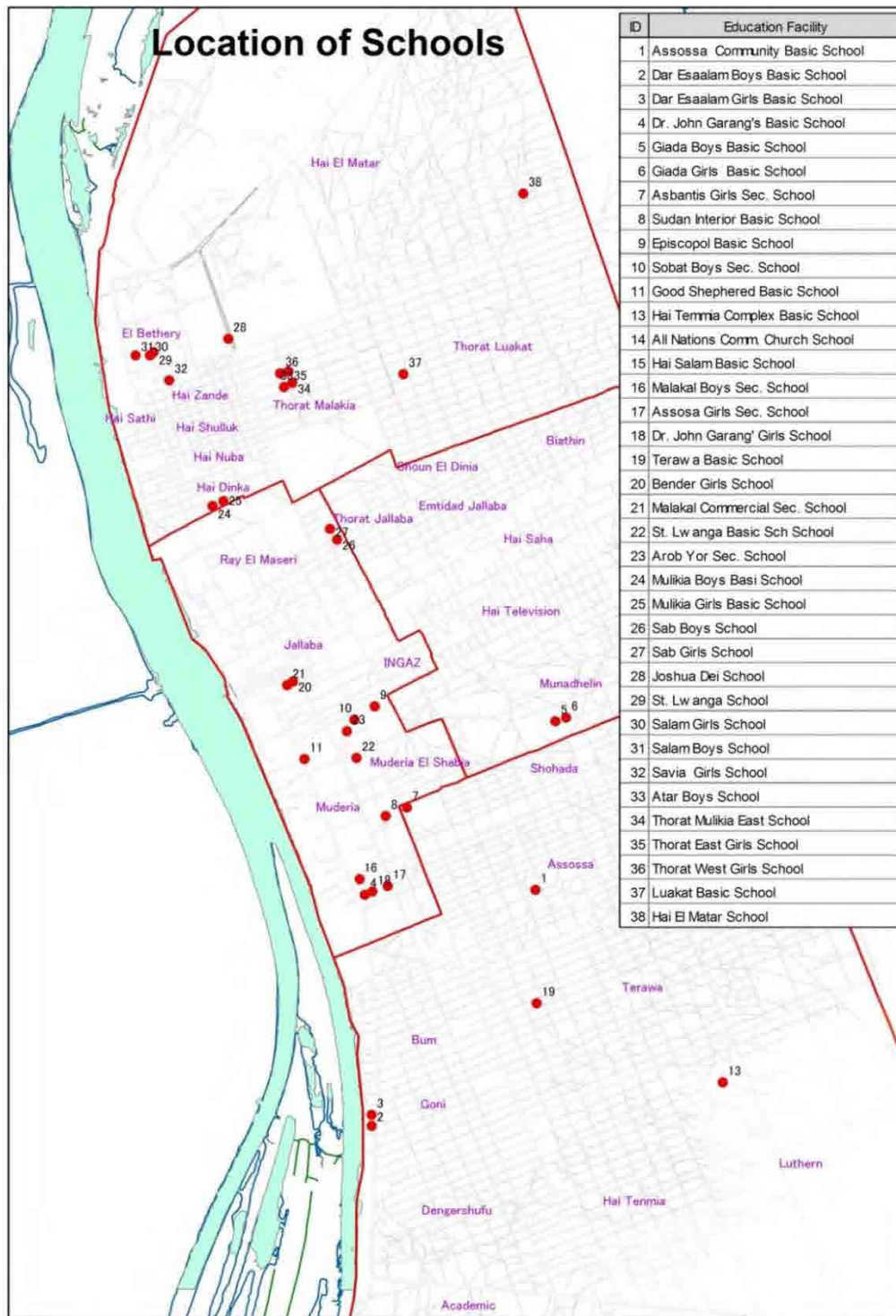
The main facilities of the Education Sector are schools. Primary schools are the most common facilities as more than half of Bomas has primary school.

### 12.6 FINDINGS FROM RELEVANT SURVEY(S)

#### 12.6.1 Household Survey Results

##### Location of Schools

Location of schools identified in the land use survey as a part of town profiling is shown in **Figure 12.6-1**.



Source: Town Profile Survey by JICA Project Team

**Figure 12.6-1 Location Schools in Malakal Town**

### Educational Background of Household Head

Educational backgrounds of heads of household in Malakal Town cover a wide range, from zero schooling to university graduates. While 18% of household heads answered that they have never been to school, 16.2% household head graduated from university schools.

**Table 12.6-1 Educational Level of Household Head**

(As of January 2013)

| No | Answer                             | Respondent | %      |
|----|------------------------------------|------------|--------|
| 1  | Never been to school               | 148        | 18.0%  |
| 2  | Primary School not finished        | 95         | 11.5%  |
| 3  | Primary School finished            | 49         | 6.0%   |
| 4  | Secondary School not finished      | 25         | 3.0%   |
| 5  | Secondary School finished          | 114        | 13.9%  |
| 6  | Post-Secondary School not finished | 22         | 2.7%   |
| 7  | Post-Secondary School finished     | 143        | 17.4%  |
| 8  | University not finished            | 94         | 11.4%  |
| 9  | University finished                | 133        | 16.2%  |
|    | Total                              | 823        | 100.0% |

Source: The Profile Survey by JICA Project Team

### Level of English

More than half people in Malakal Town answered that English is very easy or easy. Around 50% answered that English is not easy, difficult or very difficult.

**Table 12.6-2 Level of Writing and Reading a Simple English Sentence with Good Understanding**

(As of January 2013)

|   | Answer         | Respondent | %      |
|---|----------------|------------|--------|
| 1 | Very easy      | 179        | 20.9%  |
| 2 | Easy           | 254        | 29.6%  |
| 3 | Not easy       | 119        | 13.9%  |
| 4 | Difficult      | 142        | 16.6%  |
| 5 | Very difficult | 164        | 19.1%  |
|   | Total          | 858        | 100.0% |

Source: The Profile Survey by JICA Project Team

### Residents' Opinion for Education Service

Almost half of people surveyed are dissatisfied or very dissatisfied with educational services. Around 20% of people feel educational services are very much satisfactory or satisfactory.

**Table 12.6-3 Level of Satisfaction with Present Educational Services**

(As of January 2013)

| No | Answer              | Respondent | %      |
|----|---------------------|------------|--------|
| 1  | Very much satisfied | 29         | 3.3%   |
| 2  | Satisfied           | 171        | 19.7%  |
| 3  | Neutral             | 250        | 28.8%  |
| 4  | Dissatisfied        | 213        | 24.6%  |
| 5  | Very dissatisfied   | 204        | 23.5%  |
|    | Total               | 867        | 100.0% |

Source: The Profile Survey by JICA Project Team

**Table 12.6-4** below shows the factors that hinder household members from accessing educational services. The most prominent finding is that 86.2% people think that education is expensive. 24.7% of people answered unavailability of adequately trained teachers.

**Table 12.6-4 Issues with Educational Services**

(As of January 2013)

| Answer   | Respondent (Multiple Answer) | %     |
|--|------------------------------|-------|
| Education is expensive                         | 705                          | 86.2% |
| Non-availability of adequate trained teachers  | 202                          | 24.7% |
| No time to go to school because I have to work | 170                          | 20.8% |
| Education facility is far                      | 204                          | 24.9% |
| Cultural hindrances                            | 59                           | 7.2%  |
| Sickness, disability                           | 56                           | 6.8%  |
| Others   | 12                           | 1.5%  |
| My family does not agree that I go to school   | 17                           | 2.1%  |
| Total sample number                            | 818                          | -     |

Source: The Profile Survey by JICA Project Team

## 12.7 PROGRAMMES AND PROJECTS

### 12.7.1 Existing Projects in 2012

There are mainly 6 projects in UNS.

- (i) Construction of complete 2 primary schools with concrete building materials.
- (ii) Construction of complete 3 secondary schools by name Aropyor, Ulang and Akoka.
- (iii) Maintenance of 2 laboratories one in Malakal and the other in Renk.
- (iv) Construction of one pilot alternative education systems centre.
- (v) Rehabilitation of 4 existing primary schools (Malakia girls, Malakia boys, Shaab girls and Shaab boys).
- (vi) Construction of education headquarters.

### 12.7.2 Partner Organizations and Their Projects with MoE in Malakal Town

**Table 12.4-2** shows a list of existing projects in 2011 which was prepared by MoE, UNS and partners. The target area of this work plan covers UNS including Malakal Town. MoE, UNS makes annual work plan with MoE partners such as international organizations and NGOs and implements with them.

## 12.8 NEEDS AND ISSUES

The concerns of the education sector in Malakal Town area are a reflection of the issues in the entire educational system in ROSS. All surveys, point to the fact that in Malakal Town area, issues of quality and equity and cost and access are the more prominent concerns.

### 12.8.1 Different Aspects of Concerns

#### (1) Quality Issues (Primary/Secondary School)

- (i) Limited capacity of teachers: To deliver the class, especially science and mathematics, in English language as required by the South Sudan curriculum
- (ii) Teaching and learning materials: Inadequate supply of textbooks and lack of basic furniture such as water point, latrine, desks and chairs in the schools.
- (iii) Communication and coordination: Weak link and information flow between MOGEI ROSS, State MoE, County Education offices and education development partners.

**(2) Equity/Access Issues (Primary/Secondary School)**

- (i) Lack of school classrooms: Most children are in overcrowded classrooms and the rest of the children are learning in open air. At present, the child to classroom ratio is about 150:1 (UNS) as opposed to the standard ratio of 50:1 as MOGEI decided.
- (ii) Lack of number of primary and secondary school teachers.
- (iii) Inaccessibility to schools particularly during the rainy seasons.

**(3) Other Issues (Primary/Secondary School)**

- (i) Management and leadership capacity: Limited managerial capabilities of education administrators and managers in all levels.
- (ii) Socio-cultural barriers: Existence of negative cultural practices such as early and forced marriage, domestic chores and preference to educating boys affecting girls' attendance and retention rates in the schools.
- (iii) Lack of accommodation or housing for teachers in all the 13 counties of the state.
- (iv) Monitoring and inspection: Limited resources to enable adequate inspection of teacher, students' performance, assess condition of schools, make inventory of resources and monitor distribution of school teaching and learning materials
- (v) Low community participation in education activities due to insufficient knowledge on the importance of education
- (vi) Low salary for teachers

**(4) Alternative Education Systems Issues**

- (i) Lack of alternative education systems centred in communities
- (ii) Lack of practical data on the importance of adult education
- (iii) Lack of trained teachers
- (iv) Negative attitudes towards alternative education systems learning

**(5) Higher Education Issues**

- (i) Lack of qualified teaching staff.
- (ii) Lack of medical science faculty due to the removal from UNU
- (iii) Inadequate infrastructure.
- (iv) Deficiency in books in library.

**(6) Vocational Training Centre Issues**

- (i) Limited capacity of instructors.
- (ii) Inadequate infrastructure and equipment.
- (iii) Unpopular training course in relation to employment issues.

### **12.8.2 General Issues**

The following issues in the education sector were identified through the analysis of the current situation.

#### **(1) To Enhance Education Quality**

The enhancement of education quality, as envisioned by the present study, will be greatly determined by the extent to which a quality labour force including qualified teachers can be provided from within UNS and Malakal Town. As a response to a lack of qualified teachers in Malakal Town, teacher training should be encouraged. Teacher training should include courses not only the science and mathematics content but also that of English as well as educational management.

#### **(2) To Increase Education Access**

By 2022, South Sudan is on track to achieve universal access and completion of free primary education and expand equitable access to post primary education. In meeting this goal, the number of primary schools in southern and eastern Malakal Town is still low. In addition, there is an uneven location of schools. Construction and rehabilitation of schools, therefore, should be rationalized for those who are living relatively far from schools.

#### **(3) To Enhance Literacy and Alternative Education**

Since more than half of people in Malakal Town are not competent at writing English or Arabic according to Education Management Information System (EMIS), it is essential to increase the literacy and functional skills of youth and adults and to provide alternative and accelerated learning opportunities for out of school children. In order to increase the literacy rate, existing partnership in alternative education systems, such as Education Development Centre and UNICEF, should be strengthened and reinforced by encouraging the membership of other participants, especially international organization, NGOs and private sector organizations. Their expertise and resources can be utilized to increase literacy rate.

#### **(4) To Enhance Institutional and Human Capacity**

Strengthening the capacity of education managers, systems and institutions is crucial for improvement of education sector in Malakal Town. A lot of international organizations and NGO currently collaborate with MOE. Moreover, it is necessary to enhance provincial, district and school level administration by training personnel and allocating additional resources, supporting a transfer of financial and operational management decisions in a sustainable way.

### **12.8.3 Consideration for the Comprehensive Plan**

#### **(1) Relationship to the Social Economic Infrastructure Development**

The plans relate to the social and economic infrastructure comprehensive plan in the following ways; to construct educational facilities in response to the future expansion of urban areas; the concept of the neighbourhood unit is proposed as a school area centring on a primary school. This area is identified as a Boma (Block) that is the smallest administrative unit. Construction of primary schools by Boma is the underlying design concept because Boma function effectively as unit of community. To cater for the predicted increase in population and urban area up to 2022, the area to the east of the ring road will need new facilities.

#### **(2) Cooperation with Other Sectors**

Improvement of primary schools will need close cooperation with other sectors that are responsible for environmental arrangements such as securing school route during the rainy season, water supply in school, hygienic environment, electricity and waste disposal. Especially, basic infrastructure such as water supply, school routes and hygienic environment need to be coordinated with improvement of primary schools.

Furthermore, it is essential to implement effective economic policy in order to increase job opportunities in and around Malakal Town for trainees and graduates from MVTC and UNU.

#### **(3) Application to the Comprehensive Plan**

As mentioned above economic self-sustainability can be achieved not only by creation of job opportunities but also by training and more higher education for people. Formation of an information sharing and technical transfer network in the education sector including nearby school facilities to higher educational facilities and MVTC will make the education system more effective.

## **12.9 EDUCATION SECTOR DEVELOPMENT PLAN**

### **12.9.1 Objectives of Education Sector**

**Table 12.9-1** shows the education targets toward 2022 in UNS. There are four main targets. First of all, in accordance with millennium development goals, universal primary education will be achieved by 2015. In light of the 2010 situation for UNS, it seems difficult to attain this target since enrolment rate of UNS was 60% in 2010. Yet, given the prospect for effort of MOE, ROSS, future economic development and international aid for the next 10 years, 100% primary enrolment could be a realistic goal.

Secondly, improvement in literacy rate depends mainly on primary education and alternative education. Since South Sudan has a lot of people who could not attend class, expansion of alternative education is one of the important keys to increase the literacy rate to 70%. Thirdly, to achieve 80% employment rate from MVTC depends on whether industry will develop and create



job opportunities in next the 10 years. Currently, graduates from MVTC do not get job opportunities in UNS since there are not enough industries to hire them.

In addition to that, MVTC should open new courses and improve their curriculum based on job demand in UNS. Finally, it is recommended that UNS utilize UNU graduates for development. Despite being highly educated, few graduates work in UNS now. State government should take appropriate policies to encourage them to work in UNS. According to an administrative staff in UNU, a small minority of graduates work in UNS although the exact percentage is not clear.

**Table 12.9-1 Educational Target 2022 in UNS**

(As of May 2012)

| Education Sector Target for 2022 | Baseline 2010 | Source    | Responsible Spending Agency |
|----------------------------------|---------------|-----------|-----------------------------|
| 100% primary NER                 | 60%           | EMIS, MOE | MOE                         |
| 70% literate                     | 50% (UNS)     | EMIS, MOE | MOE                         |
| 90% Employment rate from MVTC    | -             | MOLPSHRD  | MOLPSHRD                    |
| 70% UNU graduates work at UNS    | -             |           | MOEST                       |

Source: JICA Project Team

**Table 12.9-2** below is school facility target 2022 in Malakal Town. The number of students is an estimate. The target of PCR should be 50.0 in 2022 which mean 50 students will study in a class. In order to do so, number of classrooms should be increased by about 658. Although access to drinking water, latrine and electricity depends on progress in the each sub-sector, improvement of these kinds of facilities will contribute to education quality and students' motivation. Regarding to textbook ratio, every children should have their own textbook.

**Table 12.9-2 School Facility Target 2022 in Malakal Town**

(As of May 2012)

| Indicators                      | Baseline 2010 | Target for 2022 |
|---------------------------------|---------------|-----------------|
| Number of primary school pupils | 31,343        | 49,200          |
| Number of classroom             | 326           | 984             |
| Pupil classroom ratio (PCR)     | 125.4         | 50.0            |
| Access for drinking water       | 53.7%         | 80%             |
| Access for latrine              | 61.0%         | 100%            |
| Access for electricity          | 14.6%         | 50.0%           |
| Pupil English text ratio        | 3.2           | 1.0             |
| Pupil Math text ratio           | 2.0           | 1.0             |

Note: \*Number of students is estimated number based on population forecast

\*PCR only accounts for permanent and semi-permanent classrooms.

Source: JICA Project Team

## 12.9.2 Education Service Strategy

In line with national education policy, education service strategies up to 2022 are made for Malakal Town and UNS. Key strategies are the following.

### Expanding the Network of Schools in an Equitable Manner

- (i) Investing in school infrastructure with a priority to reduce overcrowding in schools with

high student classroom ratios.

- (ii) Improving coordination and enhancing the quality and quantity of interventions in the area of AES.
- (iii) Ensuring the implementation of actions to support girls, sickness disability and minority tribes.

#### Improving the Quality of Instruction, Student Learning Achievement and Retention

- (i) Increasing the number of teachers in response to a planned sector expansion, to reduce the current student teacher ratios
- (ii) Improving and streamlining teacher training.
- (iii) Consolidation the implementation of the new primary education curriculum with adequate support of textbooks and instruction materials with special focus on English education.
- (iv) Satisfying varied educational needs of the poor, indigenous peoples, minority tribes and returnees and other special groups that necessitate involvement in education as a stakeholder

#### Increasing Employment Opportunity for Graduates and Skilled Labour

- (i) Promoting use of MVTC and UNU graduates for development in UNS
- (ii) Responding to changing needs of industries and market incentives in Malakal Town

#### Encouraging Private Sector Participation in Education

- (i) Allowing the provision of school and facilities by the private sector where the government is not able to provide such facilities is in line with the MOE policy.

### **12.9.3 Education Sector Plan**

The foundation for the success of any development effort is an empowered and dynamic populace and a social structure that corresponds to human's right to access quality basic services and productive and economic opportunities through education. With this fundamental notion in mind, the following education sector plan is formulated.

#### Facility and Equipment Rehabilitation/Reconstruction

Facilities and equipment should be rehabilitated so that adequate classes, water facilities, toilet and electricity are available. Generally, primary schools in Malakal Town have 8 classrooms. The priority is to resolve the situation of scarce classes. Classes should be added to the schools which have fewer than 8 classes in order to avoid a two shift system and overcrowded classes.

#### Facility Construction

Lack of schools is a common problem in all the bomas. Therefore, schools should be constructed in a balanced manner in Malakal Town. Additionally, MOE should consider returnees, ethnic minorities and group in poverty. Blue circles in **Figure 12.10-1** are planned locations of school construction within the built-up area of Malakal Town. In addition, some emergency construction of schools is necessary in the eastern area of Ring Road where population is rapidly increasing due to returnees. This emergency construction of schools in the eastern part of Ring Road shall be integrated in the Project for basic human needs (BHN) for Returnees.

### Materials and Equipment

In the present situation, pupils/students share a textbook and are seated directly on the floor. This lack of necessary material and equipment has harmful effects on pupils'/students' performance. Therefore, it is necessary to provide textbooks and school facilities such as desks and chairs to all children. Provision of materials and equipment leads to an increase in pupils'/students' performance and motivation. In order to provide materials and equipment, MOE needs to work cooperatively with the community, NGO, donors and ROSS. Establishment of a text book sharing system from graduate to students is a possible solution for the community. MOE shall convey to the NGO, donors and ROSS the real state of affairs and make a request to them.

### Capacity Development

Capacity Development of teachers and staff in MOE is necessary to improve effectiveness. This should focus on mathematics, science and English teaching.

## **12.10 EDUCATION SECTOR PROJECT**

### **(1) Primary School Establishment and Renovation Project (ED-1)**

Objectives: To increase learning spaces to enhance effective learning for Malakal Town.

Location: Hai Saha, Hai El Matar, Assossa and Dengershufu (Hai Tenmia) primary school

Scope of the Project: Construction of (1 school):

Class block No 1, Class block No 2, Office block

4-cubicle toilet×2

2 No Sewage disposal pit

2 cubicle toilet

1 No Sewage disposal pit

Engineering design and supervision

Total Cost (4 schools): US\$2.30 million.

### **(2) Strengthening Mathematics and Science Education Project (ED-2)**

Objectives: To provide technical guidance and advice on training for mathematics and science teachers at the primary level. (Technical Cooperation)

Location: Upper Nile State

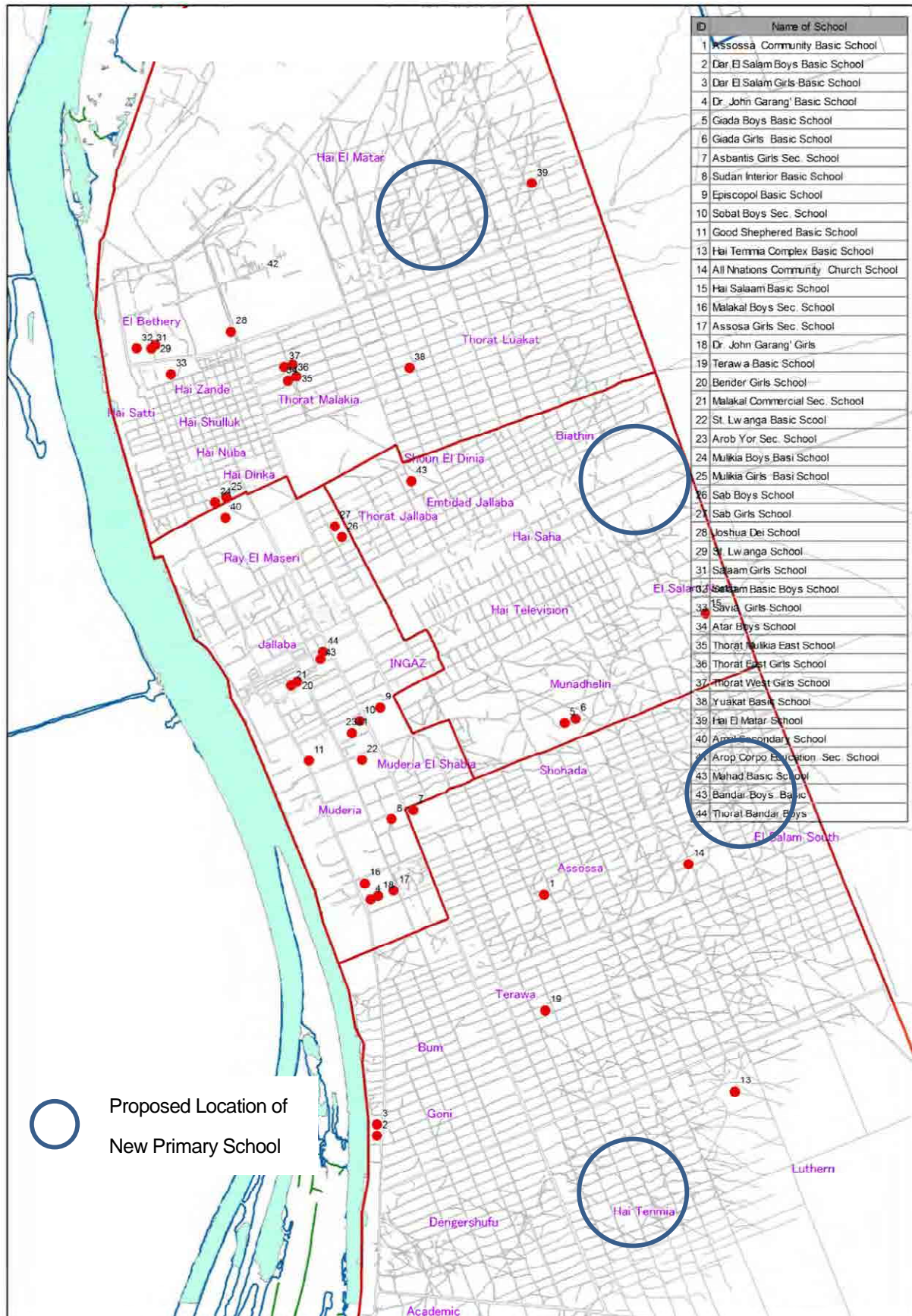
Scope of the Project: Technical Transfer of:

Assessing current teacher capacity.

Assessing the capacity of the government to plan and implement teacher training.

Providing cooperation for current teacher training.

Total Cost: US\$3.00 million.



Source: JICA Project Team

**Figure 12.10-1 Proposed Locations for New Primary Schools in Malakal Town**

**(3) Revitalisation of Medical/Health Faculty in UNU Project (HE-4)**

Refer to **Chapter 13**, Health Sector.

**(4) Malakal Vocational Training Centre Reinforcement Project (EC-11)**

Refer to **Chapter 16**, Economic Development Sector.

**(5) Capacity Building of MOE Project (ED-3)**

Objectives: To improve and strengthen the management, supervision and monitoring abilities for staffs and inspectors at MoE

Location: MoE in UNS

Scope of the Project: Technical Transfer of:

Assessing the capacity of the MoE to manage schools

Assessing the schools' situation and teachers' performance by staff of the MoE

Equipment provision: 3 bikes, 1 car (four-wheel drive )

**(6) Malakal Teacher's Training School Construction and Renovation Project (ED-4)**

Objectives: To construct training school for teachers to reinforce teacher's abilities

Location: Malakal, UNS

Scope of the Project: Construction/Renovation of teacher's school in Malakal

Equipment Provision: audio-visual aids, computers

**(7) Malakal teacher's Dormitory Reconstruction Project (ED-5)**

Objectives: Reconstruction of a teacher's dormitory to improve living conditions.

Location: Malakal, UNS

Scope of the Project: Reconstruction of teacher's dormitory in Malakal

**(8) Malakal Primary School Construction Project (ED-6)**

Objectives: To increase learning spaces to enhance effective learning for Malakal Town.

Location: Corresponding to the pupil classroom ratio (PCR) by boma.

Scope of the Project: Construction of primary schools and primary school classrooms where PCR is high.

**(9) Malakal Middle School Construction Project (ED-7)**

Objectives: To increase learning spaces to enhance effective learning for Malakal Town.

Location: Corresponding to the pupil classroom ratio (PCR) by boma.

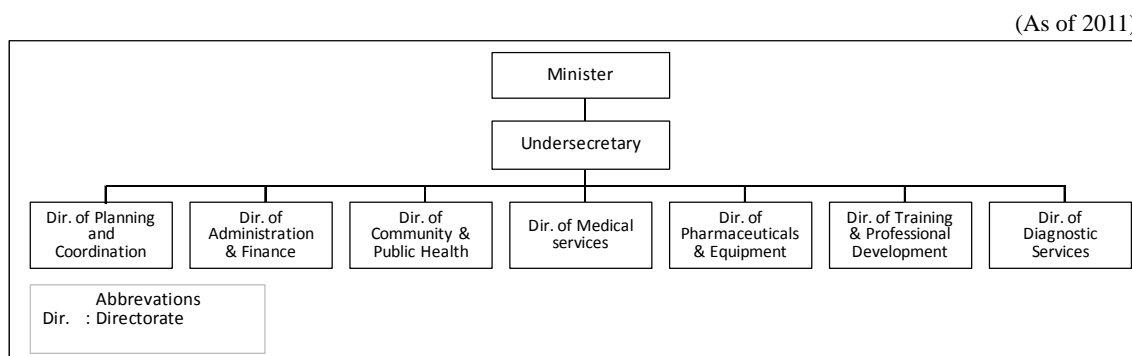
Scope of the Project: Construction of middle schools and middle school classrooms where PCR is high.

## CHAPTER 13 HEALTH

In this chapter, following perspectives regarding the Health Sector are presented and analyzed; 1) Institutional Framework, 2) Policies and Strategies, 3) Financial Resources, 4) Operation and Maintenance Systems, 5) Facilities and Staffing, 6) Findings from Relevant Survey(s), 7) Programmes and Projects, and 8) Needs and Issues. And then in section, 9) development plans are formulated based on the present situation, needs and issues, and in 10) development projects are proposed from technical point of view.

### 13.1 INSTITUTIONAL FRAMEWORK

Since December 2011, the Ministry of Health (MOH) of the central government was reorganized three times. The MOH under the new government retained these changes and consists of seven directorates shown in **Figure 13.1-1**.



Source: "Health Sector Development Plan 2012 to 2016", Ministry of Health, ROSS

**Figure 13.1-1 Organization Structure of MOH, ROSS**

After the reorganization of the central MOH in December 2010 and the establishment of a new government system following Republic of South Sudan (ROSS) independence in July 2011, the MOH began working on job regulations to enhance the organization, with the Directorate of Planning and Coordination taking a central role. Currently, a draft of Key Description and Specifications of the central MOH has been prepared and waiting for an approval by the Cabinet. The roles and functions given to all Directorates of the MOH are shown in **Table 13.1-1**.

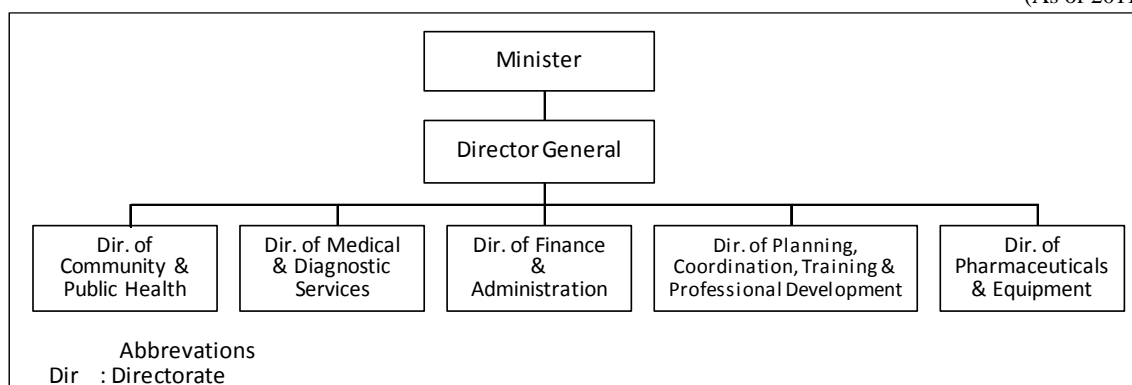
**Table 13.1-1 Roles and Functions of all Directorates in the Central MOH**

| Directorate                         | Mandate   |
|-------------------------------------|---|
| Planning & Coordination             | To plan, develop and coordinate health policies & programs.<br>- Support directorates of planning & budgeting,<br>- Coordinate resources mobilization,<br>- Manage planning & budgeting cycle,<br>- Develop & supervise construction of quality health infrastructure<br>- Network with other government departments,<br>- Develop partners & NGOs,<br>- Develop a monitoring & evaluation system   |
| Administration & Finance            | To establish effective & efficient finance, human resources management, procurement & logistical services.<br>- Application of standard procurement services,<br>- Offer effective & efficient administrative support services,<br>- Ensure proper management of CMOH staff,<br>- Collaborate with the Directorate of Planning & Coordination in preparation of the budget  |
| Community & Public Health           | To promote strategies on health & disease prevention and ensure their implementation at the different levels of the health sector.  |
| Medical Services                    | To promote quality hospital services those are affordable, accessible and sustainable.  |
| Pharmaceuticals & Equipment         | To ensure that safe efficacious and good quality drugs and medical equipment are selected, quantified, procured, stored, distributed, prescribed and made available to the public.  |
| Training & Professional Development | To development of human resources for health (HRH).<br>- Initiate polices, plans and guidelines for HRH training in liaison with the directorate of planning & coordination,<br>- Develop a HRH training strategy & curricula,<br>- Manage continuing professional development program and coordinate scholarships,<br>- Develop strategies for institutional support, including the HRH training institutions & supervision for efficient health care system,<br>- Coordinate and supervise pre-service & in-service training of all health cadres |
| Diagnostic Services                 | To provide high quality laboratory, radiologic & imaging services to hospitals.   |

Source: HSDP 2012-2016, MOH, January 2012

These job regulations recommend that the organizational structure of the State Ministry of Health, UNS (MoH) being standardized in parallel with the central MOH's reorganization. However, these job regulations have not yet been formally approved, and the MoH's organizational reforms are still in a transitional period.

(As of 2011)



Source: Draft of Key Job Description and Specifications of MOH, ROSS and MoH, UNS

**Figure 13.1-2 Recommended Organization Structure for MoH, UNS<sup>1</sup>**

<sup>1</sup> Source: "ROSS, Draft of Key Job Description and Specifications, 2011" of central MOH and state MoH,

## **13.2 POLICIES AND STRATEGIES**

The World Health Organization (WHO) calculated that 2.5 of health staff per 1,000 people is necessary for achieving the targets of MDGs, such as Maternal Mortality Rate (MMR), Infant Mortality Rate (IMR) as well as to control of the prevalence of HIV/AIDS (Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome), Malaria and infectious diseases. In the case of ROSS, there are 1.2 health staff per 1,000 people, and it obviously shows the shortage of human resources in the health sector. Policy statements of the state MoH on priorities for health system strengthening in Upper Nile State (UNS) are followings.

### **13.2.1 Policy Statement on Reducing Inequalities in Access to Health Care**

The state MoH, mindful of the current inequalities in the provision of health services, shall ensure a marked increase throughout the state. To achieve this, the SMOH shall mobilize individuals and communities to play a major part in all aspects of health care delivery. It shall also develop effective partnerships with both funders and implementers of health services and systems.

### **13.2.2 Policy Statement on Community Participation**

The MoH affirms that each community in the state has the right to participate individually and collectively in planning and implementation of its own health care. Therefore, the SHOH shall ensure that representatives of communities become actively part of the management boards and committees. This is important to ensure that they participate in decision-making processes and promote community ownership at State, County, Payam, Boma and community levels.

## **13.3 FINANCIAL RESOURCES**

### **13.3.1 Funding of Policy Implementation**

The funding to implement this policy shall be provided by the government of UNS and various donors including the Multi Donor Trust Fund (MDTF) umbrella project. Several different funding mechanisms will be used including funds received through the national budget and grants within the central government's overall framework of poverty reduction.

### **13.3.2 Annual Plans and Guidelines**

The MoH shall develop annual plans and guidelines for all levels of the health system that includes details of activities. The annual plan shall not give detailed information on financial allocations. These shall be developed in consultations with the State Ministry of Finance and Economic Planning, UNS.

The UNS draft budget for 2011/2012 allocated a total amount of South Sudan Pounds (SSP) 185,135,887 to six sectors namely;



1. Accountability and Economic Functions SSP20,298,434 (11%),
2. Education SSP25,586,312 (14%),
3. Health SSP2,404,222 (7%),
4. Infrastructure SSP24,596,151 (13%),
5. Natural Resources and Social Development SSP14,742,604 (8%), and
6. Public Administration & Rule of Law SSP65,003,137 (35%).

**Table 13.3-1 State Ministry of Health 2011/12 Budget Estimates by Expenditure Item**

| Code | Category   | 2011 Expenditure | 2012/2012 Budget |
|------|--|------------------|------------------|
| 21   | Salary   | 4,806,896        | 8,848,467        |
| 2110 | Basic Salaries & Wages, Permanent Employees        | 4,801,257        | 7,605,077        |
| 2115 | Job Specific Allowances                            | 0                | 73,053           |
| 2120 | Pension  | 5,639            | 920,337          |
| 2125 | Gratuities   | 0                | 0                |
| 2130 | Conditional Salary Transfers                       | 0                | 0                |
| 2135 | Overtime & Incentives                              | 0                | 250,000          |
| 22   | Operation  | 453,681          | 587,162          |
| 2204 | Contract Employment & Professional Services        | 180              | 21,000           |
| 2212 | Telecommunications & Postal Services               | 13,000           | 5,000            |
| 2216 | Domestic Travel                                    | 27,020           | 13,960           |
| 2220 | Foreign Travel                                     | 0                | 12,500           |
| 2224 | Printing & Advertising                             | 16,700           | 10,000           |
| 2228 | Rent & Equipment Hire                              | 38,000           | 25,000           |
| 2232 | Training, Workshops & Conferences                  | 0                | 80,000           |
| 2236 | Hospitality & Entertainment                        | 4,800            | 35,000           |
| 2240 | Insurance  | 15,091           | 10,000           |
| 2244 | Specialized Supplies                               | 0                | 5,000            |
| 2248 | Office & General Supplies                          | 0                | 25,000           |
| 2252 | Fuel & Lubricants                                  | 0                | 50,000           |
| 2256 | Vehicle Maintenance                                | 23,000           | 13,000           |
| 2260 | Other Maintenance                                  | 241,130          | 10,000           |
| 2264 | Medical Costs                                      | 40,840           | 48,000           |
| 2268 | Emergency & Disaster Relief                        | 13,920           | 50,000           |
| 2272 | Grants & Loans to Businesses                       | 0                | 0                |
| 2276 | Donations  | 20,000           | 0                |
| 2280 | Conditional Operating Transfers                    | 0                | 138,000          |
| 2284 | Other Operating Expenses                           | 0                | 20,702           |
| 28   | Capital  | 1,184,827        | 2,968,593        |
| 2805 | Furniture & General Equipment                      | 21,516           | 243,678          |
| 2810 | Vehicles & Other Transport Equipment               | 0                | 390,000          |
| 2815 | Specialized Plant, Equipment & Machinery           | 0                | 423,563          |
| 2820 | Preparation, Design & Supervision of Capital Works | 0                | 246,600          |
| 2825 | Construction & Civil Works                         | 963,311          | 420,290          |
| 2830 | Rehabilitation & Renovation of Assets              | 200,000          | 567,890          |
| 2835 | Conditional Capital Transfers                      | 0                | 676,599          |
|      | Total  | 6,445,404        | 12,404,222       |

Source: Government of Upper Nile State Draft Budget, 2011/12, State Ministry of Finance, UNS

## 13.4 OPERATION AND MAINTENANCE SYSTEM

### 13.4.1 Overview of Health Condition

As shown in **Table 13.4-1**, general health condition is relatively low in ROSS compared with neighbouring countries.

**Table 13.4-1 Regional Composition of Key Health Indicator**

| Indicators                                       | ROSS  | Uganda | Kenya | Tanzania |
|--|-------|--------|-------|----------|
| Maternal Mortality Rate (per 100,000 live birth) | 2,054 | 550    | 560   | 950      |
| Births Attended by Skilled Personnel (%)         | 15    | 42     | 42    | 46       |
| Infant Mortality Rate (per 1,000 live birth)     | 84    | 84     | 81    | 67       |
| DPT3 Coverage (12-23 months) (%)                 | 11.9  | 64     | 85    | 84       |

Source: South Sudan Development Plan; 2011-2013, MOH, ROSS January 2012, Southern Sudan Household Health Survey (SHHS) 2006, Southern Sudan Household Health Survey (SHHS) 2010

### 13.4.2 Health Service Provision

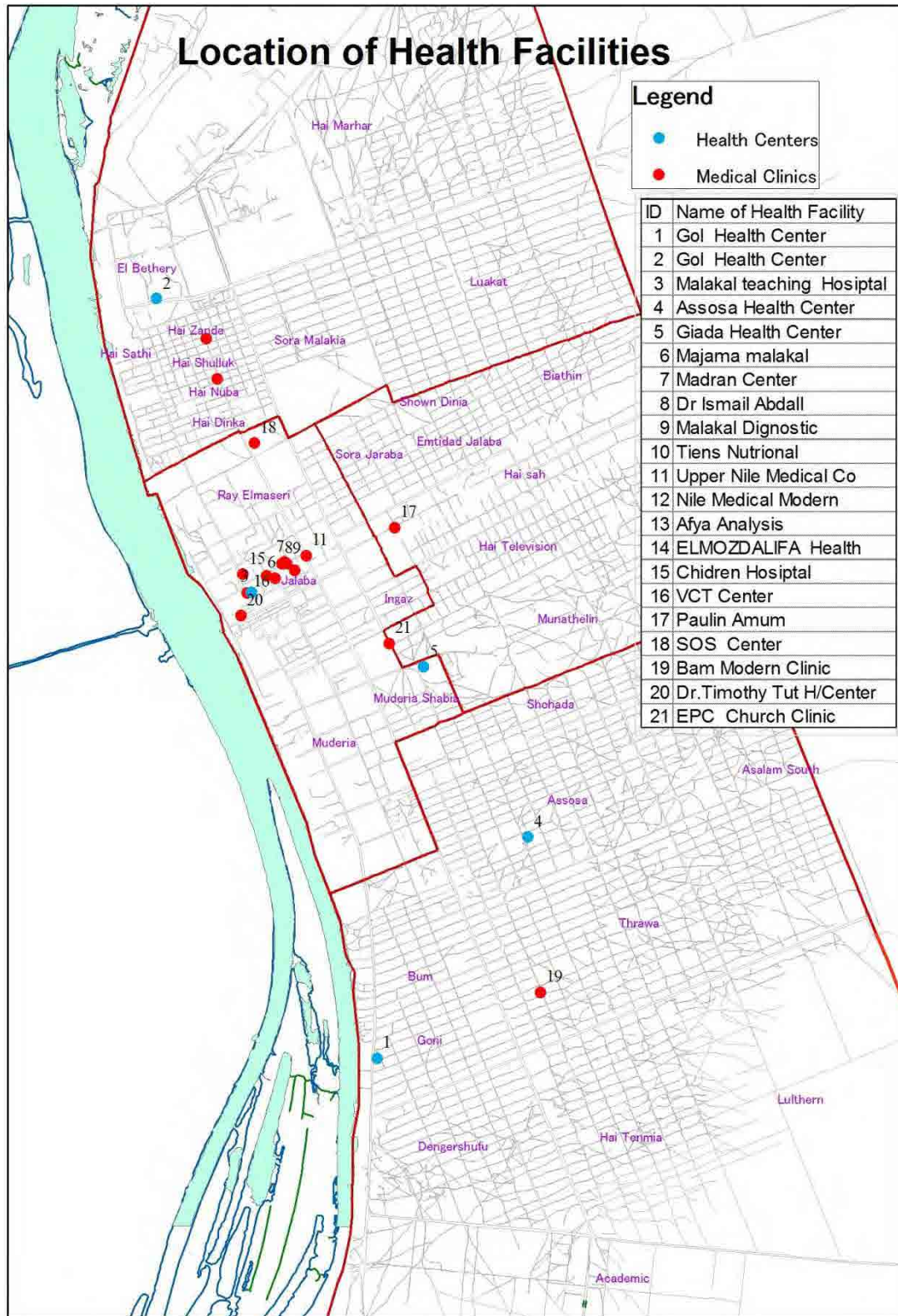
In the state, three quarters of the facilities provide services to sick children (94% treat diarrhoea; 97% treat Malaria; 76% treat respiratory infections), 16% of the facilities conduct growth monitoring, 10 (8%) centres provide supplementary feeding, and seven (6%) therapeutic feeding for the severely malnourished. Immunization is done in 41% of the health facilities.

**Table 13.4-2 Health Service Provision in UNS**

| County         | ANC*      | % ANC       | Delivery Services | % DEL S   | PNC *     | % PNC        | PMTCT *   | % PMTCT   | Growth Monitoring | % Growth M  | EPI *     | % EPI     |
|----------------|-----------|-------------|-------------------|-----------|-----------|--------------|-----------|-----------|-------------------|-------------|-----------|-----------|
| Renk           | 3         | 25.0        | 3                 | 25        | 3         | 25.00        | 1         | 8         | 3                 | 25          | 3         | 25        |
| Manyo          | 3         | 33.3        | 2                 | 22        | 1         | 11.11        | 1         | 11        | 0                 | 0           | 2         | 22        |
| Fashoda        | 2         | 16.7        | 3                 | 25        | 3         | 25.00        | 1         | 8         | 2                 | 17          | 10        | 83        |
| Melut          | 8         | 88.9        | 4                 | 44        | 3         | 33.33        | 1         | 11        | 1                 | 11          | 9         | 100       |
| Maban          | 2         | 20.0        | 4                 | 49        | 1         | 10.00        | 1         | 10        | 4                 | 40          | 2         | 20        |
| Maiwut         | 3         | 60.0        | 3                 | 60        | 0         | 0.00         | 1         | 20        | 0                 | 0           | 2         | 40        |
| Luakpiny/Nasir | 3         | 23.1        | 2                 | 15        | 1         | 7.69         |           | 8         | 1                 | 8           | 3         | 23        |
| Longochuk      | 5         | 62.5        | 5                 | 62        | 1         | 12.50        | 0         | 0         | 0                 | 0           | 1         | 12.5      |
| Ulang          | 0         | 0.0         | 2                 | 25        | 0         | 0.00         | 1         | 12.5      | 1                 | 12.5        | 1         | 12.5      |
| Baliet         | 4         | 57.1        | 6                 | 86        | 0         | 0.00         | 0         | 0         | 2                 | 28.5        | 7         | 100       |
| Malakal        | 11        | 52.4        | 4                 | 19        | 1         | 4.76         | 4         | 19        | 5                 | 24          | 6         | 28.5      |
| Panyikang      | 3         | 42.9        | 3                 | 43        | 2         | 28.57        | 0         | 0         | 1                 | 14          | 4         | 57        |
| <b>Total</b>   | <b>47</b> | <b>38.8</b> | <b>41</b>         | <b>34</b> | <b>16</b> | <b>13.22</b> | <b>12</b> | <b>10</b> | <b>20</b>         | <b>16.5</b> | <b>50</b> | <b>41</b> |

\*ANC : Ante Natal Care, PNC:Pre Natal Care, PMTCT: Prevention of Mother to Child Transmission, EPI: Expanded Programme on Immunization

Source: Health Facility Mapping 2010, Ministry of Health, Government of South Sudan (GOSS)



Source: Land Use Survey by JICA Project Team

**Figure 13.4-1 Location of Existing Health Facilities**

**Table 13.4-3** shows the number of consultations attended in the health facilities from January to December 2008.

**Table 13.4-3 Health Outcomes in UNS**

| County         | Out patients   | In-patients   | ANC patients | Delivery     | Children Immunized | Children Immunized DPT3* | Pregnant women TT | Women 15-49 received TT |
|----------------|----------------|---------------|--------------|--------------|--------------------|--------------------------|-------------------|-------------------------|
| Renk           | 81,638         | 3,622         | 649          | 2,606        | 51,111             | 32,516                   | 4,844             | 16,474                  |
| Manyo          | 17,952         | 628           | 1206         | 300          | 6,854              | 3,164                    | 4,789             | 1,859                   |
| Fashoda        | 32,397         | 912           | -            | 105          | 3,225              | 1,953                    | 1,021             | 1,271                   |
| Melut          | 15,665         | 1,200         | 1295         | 237          | 13,627             | 8,436                    | 4,487             | 3,698                   |
| Maban          | 37,344         | 7,000         | 300          | 67           | -                  | -                        | -                 | -                       |
| Maiwut         | 9,725          | 1,090         | 131          | 96           | -                  | -                        | -                 | -                       |
| Luakpiny/Nasir | 51,032         | 5,210         | 3491         | 216          | 2,553              | 771                      | 2,605             | 380                     |
| Longochuk      | 17,264         | 0             | 400          | 350          | -                  | -                        | -                 | -                       |
| Ulang          | 6,246          | 400           | .            | 215          | -                  | -                        | -                 | -                       |
| Baliet         | 40,826         | 145           | .            | 522          | -                  | -                        | -                 | -                       |
| Malakal        | 20,622         | 5,220         | 21           | 592          | 26,021             | 19,000                   | 500               | 320                     |
| Panyikang      | 29,684         | 328           | 443          | 149          | 2,158              | 354                      | 643               | 575                     |
| <b>Total</b>   | <b>360,395</b> | <b>25,755</b> | <b>7,936</b> | <b>5,455</b> | <b>105,549</b>     | <b>66,194</b>            | <b>18,889</b>     | <b>24,577</b>           |

\*DPT3:three doses of the combined diphtheria/ pertussis/ tetanus vaccine, TT: tetanus toxoid.

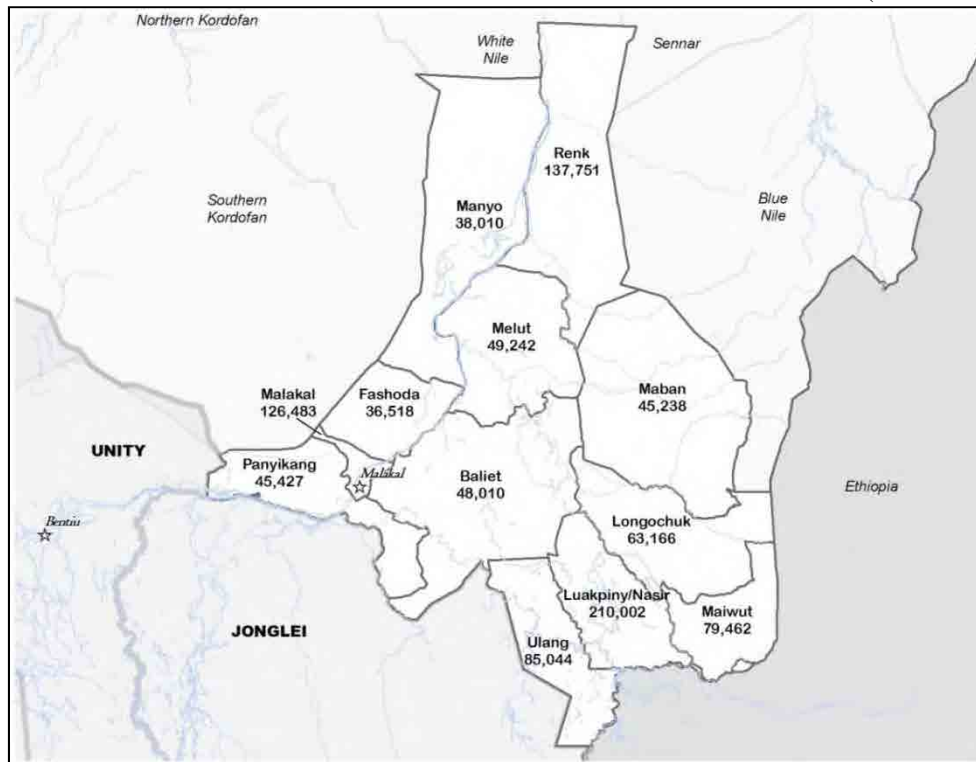
Source: Health Facility Mapping 2010, Ministry of Health, GOSS

## 13.5 FACILITIES AND STAFFING

### 13.5.1 Health Facilities

UNS health care system has one teaching hospital in Malakal Town, four County hospitals in Renk, Melut, Luakpini, and Longochuck, eight specialized, private or other hospitals including military hospitals in Renk and Luakpini, 36 Primary Health Care Centre (PHCC) and 72 Primary Health Care Unit (PHCU). Within Malakal Town health clinics are concentrated in the central area and few medic clinics and health centres operate in Southern and Eastern areas.

(As of 2011)



Source: “Health Sector Development Plan 2012 to 2016”, Ministry of Health, ROSS

**Figure 13.5-1 Population by Counties in UNS**

**Table 13.5-1 Health Facilities Inventory of UNS**

| County         | Teaching Hospital | County Hospital | PHCC | PHCU | Other                     | Total |
|----------------|-------------------|-----------------|------|------|---------------------------|-------|
| Renk           |                   | 1               | 5    | 5    | 1 (other)                 | 12    |
| Manyo          |                   |                 | 4    | 5    |                           | 9     |
| Fashoda        |                   |                 | 2    | 9    | 1 (private)               | 12    |
| Melut          |                   | 1               | 1    | 7    |                           | 9     |
| Maban          |                   |                 | 2    | 8    |                           | 10    |
| Maiwut         |                   |                 | 2    | 3    |                           | 5     |
| Luakpiny/Nasir |                   | 1               | 3    | 8    | 1 (other)                 | 13    |
| Longochuk      |                   | 1               | 3    | 4    |                           | 8     |
| Ulang          |                   |                 | 2    | 6    |                           | 8     |
| Baliyet        |                   |                 | 1    | 6    |                           | 7     |
| Malakal        | 1                 |                 | 8    | 7    | 1 (private) 4 specialized | 21    |
| Panyikang      |                   |                 | 3    | 4    |                           | 7     |
| Total          |                   | 4               | 36   | 72   | 8                         | 121   |

Source: Health Facility Mapping 2010, Ministry of Health, GOSS

**Table 13.5-2** includes the physical structure of UNS facilities. Almost half of the facilities in UNS are in good structural condition, almost one quarter need complete reconstruction, 11% need major renovation, and 18% need minor renovation.

**Table 13.5-2 Physical Structure of Health Facilities in UNS**

| County         | Good Condition | Minor Renovation | Major Renovation | New Building | Total | % Minor | % Major | % New |
|----------------|----------------|------------------|------------------|--------------|-------|---------|---------|-------|
| Renk           | 11             | 6                | 2                | 3            | 22    | 27.27   | 9.09    | 13.64 |
| Manyo          | 5              | 3                | 2                | 3            | 13    | 23.08   | 15.38   | 23.08 |
| Fashoda        | 8              | 1                | 1                | 3            | 13    | 7.69    | 7.69    | 23.08 |
| Melut          | 5              | 1                | 0                | 3            | 9     | 11.11   | 0.00    | 33.33 |
| Maban          | 8              | 1                | 3                | 1            | 13    | 7.69    | 23.08   | 7.69  |
| Maiwut         | 3              | 1                | 0                | 7            | 11    | 9.09    | 0.00    | 63.64 |
| Luakpiny/Nasir | 7              | 6                | 1                | 3            | 17    | 35.29   | 5.88    | 17.65 |
| Longochuk      | 3              | 1                | 0                | 5            | 9     | 11.11   | 0.00    | 55.56 |
| Ulang          | 7              | 1                | 0                | 0            | 8     | 12.50   | 0.00    | 0.00  |
| Baliet         | 6              | 2                | 1                | 0            | 9     | 22.22   | 11.11   | 0.00  |
| Malakal        | 8              | 6                | 6                | 6            | 26    | 23.08   | 23.08   | 23.08 |
| Panyikang      | 6              | 0                | 1                | 2            | 9     | 0.00    | 11.11   | 22.22 |
| Total          | 77             | 29               | 17               | 36           | 159   | 18.24   | 10.69   | 22.64 |

Source: Health Facility Mapping 2010, Ministry of Health, GOSS

The location of existing health facilities are shown in **Figure 13.4-1**.

### 13.5.2 Human Resources

ROSS has a critical shortage of all professional health cadres and these cadres are disproportionately based in urban areas. Consequently, health services in the rural areas are provided by less skilled health workers, known as Community Health Workers (CHWs). Mid-level health cadres, such as CHWs, community midwives (CM), maternal and child health workers (MCHWs) and home health promoters (HHPs), provide health services in the community.

The lack of a clear retention policy and plan, coupled with poor HRH management systems and poor working environment has led to high staff turnover and staff absenteeism, all of which compromise productivity.

The current capacity and intake of health training institutions limit the potential for a rapid scale up in critical cadres. Mid-level health workers, such as nurses, midwives, laboratory technicians and CHWs, are trained in the state hospitals, which is not the case for other professionals.

In 2010 there were 39 doctors, 471 nurses; 56 midwives; 38 clinical officers; 41 laboratory technicians and 50 pharmacists providing services in UNS. The indicators show on average 24,000 people per doctor; 2,407 people per nurse; 17,221 people per midwife. Distribution per county is shown in **Table 13.5-3**.

**Table 13.5-3 Distribution of Health Human Resources by Categories and by County in UNS**

| County         | Population     | Doctor    | Nurse      | Midwife   | Clinical  | Lab Tech  | Pharmacy  | Pop/Doctor    | Pop/Nurse    | Pop/Midwife   |
|----------------|----------------|-----------|------------|-----------|-----------|-----------|-----------|---------------|--------------|---------------|
| Renk           | 137,751        | 7         | 5          | 5         | 1         | 4         | 2         | 19,679        | 27,550       | 27,550        |
| Manyo          | 38,010         | 1         | 25         | 7         | 2         | 3         | 6         | 38,010        | 1,520        | 5,430         |
| Fashoda        | 36,518         | 0         | 21         | 4         | 3         | 1         | 5         | -             | 1,739        | 9,130         |
| Melut          | 49,242         | 4         | 5          | 3         | 2         | 3         | 4         | 12,311        | -            | 16,414        |
| Maban          | 45,238         | 3         | 9          | 4         | 0         | 1         | 2         | 15,079        | 5,026        | 11,310        |
| Maiwut         | 79,462         | 0         | 11         | 0         | 2         | 2         | 5         | -             | 7,224        | -             |
| Luakpiny/Nasir | 210,002        | 4         | 12         | 2         | 2         | 4         | 0         | 52,501        | 17,500       | 105,001       |
| Longochuk      | 63,266         | 3         | 6          | 1         | 0         | 2         | 9         | 21,055        | 10,528       | 63,166        |
| Ulang          | 85,044         | 0         | 0          | 1         | 1         | 1         | 0         | -             | -            | 85,044        |
| Baliet         | 48,044         | 1         | 11         | 7         | 0         | 2         | 1         | 48,010        | 4,365        | 6,859         |
| Malakal        | 126,483        | 16        | 361        | 22        | 19        | 18        | 15        | 7,905         | 350          | 5,749         |
| Panyikang      | 45,427         | 0         | 5          | 0         | 6         | 0         | 1         | -             | 9,085        | -             |
| <b>Total</b>   | <b>964,353</b> | <b>39</b> | <b>471</b> | <b>56</b> | <b>38</b> | <b>41</b> | <b>50</b> | <b>24,727</b> | <b>2,074</b> | <b>17,221</b> |

Source: Health Facility Mapping 2010, Ministry of Health, GOSS



The distribution of dental staff, EPI(Expanded Program of Immunization staff, auxiliary clinical staff, other maternity officers and nutrition officers is shown in **Table 13.5-4**. The number of auxiliary clinical staff is 225 and the maternity officers are 192. There are 67 EPI) officers but no nutrition officers in UNS.

**Table 13.5-4 Distribution of HR, by Categories and Counties in UNS\***

| County         | Dental   | EPI       | Aux Clinical | Maternity  | Nutrition Officer |
|----------------|----------|-----------|--------------|------------|-------------------|
| Renk           | 1        | 0         | 8            | 0          | 0                 |
| Manyo          | 0        | 2         | 7            | 10         | 0                 |
| Fashoda        | 0        | 4         | 19           | 0          | 0                 |
| Melut          | 0        | 20        | 26           | 3          | 0                 |
| Maban          | 0        | 1         | 25           | 0          | 0                 |
| Maiwut         | 0        | 2         | 27           | 19         | 0                 |
| Luakpiny/Nasir | 0        | 16        | 27           | 32         | 0                 |
| Longochuk      | 0        | 6         | 30           | 11         | 0                 |
| Ulang          | 0        | 4         | 18           | 6          | 0                 |
| Baliet         | 0        | 1         | 11           | 2          | 0                 |
| Malakal        | 5        | 6         | 17           | 100        | 0                 |
| Panyikang      | 0        | 5         | 10           | 9          | 0                 |
| <b>Total</b>   | <b>6</b> | <b>67</b> | <b>225</b>   | <b>192</b> | <b>0</b>          |

(\*) in addition to the above the mapping registered a total 451 administration staff and 3 classified as miscellaneous.  
Source: Health Facility Mapping 2010, Ministry of Health, GOSS

With reference to management, out of 159 health facilities in UNS, 77 (48.43%) are managed by government; five (3.14%) are managed by the private sector; 72 (45.28%) are managed by the NGOs; and 16 (10.06%) are managed by the communities.

## 13.6 FINDINGS FROM RELEVANT SURVEY(S)

### 13.6.1 Results of Household Survey

The Sudan Household Health Survey, conducted in 2006, was the first nationwide survey in two decades that covered key social development indicators including child mortality, nutrition, reproductive health and HIV/AIDS compared with Juba.

**Table 13.6-1 Social Development Indicators**

| County           | Measles immunization coverage (%) | Fully immunized children (%) | Household availability of Mosquito-net (%) | Use of improved drinking water sources (%) |
|------------------|-----------------------------------|------------------------------|--|--|
|                  | Children aged 12-23 months        |                              |  |  |
| Upper Nile State | 54.6                              | 28.5                         | 68.5                                       | 60.0                                       |

Source: Sudan Household Health Survey (SHHS), 2006

## 13.7 PROGRAMMES AND PROJECTS

The MoH, UNS is committed to focusing on 24 priority diseases as listed in the table below. It is important to note that securing an effective health system is critical to combating major diseases. Therefore, the MoH shall invest in health systems to increase the efficiency of health care delivery, and increase the coverage of quality, essential health services. It shall also promote collaborative multi-sectorial effort in addressing the priority diseases.

**Table 13.7-1 Priority Diseases for Integrated Disease Surveillance & Response**

(As of 2011)

|                                       |  |
|---------------------------------------|--|
| Cholera                               | HIV/AIDS                                 |
| Bloody diarrhoea                      | STIs                                     |
| Measles                               | Malaria                                  |
| Yellow fever                          | Trypanosomiasis                          |
| Meningococcal meningitis              | Tuberculosis (TB)                        |
| Viral haemorrhagic fevers             | Onchocerciasis                           |
| Guinea worm                           | Rabies                                   |
| AFP                                   | Lymphatic filariasis                     |
| Neonatal tetanus (NNT)                | Kala Azar                                |
| Leprosy                               | Schistosomiasis                          |
| Diarrhoea in under 5 years            | Acute jaundice syndrome                  |
| Acute respiratory illness (ARI<5 yr.) | Avian influenza (included recently-2006) |

Note: Priority diseases recommended by IDSR working group.

## 13.8 NEEDS AND ISSUES

### 13.8.1 Issues Found in Malakal

As for the health condition in Malakal Town, the followings are issues to be addressed.

- (i) High maternal mortality rate
- (ii) Low DPT3 (three doses of the combined diphtheria/ pertussis/ tetanus vaccine) Coverage (12-23 months) rate
- (iii) High incidental rate of Malaria disease

As for the health facilities in Malakal Town, the followings are challenges to be addressed:

- (i) Low coverage of health services.
- (ii) The poor condition of the few functional health facilities that exist
- (iii) The Unequally distributed access, especially in the new housing area
- (iv) The fragmented health system.
- (v) Lack of basic equipment to operate the facilities
- (vi) The unhealthy environment in terms of sanitation including open defecation, stagnated sewer and drainage.

As for the human resources for health services for Malakal Town, the followings are challenges to be addressed:

- (i) Limited capacity in various areas of need.
- (ii) Unskilled workers attending to pregnancy and child birth.
- (iii) Limited capacity development for medical staffs, nurses, midwives and other relevant staff.
- (iv) Lack of motivation for few qualified staff to work in government institutions.
- (v) Unfavourable terms and conditions of service to attract and retain qualified health workers at all levels of government health facilities.

### 13.8.2 Issues Commonly Seen in Malakal and UNS as a Whole

The issues on the health sector in the Malakal Town and UNS are as follows:

**(1) Effective and Equitable Access to the Health Services**

Despite population increase in certain areas provision of basic health care has not kept pace. This is especially the case in southern and eastern areas of Malakal Town. Especially access to the basic health services is limited in the southern and eastern parts of Malakal Town. Effective and equitable access to health service shall be pursued.

**(2) Effective and Rational Allocation and Distribution of the Limited Resources**

Medical finance, budget, human resources, facilities and equipment shall be more effectively allocated in consideration of limited resources.

**(3) The Coordination and Collaboration Network System in Health Services**

A system to network the MOH of UNS, related ministries, international organization and NGOs shall be created to more effectively coordinate health service provision.

**(4) Renovation of Medical Equipment**

Medical equipment for higher medical services shall be renovated so as to create an effective hierarchical health service network.

**(5) Capacity Development of Health/Medical Facilities and Personnel**

Appropriate facility operation know-how as well as skills and knowledge of health human resources in health/medical services of both short term and long term shall be pursued and implemented for better health/medical service provision.

**13.8.3 Considerations for the Comprehensive Plan**

**(1) Relation to the Social Economic Infrastructure Development**

The future plan of health facilities in Malakal Town will be considered with due attention to present town profiling data and predicted future population distribution. The new facilities and services are expected to be in areas in the southern and eastern part of Malakal town, especially in the area to the east of the Ring Road.

**(2) Cooperation Work with Other Sectors**

To ensure the medical services can improve, it is important to pave roads so that the ambulances can run even in the rainy season. In addition, education and training institutions for the staff in health sector should be improved as a capacity development, and medical waste management should be improved as well.

### **(3) Application to the Comprehensive Plan**

The Malakal Town is around 500km far from Juba, the capital of South Sudan and it is difficult to move between those towns frequently for geographic of reasons. Only the tertiary health care institution (Malakal Teaching Hospital) is located in the Town and it has to provide care for people's health not only in UNS, but also in Unity State and Jonglei State. Therefore, it is important that Malakal Town, the core city of Upper Nile Region is able to provide self-supporting medical services from primary to higher services.

In addition it will be necessary to improve the infrastructure of water and electricity by installing self managed generators and water treatment works at the hospital.

In addition, it is necessary to strengthen the referral system among the primary to tertiary health facilities as well as the health information management system (HIMS). This is part of network system improvement in the vision statement.

## **13.9 HEALTH SECTOR DEVELOPMENT PLAN**

### **13.9.1 Objectives of Health Sector**

MoH, UNS have outlined the following priorities for the creation of an accessible health service delivery to the people of Malakal Town, :

- (i) Improvement of mother and child health.
- (ii) Decrease of malaria diseases patients.
- (iii) Decrease of vaccine preventable diseases patients.
- (iv) Realization of equitable access to primary health care facilities, such as PHCU as well as PHCC.

The following strategies are proposed by MoH, UNS to achieve targets for the Health Sector.

#### Strengthening the referral system among several levels of the health system

Strengthening the referral system among various levels of the health system is very important in achieving the efficient use of the assets. The health sector consists of small sub sectors such as health financing, drug supply logistics and equipment and so on. Effective use of limited resources such as human resources, health financing and materials (facilities, equipment, drugs, etc.) shall be considered.

Malakal Town shall be the centre of higher medical services covering UNS and other surrounding states. In this regard medical/health faculty shall be reinstated at Upper Nile University for health related human resources development.

#### Promotion of PPP (Public Private Partnership)

As the population of Malakal Town grows, equitable access to health/medical facilities needs to be pursued. In this regard Central Government's policy of the privatization of the medical

treatment, private clinics, hospitals and drug stores shall be pursued for diffusion of such facilities. However, basic health care services, especially primary level of care shall be supplied or assisted by the government contribution.

#### Proper Allocation of the Health Human Resources and their Capacity Development

It is important to consider the education and training of medical staff for upgrading the health/medical service capabilities. Therefore, the Upper Nile University would be strengthened as a centre for capacity development in the Upper Nile Region.

#### Update the Health Information and its Proper Management

It is important to strengthen the relationship among health and health related organizations, for proper promotion of EPI activities and other major health care activities. Relationships shall be strengthened not only within Ministry of Health but also other concerned ministries and organizations.

#### Improvement of Structure and Mechanism on Health Service Delivery System

The structure and mechanism on health service delivery, namely PHCU, PHCC and hospitals shall be considered based on a predicted future distribution population and urban functions.

#### Improvement of Emergency Medical Care System

As for the emergency medical care, emergency medical care system including facilities, staff and ambulances shall be improved together with road improvement in Malakal Town complying with the standards for allocation of medical personnel in accordance with existing State Health Care Program (2011~2013).

### **13.9.2 Health Sector Improvement Plan**

#### **(1) Medical Facilities and Equipment Improvement**

In Malakal Town, there are 3 types of health facilities:

- Primary Health Care Unit (PHCU)
- Primary Health Care Centre (PHCC)
- Malakal Teaching Hospital

There are no health care facilities in the town which are able to provide inpatient services, apart from Malakal Teaching Hospital. To improve capacity, the State Ministry of Health, UNS is considering upgrading the 4 PHCC in the town so that they provide the inpatient services (by expansion of the ward block in the existing facilities). Besides, it is planned to establish new PHCU and PHCC in the town in conformity with the population growth.

Revitalisation of medical faculties at Upper Nile University will be delayed because of lack of facilities and personnel. The health referral system in the Malakal Town, and the level of each medical facility are considered as follows:

- (i) Primary Health Care Level: PHCUs and PHCCs have responsible for providing family

planning guidance, promotion of public health, hygiene and sanitation advice to the citizens, support on EPI and malaria control promotion, and outpatient clinics, etc.

- (ii) Secondary Health Care Level: Currently, there is no secondary level facility in Malakal Town, but 4 PHCCs (Malakia, Bum, Luakat and Assossa) are expected to have responsibility for secondary health care services for the citizens of Malakal Town. The facilities will be upgraded with a ward block for inpatient treatment.
- (iii) Tertiary Health Care Level: Malakal Teaching Hospital is providing tertiary health care services not only to the people in Malakal Town but also to all those Upper Nile Region.

## **(2) Medical Equipment Improvement with Related Infrastructure**

Currently, some specific medical equipment has been donated by the NGOs as well as International Donor Organizations, but generally speaking, medical equipment in the health facilities, such as Malakal Teaching Hospital as well as Primary Health Care Centres are quite old and inadequate for providing the appropriate medical services to the patients. The management of operation and maintenance for equipment in medical facilities should be strengthened, from a technical as well as financial aspect. Standard equipment should be procured within each facility (Malakal Teaching Hospital, Primary Health Care Centres; PHCCs).

The sanitary condition of medical facilities such as lavatory should be well maintained. In addition, electricity supply and water supply in the facilities should also be improved. To achieve this, in addition to the medical equipment, it is necessary to improve the physical infrastructures of the health facilities, such as electricity supply, water supply and drainage system at the health facilities by the government contribution.

## **(3) Pre-hospital and Emergency Medical Care System Improvement**

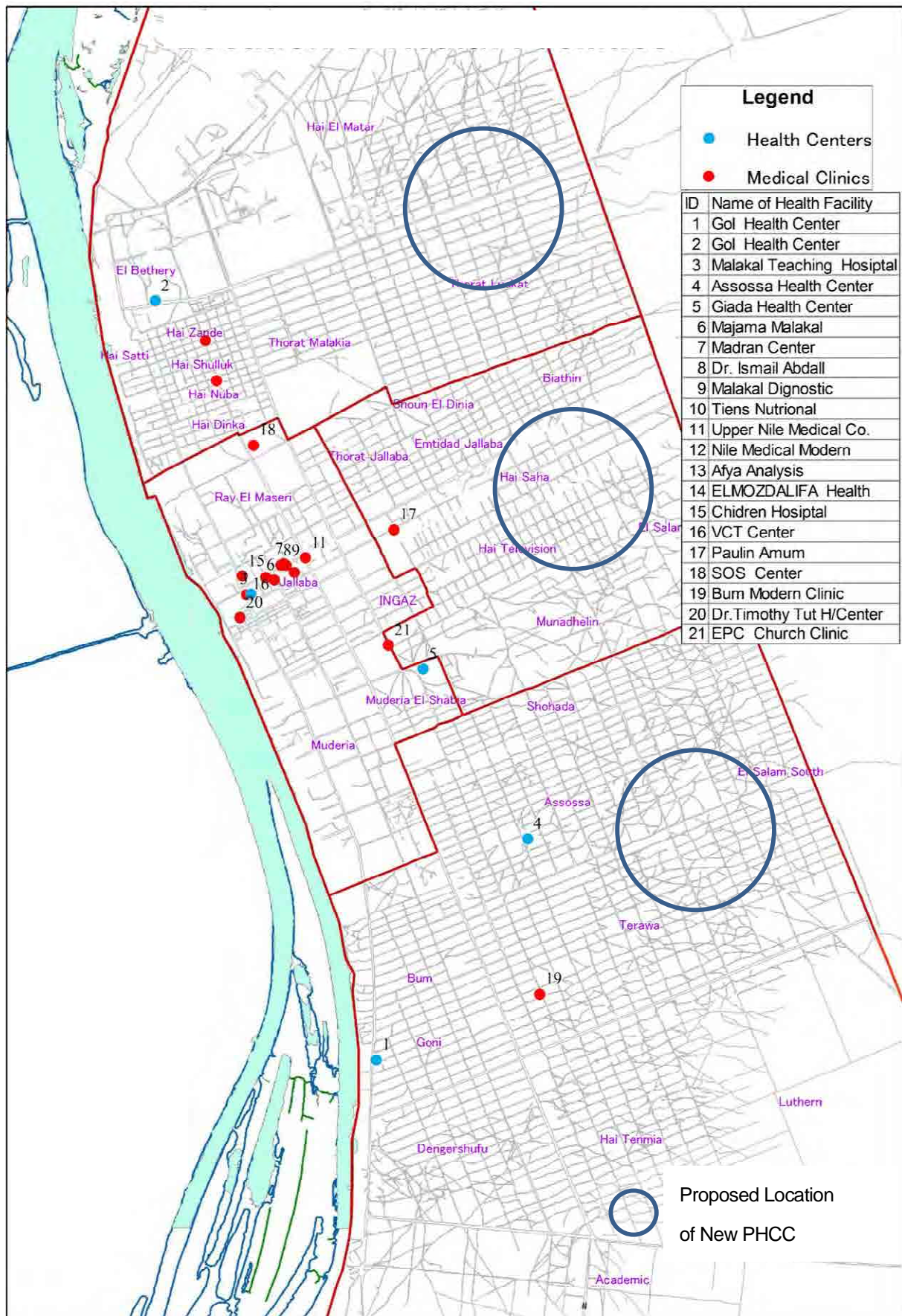
Malakal Teaching Hospital in the State performs the tertiary healthcare services as the top referral facility. Under the Malakal Teaching Hospital, some PHCCs provide outpatients clinics for the patients. However, the inpatients care services are not possible at PHCCs level, therefore, many patients are compelled to go to the Malakal Teaching Hospital directly, without screening at the PHCCs. As a result, many patients visiting at the Malakal Teaching Hospital every day.

It is necessary to consider avoiding the overconcentration at the Malakal Teaching Hospital by improving the health service capabilities of the PHCCs in the Makal Town. A minimum standard of medical services for the pre-hospital stage and emergency medical care facilities at all levels should be established and basic health related infrastructures, such as back-up generators and water treatment system, etc. should be included in the plan.

## **(4) Health/Medical Service Improvement**

### Blood Transfusion System

The total volume of blood collection is not so large at very few county hospitals and Malakal Teaching Hospital. At those hospitals capability of immunohematological and infectious diseases' testing for blood collected shall be performed well enough for effective use of blood. Securing blood safety by interviews to blood donors and testing is indispensable from the viewpoint of preventing blood-transmitted diseases, especially Hepatitis as well as HIV infection, etc. And it is necessary to improve the blood preservation infrastructure for backing up safety blood transfusion to the emergency patients in Malakal Town as the regional Centre.



Source: JICA Project Team

**Figure 13.9-1 Proposed Locations of New PHCCs in Malakal Town**



#### Drug Supply Logistics

Communication and information sharing on drug inventories between health facilities and Central Medical Supply (CMS) shall be improved so that drug shortage at Malakal Teaching Hospital and PHCCs can be addressed. In case of drug shortage, drugs shall be immediately replenished by improved supply logistics.

#### Maternal and Child Health Care

Efforts to lessen or eradicate Measles, Mumps and Rubella (MMR), Infant Mortality Rate (IMR) and Polio shall be made. Medical equipment for appropriate diagnosis, essential drug, especially in PHCCs level facilities in the town shall be procured.

#### Sanitation, Hygiene, and Infectious Diseases Control

The sanitary infrastructure of the state and sanitary-epidemiological control shall be introduced. Referral systems of specialized facilities for the sanitation, hygiene, and infectious diseases prevention shall be integrated (e.g. Scientific Research Institute of Sanitation, etc.).

#### Malaria Prevention

Not only in rural area but also in urban area of UNS, measures for malaria control shall be urgently taken. In case of urban Malaria control, it is important to improve the general physical infrastructures of the town by close communication between the Ministry of Education, ROSS (MOE) and other ministries which are responsible for town development.

### **(5) Human Resources Development**

Admission of students to medical institutes, nursing schools and colleges shall be carried out based on the analysis of needs and by evidence-based approach to assess the ratio of physicians and nurses to population. The re-orientation of the education system towards production of General Practitioners (GPs) shall be necessary to avoid workers without any substantial specialization. In-service training for paramedical staff including nurses and midwives shall be intensified.

### **(6) Health Information System Improvement**

Health information databases system developed by international organization and donors shall be harmonized among the organizations concerned. This health information system shall be established applying recent information technology. Training and guidance for improvement of rational and systematic management of reporting, statistics and information system shall be implemented.

To address some of the weaknesses of the existing HMIS and to increase the ability of the health administrators to plan, monitor and take corrective action in the management of health care services in UNS, a comprehensive HMIS project is underway at national level with the following components in a five-year time frame.

- (i) Simplification of registers and reports.
- (ii) Development of feedback system and its integration to the current software.
- (iii) Developing performance indicator system and its integration to the current software.
- (iv) Training of the HMIS personnel, management staff and computer programmers.
- (v) Review of the HMIS

HRIS (Human Resource Information System) that is JICA's technical cooperation has been implemented in coordination with HMIS at the central level.

### **13.10 HEALTH SECTOR PROJECT**

With the consideration of the above mentioned areas following inputs are prioritized inputs for filling the gaps and solving the inappropriateness health situation in Malakal Town by MoH. The list of the projects are as follows:

#### **(1) Primary Health Care Centre Construction Project (HE-1)**

Objectives:

- To strengthen the referral system of general and emergency health care services in the State
- To reduce the overloaded work of Malakal Teaching Hospital.
- To improve quality of health care services in the State.

Location:

- Malakal Town (north, central and south of the eastern-part of Malakal Town, 3 PHCCs)

Scope of the Project:

- Construction of new Primary Health Care Centres and provision of medical equipment
- Facilities for outpatient consultation and ward block.
- Provision of Medical Equipment (for outpatients clinics and ward block).
- Water treatment system, electricity back-up (generator) system.
- Total Cost: US\$8.10 million.

#### **(2) Malakal Teaching Hospital Health Infrastructures Improvement Project (HE-2)**

Objectives:

- To secure tertiary health care in the referral hospital in the Upper Nile Region
- To improve quality of maternal and child health (MCH) care services in the Upper Nile Region
- To strengthen emergency medical care services and introduce emergency medical care network system among other health facilities in Malakal Town

Location:

- Malakal Teaching Hospital

Scope of the Project:

Construction and rehabilitation of health facilities, provision of medical equipment and

ambulances:

- Facilities for outpatient consultation, obstetrics and gynecology and wards.
- Procurement of medical equipment and ambulances.
- Water treatment system, electricity back-up (generator) system.
- Total Cost: US\$12.00 million.

### **(3) Health Service Capacity of 4 Major Health Centres (PHCCs) Upgrade Project (HE-3)**

Objectives:

- To provide appropriate basic health services for all of the citizens who are living the Town.
- To upgrade the health service capability of 4 PHCCs for population increase of Malakal Town.

Location:

- Malakal Town (Malakia, Assossa, Luakat, and Bum)

Scope of the Project:

- Expansion of the inpatient wards (20 beds)
- Renovation of toilet facilities
- Water supply (elevated water supply system)
- Backup power supply (generator)
- Provision of medical equipment
- Transfer related to the maintenance skills for facilities and equipment
- Total Cost: US\$8.40 million.

### **(4) Revitalization of Medical/Health Faculty in UNU Project (HE-4)**

Objectives:

- To foster the development of doctors and nurses
- To improve higher medical care services

Location:

- Upper Nile University(UNU)

Scope of the Project:

- Construction of medical/health faculty
- Facilities for education of medical sciences
- Procurement of equipment concerning the health education
- Arrangement of personnel in medical/health sector
- Total Cost: US\$11.50 million.

In UNS, there are various types of diseases as chronic diseases, such as malaria, as well as vaccine preventable diseases. Therefore, it is important to take measures against such diseases.

### **(5) Urban Malaria Control Program (HE-5)**

Objectives:

- To decrease malaria pandemic, as well as patients suffering from the disease.
- To increase use of bed net
- To promote of citizens' concerns regarding necessity of malaria control by mass campaign

Location:

- Malakal Town

Scope of the Project:

- Distribution of insecticide treated mosquito nets
- Building staff capacity engaged in malaria control and prevention initiatives to assist with long lasting insecticide treated nets (LLIN) distribution and sensitization of the targeted communities.
- Mass campaign to spread messages about malaria prevention
- Outdoors/indoors spraying and environmental management (improvement of canals and drainage for rainwater)
- Ensure provision of enough manpower for vector control
- Ensure provision of insecticides and equipment for vector control
- Total Cost: US\$4.50 million.

Note: The malaria control project in Malakal Town was implemented by United Kingdom's NGO, MENTOR in 2013.

**(6) EPI (diphtheria, pertussis and tetanus vaccine-3 doses (DPT3), Measles) Vaccination Promotion Project (HE-6)**

Objectives:

- To increase EPI (DPT3, Measles) vaccination coverage for newborn (9-59 months) in Malakal Town.
- To decrease vaccine preventable diseases, such as tetanus and measles of newborn babies (9-59 months) in Malakal Town

Location:

- Malakal Town

Scope of the Project:

- Provision of vaccines
- Improvement of cold chain system with necessary infrastructure.
- Support of EPI campaign twice a year
- Total Cost: US\$4.50 million.

**(7) Human Resources Development for Maternal and Child Health Project (HE-7)**

Objectives:

- To develop education and training curriculum in collaboration with the technical project for human resources being implemented at the central level.
- To improve the quality of health human resources for appropriate health care services in the State

Location:

- Malakal Town

Scope of the Project:

- Technical cooperation of Development of education and training curriculum for nurses and midwives
- Training of trainers for above-mentioned courses
- Total Cost: US\$3.30 million.

## CHAPTER 14 CAPACITY DEVELOPMENT

Capacity development is a major component of this Project and supports the social economic infrastructure plan. Needs were studied and a capacity development plan is proposed.

### 14.1 EXISTING HUMAN RESOURCES IN THE GOVERNMENT OF UNS

The State Ministry of Labour, Public Service and Human Resource Development (MoLPS&HRD) in Upper Nile State (UNS) aggregates the number of public officials to calculate their salaries. **Table 14.1-1** shows the manpower of all public organizations in UNS.

The Classified Staff are Grade 12 certification holders and/or more upper degree holders (Diploma, Bachelor, Master, Doctor, etc.). Among staff who work for Ministries and related Departments and Units, the classified and unclassified staffs are 6,529 and 5,233, or 55.5% and 44.9%, respectively. However in Counties, Classified staff is just 28.5% of all staff.

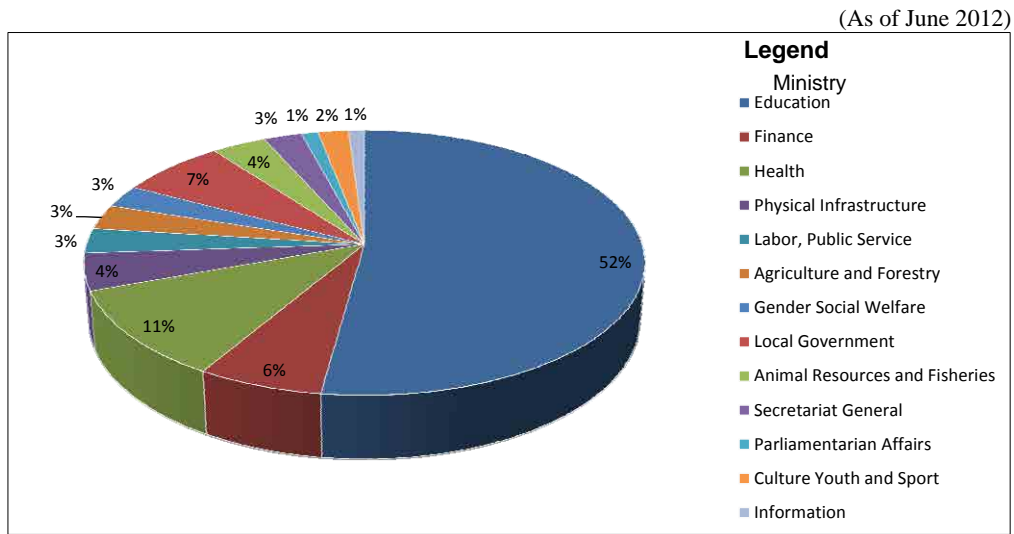
**Table 14.1-1 Key Capacity Features and Elements**

| Capacity                | Developed  | Levels   |
|-------------------------|--|--|
| Individuals             | The will and ability to set objectives and achieve them using one's own knowledge and skills.  | <ul style="list-style-type: none"> <li>• Knowledge, skills, will/stance, health, awareness</li> </ul>  |
| Organization            | The decision-making process and management systems, organizational culture, and frameworks required to achieve a specific objective.   | <ul style="list-style-type: none"> <li>• Human assets (capacities of individuals comprising organizations)</li> <li>• Physical assets (facilities, equipment, materials, raw materials) and capital</li> <li>• Intellectual assets (organizational strategy, management and business know-how, manuals, statistical information, production technology, survey and research reports, household precepts, etc.)</li> <li>• Form of organizations that can optimally utilize assets (human, intellectual, physical), management methods (flat organization, TQC (total quality control), KM (knowledge management), personnel system, etc.)</li> <li>• Leadership</li> </ul> |
| Institution and society | The environment and conditions necessary for demonstrating capabilities at the individual or organizational level and the decision-making processes, and systems and frameworks necessary for the formation/implementation of policies and strategies those are over and above an individual organization. | <ul style="list-style-type: none"> <li>• Capacities of individuals or organizations comprising a society</li> <li>• Formal institutions (laws, policies, decrees/ordinances, membership, rules, etc.)</li> <li>• Informal institutions (customs, norms)</li> <li>• Social capital, social infrastructure</li> </ul>  |

Source: "Capacity Development Handbook for JICA staff" JICA, 2004

Among the classified staffs in the Ministries in the UNS, they are allocated to the State Ministry of Education (MoE) (52%), the State Ministry of Finance and Economic Planning (MoF&EP) (6%), State Ministry of Health (MoH) (11%) and State Ministry of Local Government and Law Enforcement (MoLG&LE) (7%) as shown in **Figure 14.1-1**. The State Ministries which have highest ratio of classified staff in its total manpower are MoLG&LE (87.2%), MoF&EP (69.1%), MoE (63.9%), and Ministry of Physical Planning and Rural Development, (MoPI&RD) (61.4%) as shown in **Table 14.1-2**. Many classified staffs have some difficulties with English language

and the computers in their work, and need to take training.



Source: State Ministry of Labour, Public Service and Human Resource Development, UNS

**Figure 14.1-1 Allocation of Classified Staffs among Ministries in UNS**

**Table 14.1-2 Manpower of Public Organizations in UNS**

(As of June 2012)

| No | Institutions/Department/Unit                                  | Classified Staff | Unclassified Staff | Total Manpower |
|----|---|------------------|--------------------|----------------|
| 1  | State Ministry of Education                                   | 3,199            | 1,807              | 5,006          |
| 2  | State Ministry of Finance                                     | 391              | 175                | 566            |
| 3  | State Ministry of Health                                      | 668              | 732                | 1,400          |
| 4  | State Ministry of Physical Infrastructure & Rural Development | 276              | 254                | 530            |
| 5  | State Ministry of Labour and Public Service                   | 186              | 117                | 303            |
| 6  | State Ministry of Agriculture and Forestry                    | 186              | 189                | 375            |
| 7  | State Ministry of Gender Social Welfare                       | 167              | 213                | 380            |
| 8  | State Ministry of Local Government and Law Enforcement        | 431              | 63                 | 494            |
| 9  | State Ministry of Animal Resource and Fisheries               | 221              | 449                | 670            |
| 10 | Secretariat General   | 155              | 539                | 694            |
| 11 | State Ministry of Parliamentarian Affairs                     | 67               | 47                 | 114            |
| 12 | State Ministry of Culture Youth and Sport                     | 123              | 152                | 275            |
| 13 | State Ministry of Information & Communication                 | 64               | 46                 | 110            |
| 14 | Legislative Assembly  | 45               | 144                | 189            |
| 15 | Malakal Taxation Chamber                                      | 65               | 24                 | 89             |
| 16 | Petroleum Commission  | 4                | 8                  | 12             |
| 17 | Water Resource  | 23               | 13                 | 36             |
| 18 | Energy and Mining   | 47               | 34                 | 81             |
| 19 | Economic Affairs  | 8                | 7                  | 15             |
| 20 | Planning and Statistics                                       | 33               | 23                 | 56             |
| 21 | Cooperative   | 33               | 82                 | 115            |
| 22 | Investment  | 15               | 32                 | 47             |
| 23 | Taxation Headquarters   | 52               | 14                 | 66             |
| 24 | Commerce and Supply   | 54               | 49                 | 103            |
| 25 | Public Grievances   | 12               | 11                 | 23             |
| 26 | South Sudan Relief and Rehabilitation Commission              | 4                | 9                  | 13             |
|    | Sub-Total   | 6,529            | 5,233              | 11,762         |
| 27 | Baliet County   | 40               | 224                | 264            |
| 28 | Fashoda County  | 101              | 277                | 378            |
| 29 | Makal County  | 43               | 221                | 264            |
| 30 | Akoka County  | 101              | 330                | 431            |
| 31 | Pinyikang County  | 107              | 435                | 542            |
| 32 | Maiwut County   | 25               | 272                | 297            |
| 33 | Ulang County  | 45               | 243                | 288            |
| 34 | Nasir County  | 120              | 426                | 546            |
| 35 | Maban County  | 117              | 263                | 380            |
| 36 | Melut County  | 151              | 242                | 393            |
| 37 | Manyo County  | 240              | 603                | 843            |
| 38 | Renk County   | 823              | 1,260              | 2,083          |
|    | Sub-Total   | 1913             | 4796               | 6709           |
|    | <b>Total</b>  | <b>8,442</b>     | <b>10,029</b>      | <b>18,471</b>  |

Source: State Ministry of Labour, Public Service and Human Resource Development, UNS, June 2012



## **14.2 DONORS' CAPACITY DEVELOPMENT ACTIVITIES FOR PUBLIC OFFICIALS IN UNS**

The donors (United Nations agencies, bilateral-donors, NGOs, etc.) have been providing Capacity Development(CD) projects/activities for public officials in UNS. Some projects have been conducted in UNS, but many training courses and workshops have been conducted in Juba and in other countries.

The main activities are explained below.

### **14.2.1 United Nations (UN) Agencies**

The UN Agencies have been conducting support in alignment with the South Sudan Development Plan. The United Nation Country Team (UNCT) consolidated the intervention during 2012 – 2013 of UN development assistance as shown in **Table 14.2-1**.

#### United Nations Development Programme (UNDP)

The Support to Development Planning and Public Finance Management (SPFM) project funded by UNDP has been conducted from 1 January 2012 to 31 December 2013. The 2012 budget for the annual work plan was about US\$23 million (for technical assistance (TA), training/workshop and equipment). The Responsible Parties are MoF&EP, National Bureau of Statistics, Local Government Board, State MoF, State MoLG&LE, State MoPI&RD, and County Administrations.

The overall objective is to support all three levels of the government (national, state and county) to implement a poverty-sensitive development agenda by building its capacity for evidence based planning, budgeting, programme execution, resource mobilization and allocation and ensure sound accounting of internal and external resources.

In case of UNS, the UNDP assigned the international consultants to MoF, MoLG&LE, MoH and MoPI&RD along with its annual work plan.

The SPFM plans to strengthen the technical capacity of State MoPI&RD through training by TA and provision of needed equipment. The main areas to be addressed by training are:

- (i) Urban planning, management/supervision of civil works, and the management; and
- (ii) Procurement and management/supervision of civil works contracts.

**Table 14.2-1 UN Development Assistance Framework South Sudan (2012 – 2013)**

| Outcomes   | Outcome convener | Contributing Agency  | Main Areas  | Budget (SSP)* |
|--|------------------|--|---|---------------|
| 1. South Sudan Development Plan Objective for Governance: To build a democratic, transparent and accountable government, managed by a professional and committed public service, with an effective balance of power among the executive, legislative and judicial branches of government   |                  |  |   |               |
| Core government and civil service functions are established and operational.   | UNDP             | ILO, IOM, OHCHAR, UNDP, UNESCO, UNFPA, UNHCR, UNICEF, UNOPS <sup>1</sup> , UNMACC <sup>2</sup> , UN Women <sup>3</sup> | <ul style="list-style-type: none"> <li>• Oversight and Accountability</li> <li>• Civil service capacity and public sector reform</li> <li>• Pro-poor planning and budgeting</li> <li>• Decentralization</li> </ul>  | 128,915,000   |
| 2. South Sudan Development Plan Objective for Economic Development: Diversified private sector-led economic growth and sustainable development that improves livelihoods and reduces poverty   |                  |  |   |               |
| Chronic food insecurity is reduced and household incomes increase.   | FAO              | FAO, ILO, IOM, UNDP, UNEP, UN-Habitat, UNHCR, UNICEF, UNIDO, UNMACC, UNOPS, UN Women, WFP, UNESCO                      | <ul style="list-style-type: none"> <li>• Food Security</li> <li>• Natural Resources and Land</li> <li>• Private Sector Development</li> <li>• Social Infrastructure                             <ul style="list-style-type: none"> <li>➤ Road construction</li> <li>➤ Drinking water</li> </ul> </li> </ul> | 429,395,000   |
| 3. South Sudan Development Plan Objective for Social and Human Development: To promote the well-being and dignity of all the people of South Sudan by progressively accelerating universal access to basic social services   |                  |  |   |               |
| Key service delivery systems are in place, laying the groundwork for increased demand.   | UNICEF           | ILO, IOM, UNAIDS, UNDP, UNESCO, UNFPA, UNHCR, UNICEF, UNIDO, UNMACC, UNOPS, UN Women, WHO, WFP                         | <ul style="list-style-type: none"> <li>• Health and maternal mortality</li> <li>• Education</li> <li>• Social protection</li> <li>• Local development</li> </ul>  | 384,856,760   |
| 4. South Sudan Development Plan Objective for Conflict Prevention and Security: To defend the sovereignty and territorial integrity of South Sudan, uphold its constitution and secure the dividends of peace by seeking to prevent the resurgence of conflict, providing equitable access to justice and maintaining law and order through institutions that are accountable, adequate, and appropriate in their structures and human in their actions. |                  |  |   |               |
| 4.1 Violence is reduced and community security improves.   | UNHCR            | IOM, OHCHR, UNDP, UNESCO, UNFPA, UNHCR, UNICEF, UNMACC, UNODC, UNOPS, UN Women   | <ul style="list-style-type: none"> <li>• Reintegration of ex-combatants</li> <li>• Community security and peace-building</li> </ul>   | 243,608,300   |
| 4.2 Access to justice and the rule of law improves.  | UNHCR            | OHCHR, UNFPA, UNDP, UNHCR, UNICEF, UNODC, UNOPS, UN Women  | Access to justice, rule of law and human rights   |               |

\*SSP:South Sudan Pounds

Source: "United Nations Development Assistance Framework for ROSS 2012 – 2013", UN, 2012

<sup>1</sup> United Nations Office for Project Services

<sup>2</sup> United Nations Mine Action Coordination Centre

<sup>3</sup> United nations Entity for Gender Equality and the Empowerment of Women

### **14.2.2 Capacity Building Trust Fund (CBTF)**

The 14.2.2 Capacity Building Trust Fund (CBTF) phase I (CBTF-I) was established in 2004 in anticipation of the signing of the Comprehensive Peace Agreement. CBTF I operated from 2004 to 2009, shifting from financing for recurrent costs to capacity building and public sector reform projects nationwide. UNICEF acted as the Fund Trustee and KPMG (an audit, tax and advisory services firm) as the Financial Management Agent. Donors included Norway, the UK, the Netherlands, Sweden, the EU and Italy. During CBTF-I, US\$22.3 million was funded. It was extended to the end of 2014, and the total fund would be the same as the CBTF-II as explained below. The CBTF phase II (CBTF-II) was established with commitment of US\$28 million from 1 February 2010 to 31 January 2012. The donors are Canada, Denmark, the Netherlands, Norway, Spain, Sweden and the UK. The EU and USAID are invited to the CBTF Steering Committee meetings as observers without voting power.

The pillars of CBTF-II were (a) the Core Window and (b) the State Responsive Window. The Core Window included main projects about (a-1) Financial Management System, (a-2) Technical Capacity of Civil Servants, and (a-3) the Support for Post-2011 Needs.

In the extension period of 2012 – 2013, the CBTF-II focused on three areas; (a) Financial Management System; (b) Technical Capacity Building; and (c) Accountability. The main counterparts are the MoLPS&HRD, MoFE&P in the three levels (national, state and county). Training was conducted in some selected states as trials, but UNS was not included.

### **14.2.3 The Inter-Governmental Authority on Development (IGAD)<sup>4</sup> Regional Initiative**

The aim of the Inter-Governmental Authority on Development (IGAD) initiative is to deepen regional cooperation and integration and boost the capacity of Republic of South Sudan (ROSS) ministries by seconding and embedding civil servants from IGAD member states (Ethiopia, Kenya and Uganda) in core ministries. The programme is funded by the Norwegian Government. The funds are channelled through UNDP, which functions as the implementing partner in South Sudan.

The civil servants from IGAD member states are called “Civil Service Support Officers (CSSOs)”. By the end of March 2012, 138 CSSOs were deployed across 15 ministries in South Sudan. Among them, 54, 46, and 38 were from Ethiopia, Kenya, and Uganda, respectively. As shown in the **Table 14.2-3**, 15 CSSOs were assigned in UNS. In addition, within 2012, 62 CSSOs were expected to come. Among these 62; 6, 34, and 22 CSSOs are from Ethiopia, Kenya, and Uganda, respectively.

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<sup>4</sup> Inter-Governmental Authority on Development (IGAD) “was first established in 1986 as a forum to coordinate the efforts of East African countries in combating drought and desertification. It has now evolved into a regular forum where leaders of East African countries tackle other regional political and socio-economic issues. As the newest nation, South Sudan became the eighth member state of IGAD in 2011”. (UNDP)

**Table 14.2-2 CBTF-II (2010 – 2012) and the Extension Period (2012 – 2013) Work Plan**

| Area                                | Activities  | Description   | Budget (US\$) |             |
|-------------------------------------|---|---|---------------|-------------|
|                                     |   |   | 2010 – 2012   | 2012 – 2013 |
| 1. Financial Management             | Payroll   | The payroll project focuses on building MOLPSHRD and MOFEP capacity, and linking the payroll system to human resources management.  | 4,000,000     | 4,000,000   |
|                                     | Government Accountancy Training Centre (GATC)     | An assessment of the professionalism of State in public financial management is underway.   | 1,800,000     | 2,000,000   |
|                                     | Pension System Development                        | The CBTF-II supported MOLPSHRD to draft the Strategic Design, and the ROSS Council of Ministers approved it. The CBTF-II extension period will support for MOLPSHRD to draft the legislation and establishment of an independent South Sudan Pension Fund, and to operate the fund. | 3,000,000     | 3,000,000   |
|                                     | Bank of South Sudan                               | To establish a distributed electronic banking system. Equipment provision   | 5,000,000     | -           |
|                                     | Human Resource Information System (HRIS)          | The project will roll out an electronic Human Resource Information System to all state Ministries. This system would be highly complementary to the payroll project.  | -             | 2,100,000   |
| 2. Technical Capacity               | Support to Central State Institutions             | The project will strengthen the capacity of MOFEP, MOLPSHRD and selected accountability institutions at the State Level. The activities are conducted in the states where are beneficiaries of “Core Skills Training”.  | -             | 2,000,000   |
|                                     | Core Skills Training at State Level               | The project is currently supporting 4 ministries in 3 states and the MOLPSHRD at ROSS level, including English language and computer literacy.  | 3,000,000     | 3,300,000   |
|                                     | Local Government Administrative Officers Training | Under this project, a 4 weeks orientation course for local government administrative officers was organized in six states (Eastern Equatoria, Central Equatoria, Western Equatoria, Western Bahr el Ghazal and Lakes)   | 1,000,000     | -           |
|                                     | Recruitment Database                              | This project aims to provide the MOLPSHRD with the capacity and tools to identify qualifies and skilled employees and match these to clearly identified vacancies.<br><a href="http://www.eepublicserviceopportunities.com">www.eepublicserviceopportunities.com</a>                | 400,000       | -           |
|                                     | Local Services Support                            | In response to the request from MOFEP, the project will support the drafting of a PFM manual for local government as well as a programme design for the rollout of this manual throughout the country.  | -             | 350,000     |
|                                     | MOFEP IT Support                                  | The project will provide technical support to the MOFEP to manage its computer network and information management system.   | 1,200,000     | 1,800,000   |
| 3. Accountability (Post-2011 Needs) |   | Work in accountability requires a design mission before final programming decisions are made.   | 1,400,000     | 2,700,000   |

Source: “Annual Report – Year 2 (1 January 2011 – 31 January 2012)”, CBTF, 2012

The CSSOs are paired (“twinned”) with South Sudanese civil servants respectively, and directly transfer their skills and knowledge to South Sudanese counterparts through on the job training (OJT). The CSSOs are either trainers or mentors for South Sudan counterparts.

Many CSSOs have highly specialized skills, such as; surgeons, gynaecologists, architects and veterinary laboratory technicians. The salaries of the CSSOs continue to be paid by the Government of their origin (Ethiopia, Kenya or Uganda). The allowance and other costs are paid by the programme.

**Table 14.2-3 Deployment of the CSSOs According to Sector and Location**

| Ministry  | NAT | CES | EES | JL | UNS | UTY | LKS | WRP | WES | WBG | NBG | Total |
|---|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-------|
| 1. Ministry of Health                             | 10  | 4   | 4   | 5  | 14  | 6   | 5   | 2   | 8   | 10  | 3   | 71    |
| 2. Ministry of LPS&HRD                            | 17  | 0   | 1   | 1  | 1   | 0   | 1   | 1   | 1   | 1   | 0   | 24    |
| 3. Ministry of Housing and Physical Planning      | 10  | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 10    |
| 4. Ministry of Commerce, Industry and Investment  | 9   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 9     |
| 5. Ministry of Information and Broadcasting       | 4   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 4     |
| 6. Ministry of Animal Resources and Fisheries     | 4   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 4     |
| 7. Ministry of Petroleum and Mining               | 3   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 3     |
| 8. Ministry of Finance and Economic Planning      | 2   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2     |
| 9. National Legislative Assembly                  | 2   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2     |
| 10. Ministry of General Education and Instruction | 2   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2     |
| 11. Ministry of Culture Youth and Sports          | 2   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2     |
| 12. Ministry of Water Resources and Irrigation    | 2   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2     |
| 13. Ministry of Parliamentary Affairs             | 1   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1     |
| 14. Ministry of Foreign Affairs and International | 1   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1     |
| 15. Ministry of Higher Education                  | 1   | 0   | 0   | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1     |
| Total   | 70  | 4   | 5   | 6  | 15  | 6   | 6   | 3   | 9   | 11  | 3   | 138   |

Source: UNDP South Sudan, 2012

#### 14.2.4 JICA

JICA has been conducting CD projects in various sectors in South Sudan since the Comprehensive Peace Agreement (CPA). JICA’s on-going CD projects are shown in **Table 14.2-4**. The training for these projects has been conducted mainly in Juba, but they always invite some related State ministries’ staff to the training and/or the workshops.

**Table 14.2-4 JICA’s on-going Capacity Development Projects in South Sudan**

(As of July 6, 2012)

| Sector                 | Project Name  | Period                | Objectives  |
|------------------------|---|-----------------------|---|
| Education              | Strengthening Mathematics and Science Education in South Sudan (SMASESS)                                      | Nov. 2009 – June 2013 | The SMASESS aims to strengthen the capacity of teachers about Mathematics and Science through the development of teaching materials and implementation of teachers’ trainings.  |
| Vocational Training    | Project for Improvement of Basic Skills and Vocational Training in South Sudan (SAVOT) Phase 2                | Aug. 2010 – Jul. 2013 | The SAVOT 2 aims to strengthen the capacity of all vocational training centres (VTCs) in terms of administration and funding of the VTCs, designing needs-oriented curriculum, and teaching skills (including the development of manuals, guidelines, materials, and equipment).  |
| Health                 | Human Resource Development for Health in South Sudan  | Mar. 2009 – Jul. 2013 | The project aims to develop organizational capacity of MoH in national and state levels as to enforce the policies and action plans effectively and efficiently. Also the project supports to establish of Human Resource Information System (HRIS) and to promote the usage of HRIS nationwide.  |
| Water                  | The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation (SSUWC)                | Nov. 2010 – Nov. 2013 | The project aims to strengthen the management capacity of SSUWS Headquarters. Especially, the project focuses on five CD areas; operation and maintenance (O&M) of facilities; O&M of pipelines; laboratory technique; cost recovery system; and supports to branches.  |
| Road                   | Technical Cooperation Project for Capacity Development on Sustainable Road Maintenance and Management in Juba | Sep. 2011 – Mar. 2014 | This project has two counterpart organizations (C/Ps); Ministry of Transport (MOT) and Ministry of Housing and Physical Plannin (MOH&PP) in national level. The project aims that the C/Ps can manage all roads along with a road operation and maintenance plan. In order to increase the quality of the O&M plan, the project supports that the C/Ps would establish inventory of roads and inspection manual/ guideline, and that they provide trainings for the staffs. |
| Solid Waste Management | The Project for Capacity Development on Solid Waste Management in Juba  | Oct. 2011 – Oct. 2014 | The project aims to establish a model of solid waste management in Juba, and to develop the capacity of staffs in Juba city council about the solid waste management.   |

Source: <http://gwweb.jica.go.jp/km/ProjectView.nsf>

### 14.3 CD NEEDS IN IMPLEMENTING THE PROJECTS FOR THE COMPREHENSIVE PLAN

#### 14.3.1 Individual Capacity Development Needs

One of the most important challenges facing the South Sudan is the inadequate educational opportunity of individuals. UNDP reported that a half of all positions in ministries remain unfilled, and that 50% of public officials have only early education (unclassified staff) and only 5% have a graduate degree or higher.

As mentioned earlier, 6,529 people (55.5%) in UNS Government (ministries and departments/units) are classified staff in June 2012. If we include officials working at the county level, the number of classified staff is 8,442, which is 28.5% in all public officials. Also informal reviews indicate that many of the current staff lack necessary work experience and have major difficulties in English communication.

The JICA Project Team conducted a “training needs survey” mainly to the MoPI&RD, UNS in March – April 2012. The results are shown in **Table 14.3-1**. Many departments claim that basic trainings like computer (information technology:IT) training and English language training are

necessary for their staffs.

**Table 14.3-1 Results of the Training Needs Survey**

| Sub-Sector                  | Department  | Training Areas                             | Training Targets                            |
|-----------------------------|---|--|---|
| Water Supply                | SSUWC UNS   | Operation and Maintenance                  | Plumbers and Mechanics                      |
|                             |   | Mechanical Operation                       | Mechanics                                   |
|                             |   | Distribution Network Maintenance           | Plumbers                                    |
|                             |   | Revenue Collection Techniques              | Accountants                                 |
|                             |   | Billing Agent Training                     | Accountants                                 |
|                             |   | Customer Service Training                  | Accountants                                 |
|                             |   | Laboratory                                 | Chemist                                     |
|                             | State MoPI&RD<br>Directorate of Water<br>Sanitation                               | Drilling Engineering                       | 2 persons                                   |
|                             |   | Installation of Water Pump                 | 2 persons                                   |
|                             |   | Ground Water Development                   | 2 persons                                   |
|                             |   | Geology                                    | 2 persons                                   |
|                             |   | Water Quality Analysis and Water Treatment | 2 persons                                   |
|                             |   | Computer Skills                            | 2 persons                                   |
|                             |   | Water Distribution Networks                | 2 persons                                   |
| Water Transport             | Ministry of Transport<br>Directorate of River<br>Transport (National<br>Level)    | Port Management                            | Port manager and Deputy Manager             |
|                             |   | Goods traffic and ship movement            | Traffic Officer                             |
|                             |   | Port Engineering                           | Port Engineer                               |
|                             |   | Computer and IT                            | Clerk                                       |
|                             |   | Statistics/Operation                       | Inspector                                   |
|                             |   | Port Safety, Safety and Health             | Inspector and Supervisor                    |
|                             | State MoPI&RD   | Port Engineering                           | Engineers                                   |
|                             |   | Port Management                            | Administrators (management)                 |
|                             |   | Navigation                                 | Navigators                                  |
|                             |   |  |   |
| Road Transport              | State MoPI&RD<br>Directorate of Road<br>and Transport                             | Construction of Road and Bridge            | Road Section                                |
|                             |   | Operation of Machinery                     | Road Section                                |
|                             |   | Drainage System                            | Road Section                                |
| Energy                      | State MoPI&RD<br>Department of Public<br>Utilities                                | Distribution of Power                      | All   |
|                             |   | Generation                                 | All   |
|                             |   | Sales                                      | All   |
| Sewage and Sanitation       | State MoPI&RD<br>Directorate of Water<br>and Sanitation, and<br>Rural Development | Public Toilets O&M                         | Staff<br>Local People (Beneficiaries)       |
| Solid Waste Management      | State MoPI&RD   | Management Method, Collection Plan, O&M    | Staff                                       |
|                             |   | O&M of Collection Cars                     | Mechanics                                   |
| Physical and Urban Planning | State MoPI&RD<br>Directorate of<br>Physical and Urban<br>Planning                 | Database for Land Use                      | Employees of Land, Survey and Town Planning |
|                             |   | Computer Training                          | Employees of Land, Survey and Town Planning |
|                             |   | Modern Survey Equipment                    | Survey Employees                            |
|                             |   | GIS and Auto CAD                           | Employees of Land, Survey and Town Planning |
| Administration and Finance  | State MoPI&RD<br>Directorate of<br>Administration and<br>Finance                  | Computer/ IT                               | Computer Illiterates                        |
|                             |   | English Language                           | Non-English Speakers                        |
|                             |   | Land Database Management                   | Land Department Staff                       |
|                             |   | Filing Systems                             | Human Resources and Clerical Section Staff  |
|                             |   | Financial Management                       | Finance and Administration Staff            |
|                             |   | Procurement Management                     | Procurement Department Staff                |
| Planning and Budgeting      | Planning and Budgeting Staff  |  |   |

Source: JICA Project Team, March – April 2012

Also various skills trainings about management, operation and maintenance (O&M) are high demands in all sub-sectors. As to the water transport (port) sub-sector, the MOT was also included in the scope of the training needs survey for O&M of Malakal Port with UNS.

### 14.3.2 Organizational Capacity Development Needs

The Policy Framework (2011) of the MoPI&RD states “continuous development of human resources training program for staff to ensure efficiency and effectiveness, responsibility, accountability, and transparency in management of financial resources, and also ensuring fairness in employment”.

According to the Policy Framework of the MoPI&RD in UNS, it has mainly two (2) objectives; 1) to provide efficient and reliable infrastructure facilities and vital services delivery to support economic development; and 2) to give better access to basic physical and social services to both urban and rural communities<sup>5</sup>.

In order to achieve these objectives, the State Ministry has eight (8) directorates of different functions that are shown in **Table 14.3-2**.

**Table 14.3-2 Directorates of MoPI&RD**

(As of August 2012)

| Directorate  | Function   |
|--|--|
| Directorate of Administration and Finance                  | - Procurement and Asset Management<br>- Account and Internal Audit<br>- Personnel and Training<br>- IT Professional  |
| Directorate of Planning and Budget                         | - State Planning<br>- Urban Planning<br>- Budget Execution<br>- Revenues   |
| Directorate of Physical and Urban Planning                 | Physical Planning and Land Management<br>- Town Planning<br>- Survey<br>- Land Management  |
| Directorate of Housing                                     | Housing Development<br>- Housing Policy and Regulations<br>- Drafting and Construction<br>- Maintenance  |
| Directorate of Water and Sanitation, and Rural Development | - Supervision of Water Resources Development, Management, and Provision of Sanitation and Hygiene Services<br>- Cooperatives and Rural Development                     |
| Directorate of Public Utilities                            | - Provision and Management of Electrical Power<br>- Development, Provision and Management of Urban Water   |
| Directorate of Roads and Transport                         | Roads and Transport Development<br>- Road and Bridget construction and maintenance<br>- Road Transport Safety<br>- River Transport<br>- Civil Aviation/Malakal Airport |
| Directorate of Projects and Contracts                      | Project Design and Management, and Contract  |

Source: MoPI&RD

<sup>5</sup> State Ministry of Physical Infrastructure and Rural Development (2011), “Policy Framework, 10 September 2011”



### Physical and Urban Planning, Administration and Finance

In the Policy Framework, especially on urban planning and administration, MoPI&RD asserts the following: 1) state and rural planning must be based upon accurate data; 2) revenue collection must achieve the budgeted/estimated targets; and 3) unauthorized over expenditure must be avoided.

As for the administration of lands, it needs urgent reform, both human resource through training, and the system through computerization to help the screening of land applications to avoid random or duplicated allotment, collusion over plots, and manipulation of records. Geographic Information System (GIS) and Auto CAD trainings are needed for effective work. Many officials for administration across the departments need IT and English documentation training because most of them are not so familiar with IT, and have difficulties to use English in the work.

### **14.3.3 Institutional Capacity Development Needs**

#### Local Administration

The projects proposed in this chapter are formulated by sub-sector for the sake of convenience in line with the proposed strategies and programs. Capacity development for planning, budget implementation and management, coordination with other sector departments are required.

Various activities proposed by the present Project should involve local communities of Malakal Town. Communities, which have lost traditional values and human ties due to the long lasting civil war, should be strengthened and revitalized. The lowest tier of government such as Malakal Town is in the best position to support community development in this context. In this regard, the role of Malakal Town Council should be strengthened. Dispatch of CDOs from MoG&SW to Malakal City Council could be an initial step in this endeavour.

Services provided by administrative bodies are not free of charge. Taxes and dues shall be applied to the cost of the public services and their operation and maintenance. Thus, CD such as cost recovery system to some public services is especially important, although CD is necessary for all public services to maintain them effectively.

#### Water Supply

Training and capacity development is needed in the following areas: the Standards of Drawing Pipe-Network, Mid-term & Long-term O&M Action Plan, M&E System, Management Plan of the Water Intake Facility and/or Water Treatment Plant, O&M System of Pipelines, Water Tariff Collection System, Complaint Handling System, Standards of Water Examination, etc.

#### Water Transport

Training and capacity development is needed in the following areas: Single Window System, Loading/Unloading System, Port Tariff and Taxation System, Safety Standards, and the like are identified as and recommended for prioritized CD activities.

### Road Transport

Training and capacity development is needed in the following areas: Traffic Rules/Regulations, the Guideline of Environmental and Social Consideration, Regulations Regarding Importing Equipment and Materials for Road Construction, Standards of Inspections, Road Traffic Control Manual, etc.

### Energy

Training and capacity development is needed in the following areas: Technical Standards and Design Criteria of Facilities, the Inspection Guideline/Manuals, Annual Inspection Plan, the Tariff Collection System, etc.

### Sewage and Sanitation

An Annual Plan for Construction of Public Toilet, O&M System of Public Toilets, etc.

### Storm Water Drainage

An Annual Plan for Storm Water Drainage, a Rainfall Intensity Formula of UNS, the Standards in Designing Storm Water Drainage Facilities, a Manual of Construction Supervision, an Annual O&M Plan, Monitoring Guideline, an Annual O&M Plan about Machines and Equipment, etc.

### Solid Waste Management

A new Collection System of Solid Waste, a Proper Plan for Collection, Maintenance Plan of Vehicle and Needed Equipment, Maintenance Plan of Landfill, Regulation of Landfill Construction, Regulation of the Treatment of Medical Waste, the Guideline of the Treatment of Medical Waste, etc.

The details of CD needs for the above target sector are presented in the following chapters: Water Supply (Chapter 5), Water Transport (Chapter 6), Road Transport (Chapter 7), Energy (Chapter 8), Sewage and Sanitation (Chapter 9), Storm Water Drainage (Chapter 10), and Solid Waste Management (Chapter 11).

## **14.4 CAPACITY DEVELOPMENT PROJECT**

### **(1) Basic Skill Trainings (Individual CD)**

It is recommend that classified staffs are provided with the following basic skills training; English Documentation, IT skills including database, and Project Management Method. Also it is necessary to provide GIS and Auto CAD trainings for surveyors, machinery/technical trainings for technicians, and accounting training for accountants. The training details are shown in **Table 14.4-1** to **Table 14.4-7**.

Since all staff should be able to participate in the training, these 7 basic skills trainings have to be held in Malakal City whoever conducts the actual training. The donors are expected to support the Ministries to conduct the recommended training.

The proposed training is prioritised for inclusion in this Project by examining the following

criteria:

- (i) The urgency to implement proposed projects in this social and economic infrastructure plan
- (ii) Its contribution to promoting the implementation of the urgent support projects (port, water supply and road)

Consequently following capacity development trainings were provided in the course of the Project.

- (i) GIS training/AutoCAD Training
- (ii) English documentation training/IT skill training
- (iii) Accounting training
- (iv) Project Management Training (PCM)

Presumed goals of the training is as follows.

- To be able to manage accounting
- To be able to control a project process
- To be able to report work progress in English
- To conduct drawing, spatial planning, and data management of land by ArcGIS and AutoCAD
- To be able to evaluate and monitor projects

Those four training courses have been given to staff of MoPI&RD and other relevant organizations from March to November 2013 in cooperation with Malakal Vocational Training Centre.

As to Auto CAD and GIS trainings especially were provided to staff of MoPI&RD who involved in road transport, water supply, energy, and storm drainage water. Other courses were offered to staff across the departments.

## **(2) Sectorial Skill Trainings (Individual, Organizational and Institutional CD)**

The sectorial skill trainings are better conducted through OJT for practical reasons, but JICA will offer to invite some staffs to some workshops and trainings in Juba, and Japan.

**Table 14.4-1 English Documentation Training**

| <b>Project Title</b>  | English Documentation Training  |  |         |          |  |                       |   |
|---|---|--|---------|----------|--|-----------------------|---|
| <b>Training Type</b>  | Training in Malakal<br>Course work:<br>a) general English for all civil servants working for the UNS government<br>b) technical course for each sub-sector of MoPI&RD   |  |         |          |  |                       |   |
| <b>Background of the Training</b>   | <p>Before the CPA, Malakal people took primary and secondary education in Arabic, so many have some difficulties to work in English. Moreover, they are not familiar with the English technical terms and expressions in their respective special field.</p> <p>After the CPA, donors/NGOs have provided various trainings and workshop in Juba, but many of them are conducted in English. In order to develop their knowledge and skills, they have to learn English.</p> <p>This course will provide a) general English course for all civil servants of UNS, and b) technical course for various sub-sector for the engineers and other specialists in MoPI&amp;RD.</p> <p>It should be concerned to entrust the management of the courses to NGOs (including Church) or private sector from the beginning of the project. The consignee is expected to cover the expenses of course by the tuition fees from trainees.</p> |  |         |          |  |                       |   |
| <b>Target Groups</b>  | a) general English: all civil servants of UNS (not limited to the MoPI&RD staffs)<br>b) technical English: engineers and specialist of MoPI&RD  |  |         |          |  |                       |   |
| <b>Number of Trainees</b>   | a) general English: 20 persons per class<br>b) technical English: 20 persons per class (maybe one class for one sub-sector)   |  |         |          |  |                       |   |
| <b>Project Purpose</b>  | <p>To increase English comprehension of UNS civil servants in terms of</p> <ul style="list-style-type: none"> <li>• making and reading English documents</li> <li>• English communication</li> <li>• Presentation in English</li> </ul> <p>To increase the possibility (opportunity) to participate training courses in English</p> <p>To increase their work efficiency and effectiveness</p>  |  |         |          |  |                       |   |
| <b>Training Subjects and Expected Duration</b><br><br><b>Day; 16:30-18:00 (90min)</b> | <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 60%;">Subject</th> <th style="width: 40%;">Duration</th> </tr> </thead> <tbody> <tr> <td>a) general English<br/>Depending on the level, trainees have to be classified</td> <td rowspan="2">5 day/week x 1 months</td> </tr> <tr> <td>b) technical English<br/>Depending on the specialty, trainees have to be classified.</td> </tr> </tbody> </table>  |  | Subject | Duration | a) general English<br>Depending on the level, trainees have to be classified | 5 day/week x 1 months | b) technical English<br>Depending on the specialty, trainees have to be classified. |
| Subject   | Duration  |  |         |          |  |                       |   |
| a) general English<br>Depending on the level, trainees have to be classified          | 5 day/week x 1 months   |  |         |          |  |                       |   |
| b) technical English<br>Depending on the specialty, trainees have to be classified.   |   |  |         |          |  |                       |   |
| <b>Related Projects</b>   | Any projects which derive from the Comprehensive Plan   |  |         |          |  |                       |   |
| <b>Needed Input (Human Resources, Cost, Equipment)</b>                                | Classrooms and equipment (blackboard and chalk, desks and chairs, cabinets, etc.)<br>Curriculums and Teaching materials (including textbook, audio visuals, etc.) and manuals<br>Teachers of English classes  |  |         |          |  |                       |   |

Source: JICA Project Team

**Table 14.4-2 IT Skills Training**

| <b>Project Title</b>  | IT Skills Training  |  |         |          |  |                        |                         |                        |
|---|---|--|---------|----------|--|------------------------|-------------------------|------------------------|
| <b>Training Type</b>  | Course Training in Malakal  |  |         |          |  |                        |                         |                        |
| <b>Background of the Training</b>   | In Malakal, it is said that many public officials (classified/unclassified staffs) are not IT literate.   |  |         |          |  |                        |                         |                        |
| <b>Target Groups</b>  | 1. For all public officials   |  |         |          |  |                        |                         |                        |
| <b>Number of Trainees</b>   | 1. 20 persons/training  |  |         |          |  |                        |                         |                        |
| <b>Project Purpose</b>  | 1. All classified staffs have obtained basic IT skills, and they can work with PC.<br>2. All IT specialists can develop and operate database.   |  |         |          |  |                        |                         |                        |
| <b>Training Subjects and Expected Duration</b><br><br>1-Day; 16:30-18:00<br>(90min)<br>2-Day; 8:30-18:00<br>(AM tea break: 30min<br>Lunch break: 60min) | <table border="1"> <thead> <tr> <th>Subject</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1. Microsoft Office <ul style="list-style-type: none"> <li>• Word</li> <li>• Excel</li> <li>• Power Point</li> <li>• Access</li> </ul> </td> <td>5 day/ week x 3 months</td> </tr> <tr> <td>2. Database Development</td> <td>5 day/ week x 3 months</td> </tr> </tbody> </table> |  | Subject | Duration | 1. Microsoft Office <ul style="list-style-type: none"> <li>• Word</li> <li>• Excel</li> <li>• Power Point</li> <li>• Access</li> </ul> | 5 day/ week x 3 months | 2. Database Development | 5 day/ week x 3 months |
| Subject   | Duration  |  |         |          |  |                        |                         |                        |
| 1. Microsoft Office <ul style="list-style-type: none"> <li>• Word</li> <li>• Excel</li> <li>• Power Point</li> <li>• Access</li> </ul>                  | 5 day/ week x 3 months  |  |         |          |  |                        |                         |                        |
| 2. Database Development   | 5 day/ week x 3 months  |  |         |          |  |                        |                         |                        |
| <b>Related Projects</b>   | JICA SAVOT, VTC in Malakal  |  |         |          |  |                        |                         |                        |
| <b>Needed Equipment</b>   | Curriculum and teaching materials<br>Lecturers<br>Classroom(s)<br>Application for accounting, PCs   |  |         |          |  |                        |                         |                        |

Source: JICA Project Team

**Table 14.4-3 Project Management Training**

| <b>Project Title</b>                           | Project Management Skills (PCM: Planning) Training   |  |         |          |     |                              |
|--|--|--|---------|----------|-----|------------------------------|
| <b>Training Type</b>                           | Workshop in Malakal  |  |         |          |     |                              |
| <b>Background of the Training</b>              | In UNS, strategy papers have been establishing gradually. However it is observed that public officials still have some difficulties in transferring the strategies into short-term plans like an annual action plan and/or an annual work-plan of directorate.<br>The project will train the planning methods using “Project Cycle Management” theory. |  |         |          |     |                              |
| <b>Target Groups</b>                           | Directors, Senior Inspectors of MoPI&RD  |  |         |          |     |                              |
| <b>Number of Trainees</b>                      | 25 people/workshop   |  |         |          |     |                              |
| <b>Project Purpose</b>                         | To increase project planning skills of each directorate  |  |         |          |     |                              |
| <b>Training Subjects and Expected Duration</b> | <table border="1"> <thead> <tr> <th>Subject</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>PCM</td> <td>3 days (all day: 8:30-16:30)</td> </tr> </tbody> </table>  |  | Subject | Duration | PCM | 3 days (all day: 8:30-16:30) |
| Subject  | Duration   |  |         |          |     |                              |
| PCM  | 3 days (all day: 8:30-16:30)   |  |         |          |     |                              |
| <b>Related Projects</b>                        | JICA   |  |         |          |     |                              |
| <b>Needed Equipment</b>                        | Curriculum and teaching materials<br>Lecturers<br>Classroom(s)<br>Application for accounting, PCs  |  |         |          |     |                              |

Source: JICA Project Team

**Table 14.4-4 GIS Training**

| <b>Project Title</b>  | GIS Trainings   |  |         |          |   |                       |
|---|---|--|---------|----------|---|-----------------------|
| <b>Training Type</b>  | 1. Training in Malakal (MoPI&RD) <ul style="list-style-type: none"> <li>• Course work</li> <li>• Field work (OJT)</li> </ul> 2. Training in Juba<br>3. Training in Kenya (RCMRD)  |  |         |          |   |                       |
| <b>Background of the training</b>   | In 2007, some of surveyors of UNS MoPI&RD were dispatched to Kenya RCMRD <sup>6</sup> to learn about the theory and tools of Digital Mapping. However when they came back to South Sudan, their offices did not have electricity, hardware and software yet. While they have had no opportunity to utilize their learned knowledge and skills, they unfortunately have lost them. Thus they request us to refresh and update their knowledge and skills.<br><br>Also not only the ex-trainees of RCMRD training but also new employees (surveyors and/or technicians) need to learn the GIS tools practically.        |  |         |          |   |                       |
| <b>Target Groups</b>  | UNS MoPI&RD <ul style="list-style-type: none"> <li>• Survey Department</li> <li>• Road and Construction Department</li> </ul> SSUWC, UNS  |  |         |          |   |                       |
| <b>Number of Trainees</b>   | 10 persons  |  |         |          |   |                       |
| <b>Project Purpose</b>  | To develop the knowledge and skills of the MoPI&RD technical staffs about digital mapping with GIS  |  |         |          |   |                       |
| <b>Training Subjects and Expected Duration</b>  | <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 70%;">Subject</th> <th style="width: 30%;">Duration</th> </tr> </thead> <tbody> <tr> <td>           GIS           <ul style="list-style-type: none"> <li>• Basic operation</li> <li>• Component, and its interface</li> <li>• GIS Data</li> <li>• Working with Arc Map</li> <li>• GIS data analysis</li> <li>• Creating land use map</li> <li>• Introduction of GIS data created under JICA Project</li> <li>• Future project utilization of GIS data for Malakal Town</li> </ul> </td> <td>5 day/ week x 1 month</td> </tr> </tbody> </table> |  | Subject | Duration | GIS <ul style="list-style-type: none"> <li>• Basic operation</li> <li>• Component, and its interface</li> <li>• GIS Data</li> <li>• Working with Arc Map</li> <li>• GIS data analysis</li> <li>• Creating land use map</li> <li>• Introduction of GIS data created under JICA Project</li> <li>• Future project utilization of GIS data for Malakal Town</li> </ul> | 5 day/ week x 1 month |
| Subject   | Duration  |  |         |          |   |                       |
| GIS <ul style="list-style-type: none"> <li>• Basic operation</li> <li>• Component, and its interface</li> <li>• GIS Data</li> <li>• Working with Arc Map</li> <li>• GIS data analysis</li> <li>• Creating land use map</li> <li>• Introduction of GIS data created under JICA Project</li> <li>• Future project utilization of GIS data for Malakal Town</li> </ul> | 5 day/ week x 1 month   |  |         |          |   |                       |
| <b>Related Projects</b>   | Port rehabilitation, road construction, water supply, water storm drainage, and the other projects which derive from the Comprehensive Plan   |  |         |          |   |                       |
| <b>Needed Input (Human Resources, Cost, Equipment)</b>  | Lecturers<br>Technical Assistance (Training Plan)<br>Software, satellite images   |  |         |          |   |                       |

Source: JICA Project Team

<sup>6</sup> The Regional Centre for Mapping of Resources for Development

**Table 14.4-5 Auto CAD Training**

| <b>Project Title</b>  | Auto CAD Trainings   |  |         |          |   |                       |                           |
|---|--|--|---------|----------|---|-----------------------|---------------------------|
| <b>Training Type</b>  | 1. Training in Malakal (MoPI&RD) <ul style="list-style-type: none"> <li>• Course work</li> <li>• OJT for road planning, residential area planning, etc.</li> </ul> 2. Training in Juba<br>3. Training in Kenya (RCMRD)   |  |         |          |   |                       |                           |
| <b>Background of the training</b>   | In 2007, some of surveyors of UNS MoPI&RD were dispatched to Kenya RCMRD <sup>7</sup> to learn about GIS for digital mapping. However when they came back to South Sudan, their offices had not had electricity, hardware and software installed yet.<br>Recently, number of returnees migrated to Malakal Town has increased, therefore, it is needed to use Auto CAD to process the map data. It is useful for planning residential areas and registering the sales of land effectively. Auto CAD is also used for general purposed of design such as road, water supply, etc. Since quite a few engineers of MoPI&RD could use Auto CAD as of 2012.   |  |         |          |   |                       |                           |
| <b>Target Groups</b>  | UNS MoPI&RD <ul style="list-style-type: none"> <li>• Survey Department</li> <li>• Road and Bridge Department</li> <li>• Land Department</li> </ul> SSUWC, UNS  |  |         |          |   |                       |                           |
| <b>Number of Trainees</b>   | 10 persons   |  |         |          |   |                       |                           |
| <b>Project Purpose</b>  | To develop the knowledge and skills of the MoPI&RD technical staff regarding digital mapping with GIS  |  |         |          |   |                       |                           |
| <b>Training Subjects and Expected Duration</b>  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Subject</th> <th style="width: 30%;">Duration</th> </tr> </thead> <tbody> <tr> <td>           Methodology and Practice           <ul style="list-style-type: none"> <li>• Starting up program, creation and working with drawing files, creation and modification of lines and objects, drawing annotation and dimensioning, drawing organization using layers, printing &amp; plotting, and use of inquiry and property tools, etc.</li> </ul> </td> <td rowspan="2" style="text-align: center; vertical-align: middle;">5 day/ week x 1 month</td> </tr> <tr> <td>OJT using Topographic Map</td> </tr> </tbody> </table> |  | Subject | Duration | Methodology and Practice <ul style="list-style-type: none"> <li>• Starting up program, creation and working with drawing files, creation and modification of lines and objects, drawing annotation and dimensioning, drawing organization using layers, printing &amp; plotting, and use of inquiry and property tools, etc.</li> </ul> | 5 day/ week x 1 month | OJT using Topographic Map |
| Subject   | Duration   |  |         |          |   |                       |                           |
| Methodology and Practice <ul style="list-style-type: none"> <li>• Starting up program, creation and working with drawing files, creation and modification of lines and objects, drawing annotation and dimensioning, drawing organization using layers, printing &amp; plotting, and use of inquiry and property tools, etc.</li> </ul> | 5 day/ week x 1 month  |  |         |          |   |                       |                           |
| OJT using Topographic Map   |  |  |         |          |   |                       |                           |
| <b>Related Projects</b>   | Port rehabilitation, road construction, water supply, water storm drainage, subdivision planning and the other projects which derive from the Comprehensive Plan   |  |         |          |   |                       |                           |
| <b>Needed Input (Human Resources, Cost, Equipment)</b>  | Lecturers<br>Technical Assistance (Training Plan)<br>Software, satellite images  |  |         |          |   |                       |                           |

Source: JICA Project Team

<sup>7</sup> RCMRD: The Regional Centre for Mapping of Resources for Development

**Table 14.4-6 Technical (Skills) Training**

| <b>Project Title</b>   | Training for Technicians in workshops of the MoPI&RD   |         |          |             |   |         |  |          |  |                            |  |
|--|--|---------|----------|-------------|---|---------|--|----------|--|----------------------------|--|
| <b>Training Type</b>   | Training in MoPI&RD, Malakal<br>1. Course Training<br>2. Field Training (OJT)  |         |          |             |   |         |  |          |  |                            |  |
| <b>Background of the Training</b>  | The number of experimental technicians is in short supply in Malakal. In order to implement projects which derive from the Comprehensive Plan smoothly, skilled technicians are needed. Since JICA has been supporting the VTCs in South Sudan, it is expected to collaborate with the VTC Malakal about the curriculum and teaching materials of skill trainings, and the classroom and workshop.   |         |          |             |   |         |  |          |  |                            |  |
| <b>Target Groups</b>   | Technicians of MoPI&RD in the fields of electric, plumbing, mechanic, and tool car mechanic  |         |          |             |   |         |  |          |  |                            |  |
| <b>Precondition</b>  | The trainees have certain basic knowledge and skills and/or certification from VTC.  |         |          |             |   |         |  |          |  |                            |  |
| <b>Number of Trainees</b>  | 8 persons per each class   |         |          |             |   |         |  |          |  |                            |  |
| <b>Project Purpose</b>   | The trainees obtain the operational and maintenance knowledge and skills of their responsible facility and equipment.<br><br>Also in the future, the trainees acting as trainers will be able to transfer the knowledge and skills to junior staffs (new staffs) and/or community people.  |         |          |             |   |         |  |          |  |                            |  |
| <b>Training Subjects and Expected Duration</b><br><br>Day; 8:30-18:00<br>(AM tea break: 30min<br>Lunch break: 60min) | <table border="1"> <thead> <tr> <th>Subject</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>Electrician</td> <td>Course training: 2 weeks<br/>OJT: 3-5 months depending on sector</td> </tr> <tr> <td>Plumber</td> <td>Course training: 2 weeks<br/>OJT: 1 month</td> </tr> <tr> <td>Mechanic</td> <td>Course training: 2 weeks<br/>OJT: 3-5 month depending on sector</td> </tr> <tr> <td>Car Mechanic for tool cars</td> <td>Course training: 2 weeks<br/>OJT: 3-5 month depending on sector</td> </tr> </tbody> </table> | Subject | Duration | Electrician | Course training: 2 weeks<br>OJT: 3-5 months depending on sector | Plumber | Course training: 2 weeks<br>OJT: 1 month | Mechanic | Course training: 2 weeks<br>OJT: 3-5 month depending on sector | Car Mechanic for tool cars | Course training: 2 weeks<br>OJT: 3-5 month depending on sector |
| Subject  | Duration   |         |          |             |   |         |  |          |  |                            |  |
| Electrician  | Course training: 2 weeks<br>OJT: 3-5 months depending on sector  |         |          |             |   |         |  |          |  |                            |  |
| Plumber  | Course training: 2 weeks<br>OJT: 1 month   |         |          |             |   |         |  |          |  |                            |  |
| Mechanic   | Course training: 2 weeks<br>OJT: 3-5 month depending on sector   |         |          |             |   |         |  |          |  |                            |  |
| Car Mechanic for tool cars   | Course training: 2 weeks<br>OJT: 3-5 month depending on sector   |         |          |             |   |         |  |          |  |                            |  |
| <b>Related Projects</b>  | Road Construction, Water Supply, Public Toilet Distribution, and other projects which derive from the Comprehensive Plan   |         |          |             |   |         |  |          |  |                            |  |
| <b>Needed Input (Human Resource, Cost, Equipment)</b>  | Curriculum and teaching materials<br>Operational and maintenance manuals<br>Installation of facilities and equipment which the trainees should operate within the projects<br>Workshop equipment   |         |          |             |   |         |  |          |  |                            |  |

Source: JICA Project Team



**Table 14.4-7 Basic Accounting Skill Training**

| <b>Project Title</b>                           | Basic Accounting Skill Training  |  |         |          |  |                        |                    |                   |                       |                   |
|--|--|--|---------|----------|--|------------------------|--------------------|-------------------|-----------------------|-------------------|
| <b>Training Type</b>                           | Course Training in Malakal   |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Background of the Training</b>              | Almost all ministries and agencies are facing a shortage of personnel who have accounting skills. Also many existing accountants in public sector still work manually.<br>This training utilizes modernized accounting skills with computer software. It aims to strengthen basic accounting skills of existing accountants, and to produce new accountants.             |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Target Groups</b>                           | For all accountants and public officials in charge of finance and accounting of UNS government (ministries and agencies)   |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Number of Trainees</b>                      | 2 persons from each ministry/agency<br>(total about 30 persons)  |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Project Purpose</b>                         | This training utilizes modernized accounting skills with computer software. It aims to strengthen basic accounting skills of existing accountants, and to produce new accountants.   |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Training Subjects and Expected Duration</b> | <table border="1"> <thead> <tr> <th>Subject</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1. Microsoft Office<br/>• Word<br/>• Excel</td> <td>2 weeks (only evening)</td> </tr> <tr> <td>2. Cash Management</td> <td rowspan="3">2 weeks (all day)</td> </tr> <tr> <td>3. Deposit Management</td> </tr> <tr> <td>4. Reports Making</td> </tr> </tbody> </table> |  | Subject | Duration | 1. Microsoft Office<br>• Word<br>• Excel | 2 weeks (only evening) | 2. Cash Management | 2 weeks (all day) | 3. Deposit Management | 4. Reports Making |
| Subject  | Duration   |  |         |          |  |                        |                    |                   |                       |                   |
| 1. Microsoft Office<br>• Word<br>• Excel       | 2 weeks (only evening)   |  |         |          |  |                        |                    |                   |                       |                   |
| 2. Cash Management                             | 2 weeks (all day)  |  |         |          |  |                        |                    |                   |                       |                   |
| 3. Deposit Management                          |  |  |         |          |  |                        |                    |                   |                       |                   |
| 4. Reports Making                              |  |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Related Projects</b>                        | CBTF   |  |         |          |  |                        |                    |                   |                       |                   |
| <b>Needed Equipment</b>                        | Curriculum and teaching materials<br>Lecturers<br>Classroom(s)<br>Application for accounting, PCs  |  |         |          |  |                        |                    |                   |                       |                   |

Source: JICA Project Team

### (3) Proposed Capacity and Institutional Development Projects

The proposed capacity development projects so far are as follows.

CD-1 Local Government Administration Improvement Project

Capacity development for planning, budget implementation and management, coordination with other sector departments.

CD-2 Cost Recovery System Improvement Project

Hygiene education, establishment of community public toilet maintenance committee, accounting capability development, etc.

ID-1 Police Box and Community Police System Establishment Project

Establishment of police box and community police system linked with government police headquarter.

ID-2 Malakal-Juba Urban Management System Project

Monitoring of implementation progress of Malakal and Juba urban infrastructure M/P supported

by JICA, and human resource development (law, land registration, detailed planning, participatory development, social research, GIS, and so on).

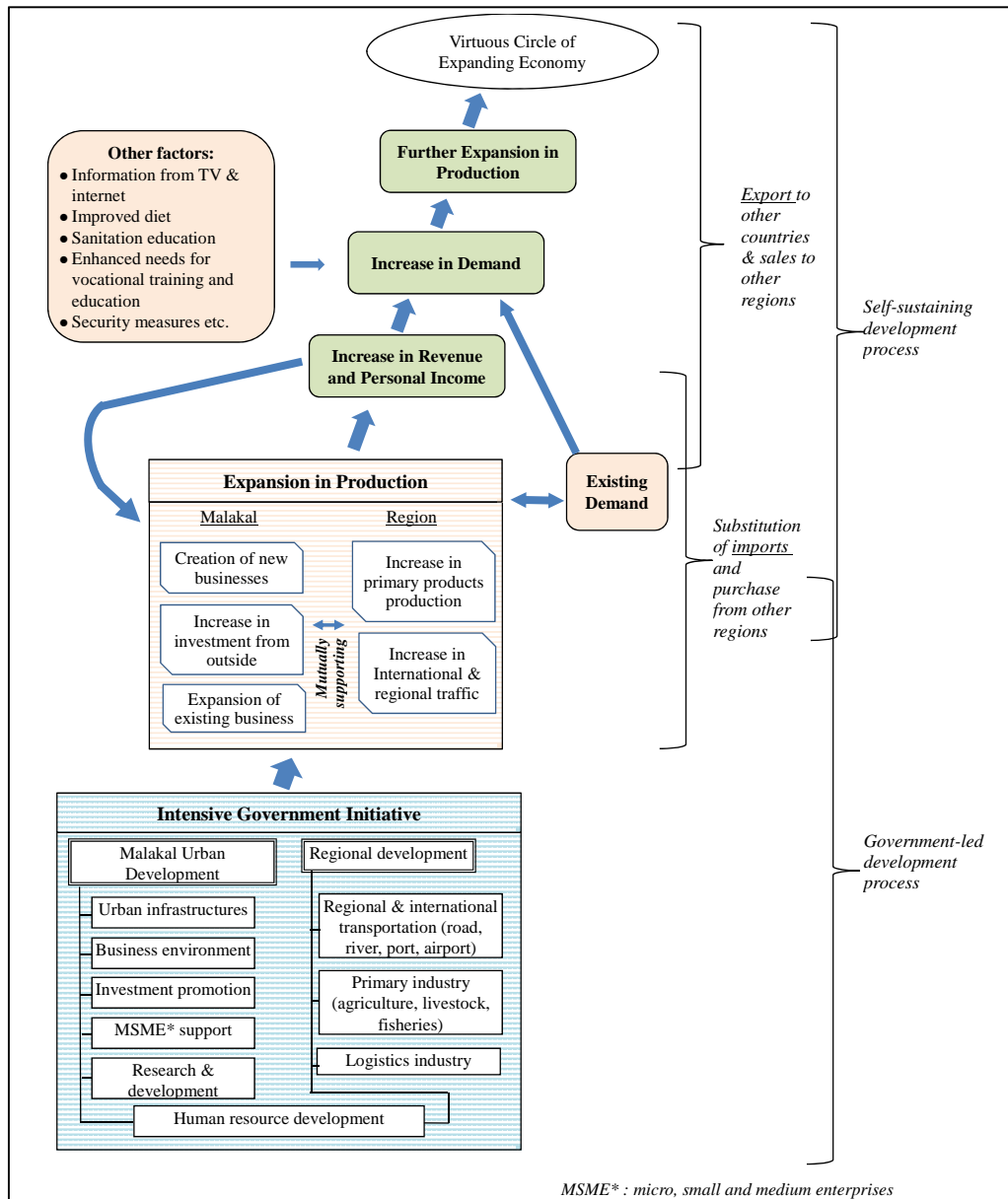
ID-3 Land Registration System Improvement Project

Mechanization and computerization of land registration, computer data base establishment, human resource development for land registration, use of JICA prepared topographic maps.

## CHAPTER 15 ECONOMIC DEVELOPMENT

### 15.1 ECONOMIC DEVELOPMENT BY STAGE

Figure 15.1-1 presents a general schematic of step-by-step economic development. Figure 15.1-2 is a development of Figure 15.1-1 taking into consideration the specific conditions of Malakal Town.



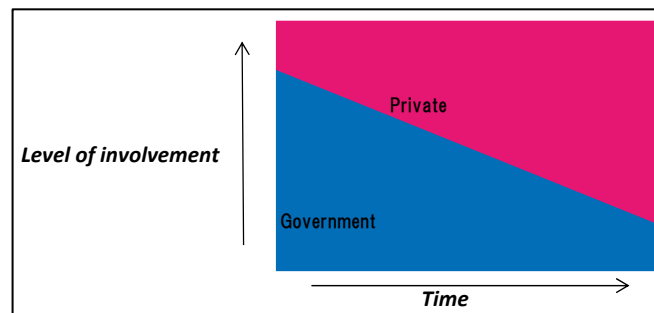
Source: JICA Project Team

**Figure 15.1-1 Stages of Economic Growth**

The whole process of economic development in Malakal can be divided into two stages from two perspectives. From the perspective of the leading player of development, the first stage of the process will be the “Government-led development process”, at which the government leads the development by public investment to improve the physical condition of Malakal Town and the surrounding areas as well as adopting reform measures to improve business environment to one

more favourable for businesses activities. Human resources development is the most fundamental factor common to Malakal Town and the surrounding area.

As a result of various efforts by the government at the initial stage of the process, activities by the private sector will be activated and expanded. Production by the existing business, new business or even investors from outside will increase in Malakal Town. The production of primary sector products from the agriculture, livestock and fisheries sectors will also increase as a result of improved availability of inputs and introduction of modern technology. Demand for products will increase as a result of increasing revenue and personal income, further increasing production. Other factors such as improved diet and enhanced awareness for sanitation, for example, would also contribute to an increase in demand. This stage could be called “Self-sustaining development process”, once this mechanism of expanding demand and supply gains momentum as a virtuous cycle. The role of government and the private sector would change over time as conceptualized as below.



Source: JICA Project Team

**Figure 15.1-2 Concept on Level of Involvement of Government and Private Toward Self-Sustaining Development**

From the perspective of inter-regional and international trade, the process of economic development can be divided into “import substitution stage” and “export promotion stage”. The terms “import” and “export” here include commodities traded with other regions within South Sudan in addition to those with other countries. It is sensible to promote production of commodities that are imported from other regions or countries, especially those for which a comparative advantage exists. There are many products in Malakal, which are imported from other countries and regions such as beans, vegetables and fruits for example.

They are imported simply because they are not produced in Malakal and the surrounding areas, despite favourable natural conditions, and this is due to the under-exploitation of land and water resources as a result of many years of civil war. So the initial effort in increasing production will focus on substitution of commodities imported from other countries or purchased from other regions. It should be noted, however, that there is a limit in import substitution. Some goods for which the comparative advantage of Makal is low, may be better to remain imported. The geographical isolation of Malakal at present could be an advantage in these substitution industry promotion if international and inter-regional transportation networks are improved.

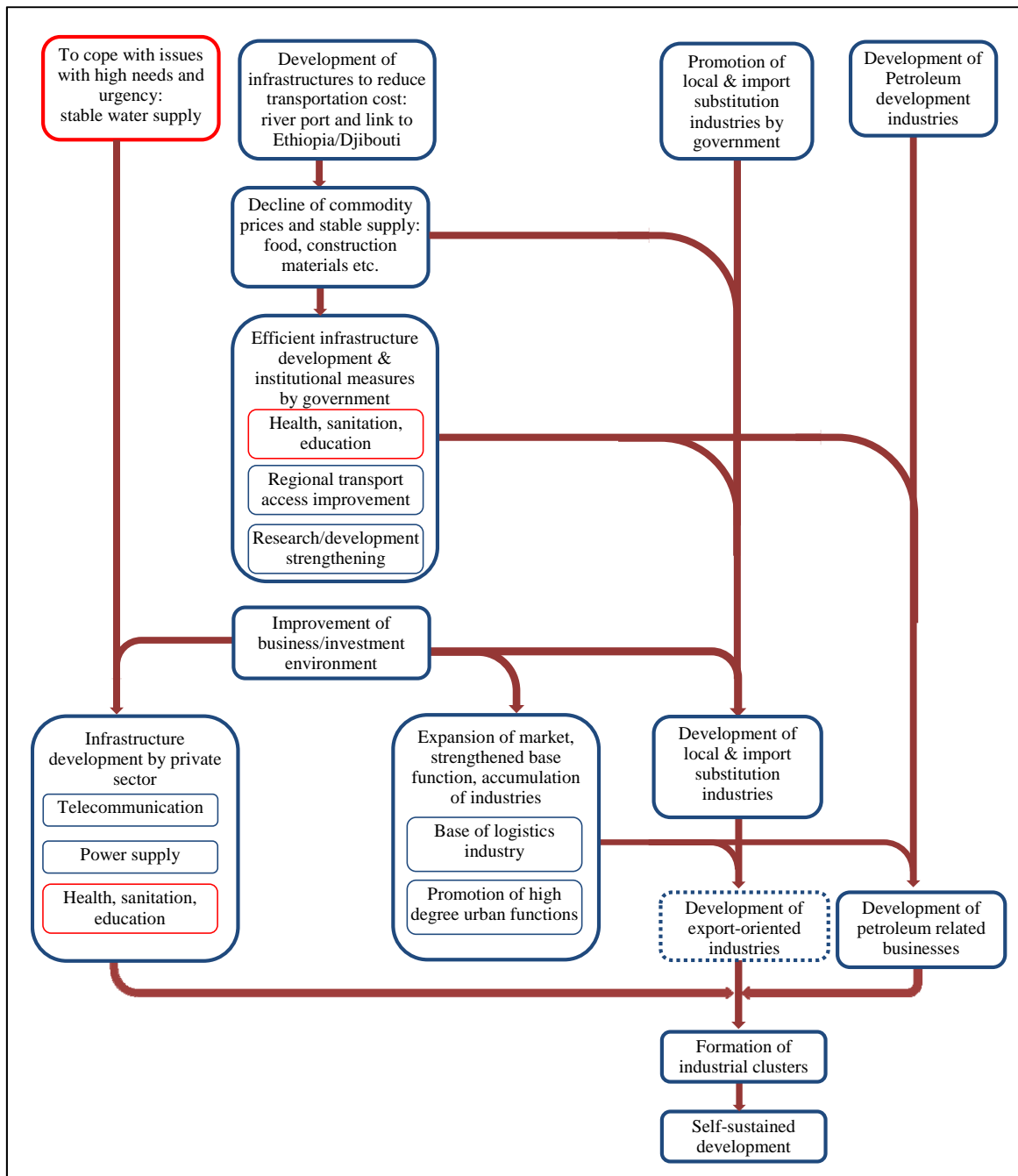
In the process of import substitution, some goods may be found to be competitive in the national market or overseas market. Promotion of export of these commodities could be promoted, at that stage. There may be some exceptional cases in which export could be promoted from the beginning. Fish and fish processed products may be one of them.

In reality, the process from import substitution to export promotion would be a general trend rather than two different clearly separated stages. They could happen at the same time sometimes. It may also be a cycle to be repeated in accordance with technological innovations and entering of new types of products and services into market.

**Figure 15.1-3** elaborates the scenario shown in **Figure 15.1-1** by considering the circumstance in which Malakal Town finds itself. The major issues are summarized as follows.

- (i) The prices of commodities in Malakal are extremely high due to high transportation costs. It is said that 50% of the prices are transportation cost. It is, therefore, of high priority to improve and expand the transportation network to minimize the transportation cost. The important facilities in this regard are the river port in Malakal, river transport system and the international road link to neighbour countries such as Ethiopia and Djibouti. Reduction of prices will ease the burden on the people's life and enhance the efficiency of public investment by the government.
- (ii) The improvement of various services supplying urgent needs such as the water supply should be promoted prior to the reduction of the prices. Although these would be high cost development, they should be promoted to fulfil basic human needs.
- (iii) Under preferable condition with reduced prices of commodities, the government would expand its activities to cover other important areas such as the regional road network, health and medical facilities and education. Research and development functions shall be strengthened.
- (iv) The initial government initiatives such as above would contribute to improving the business environment for the private sector. This would encourage private companies to start or expand their business in providing services of infrastructure such as telecommunications, power supply, health and medical services and education.
- (v) The position of Malakal in a larger region encompassing Upper Nile State (UNS) and Upper Nile region will be established, especially as the hub of transportation and logistics network and the base of higher urban services provision. Private business will expand in this context.
- (vi) The initial government support for promoting local industries starts bearing fruits with the improved business environment. Some export-oriented industries start emerging.
- (vii) Industries related to petroleum industry in UNS such as logistics, service and engineering industries will be promoted.
- (viii) Industrial clusters will be created in the forms of new products combining different locally available resources and collaborative efforts by different actors such as government, academia, research institute and business. The new products will be exported, thus reaching

the self-sustained economic growth stage.

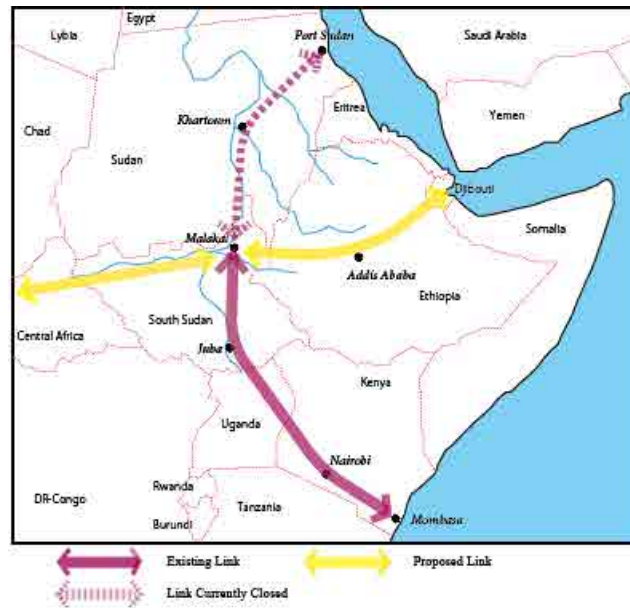


Source: JICA Project Team

**Figure 15.1-3 Stage-wise Economic Development Scenario of Malakal Town**

## 15.2 ESTABLISHMENT OF AN EAST-WEST TRANSPORTATION CORRIDOR

Reduction of transportation costs for commodities supplied to Malakal is an important task the government should tackle at an early stage, because high cost of commodities in Malakal is placing burdens on public expenditure, people's life and business activities as stated above. For inter-regional and international links, strengthening links as shown in **Figure 15.2-1** is recommended.



Source: JICA Project Team

**Figure 15.2-1 Proposed East-West Transportation Corridor**

The traditional routes along which commodities have been transported to Malakal run in the north-south direction, from Juba to Malakal and Khartoum to Malakal. Most goods from Juba and those from Khartoum are imported from Mombasa in Kenya and Port Sudan in Sudan respectively. The distance between Malakal and Port Sudan is about 1,300km, while that between Malakal and Mombasa is about 1,800km. The proposed link above runs in the east-west direction. It connects Malakal with Djibouti in the east through Addis Ababa in Ethiopia and extends to west through western provinces of South Sudan and into Central Africa.

The link between Malakal and Djibouti can function as an alternative route to the Malakal-Khartoum route which has been closed since April 2012. Its distance is about 1,300km, similar to Malakal-Port Sudan. Commodities could be transported to Malakal from Djibouti and vice versa along this route with similar transportation cost and further to the western states and Central Africa. Products that are produced in Malakal could be exported to overseas market through this east-west route. Malakal could function as the node of regional and international transportation by the creation of this “East-West Transportation Corridor”.

There are two projects going on to realize this concept. One is the road project for connecting Malakal with Ethiopia at Gambella through Paloque, Mathian, Maiut and Pagak. This project is jointly undertaken by the federal government and UNS with assistance of an international partner. Although this project is reported to be completed in 2013, it will likely take some more years in reality.

The other is the road project to connect Malakal with Ethiopia at Joko through Naseer. This project is jointly undertaken by the central government and Upper Nile state government. A Chinese contractor will take over the construction work from Sudan company. Its completion is planned in 2017.

### 15.3 IMPROVEMENT OF BUSINESS ENVIRONMENT

Information collected from companies and shops surveyed by the Town Profile Survey revealed that they face problems of transportation costs, poor road, too many taxes, lack of financial institutions, corruption and high cost of cooling facilities. The issue of transportation and road is dealt with in **Section 7.9**. The following part presents proposed directions for improving business environment mainly in institutional aspect, not physical infrastructure aspect.

**Table 15.3-1** presents the result of a survey conducted by the World Bank titled “Doing Business in Juba 2011”. Although this survey focused on Juba, the findings would be relevant to Malakal Town in improving its business environment. A set of information was collected by the survey, based on which scores were calculated for respective factor and the results compared with those of 183 economies in the world. The information collected included nine aspects: “starting a business”, “dealing with construction permits”, “registering property”, “getting credit”, “protecting investors”, “paying taxes”, “trading across borders”, “enforcing contracts” and “closing a business”.

Juba was rated at 159<sup>th</sup> out of 184 economies in the world in terms of overall ease in doing business. The results are summarized as follows.

**Table 15.3-1 Result of Business Survey in Juba**

| Evaluation Factor                 | Rank                       |
|-----------------------------------|----------------------------|
| Ease of doing business (overall)  | 159 (out of 184 economies) |
| Starting a business               | 123                        |
| Dealing with construction permits | 49                         |
| Registering property              | 124                        |
| Getting credit                    | 176                        |
| Protecting investors              | 173                        |
| Paying taxes                      | 84                         |
| Trading across borders            | 181                        |
| Enforcing contracts               | 74                         |
| Closing a business                | 183                        |

Source: “Doing Business in Juba 2011”, World Bank

Those factors requiring most effort are “getting credit”, “protecting investors” and “trading across borders”, followed by “registering property” and “starting a business”. The low ranks of “getting credit” and “trading across border” coincide with the findings of the Town Profile Survey. It clarified the constraints for businesses in Malakal such as non-availability of financial institutions and limitations related to transportation such as the high cost of transportation, poor road and inaccessibility to goods and commodities.

Based on the survey results, the World Bank report proposes a set of reforms for respective item as shown in **Table 15.3-2**. Since some issues are more suitable to be dealt with at national level, cooperative effort by state government, national government and Malakal City Council is essential.



**Table 15.3-2 Measures Proposed to Improve Business Environment in Juba**

Starting a Business

- Improve access to information and publicize regulations
- Reduce the cost of starting a business
- Streamline procedures
- Encourage delegation at the business registry

Dealing with Construction Permits

- Set the foundation of a building code
- Establish a simple and efficient construction permit process
- Build the capacity of local authorities and association of construction professionals to enforce construction regulations
- Improve electricity and water infrastructure

Registering Property

- Complete the transfer of the land registry to the executive branch
- Reduce property registration fees or replace them with a lower fixed fee
- Clarify the process for land transactions between communities and entrepreneurs

Getting Credit

- Enact a single comprehensive law concerning the use of movable assets as collateral
- Overhaul the system of registration of movable property
- Allow out-of-court enforcement
- Promote the establishment of a credit bureau

Protecting Investors

- Increase disclosure obligations to the board of directors and in the annual report
- Request an assessment of related-party transactions by an independent body
- Increase the liability of manager and the board of directors
- Allow shareholders greater access to corporate documents before and during trials

Paying Taxes

- Clarify ambiguities in tax obligations
- Educate entrepreneurs on the taxation system
- Simplify taxes where possible

Trading Across Borders

- Streamline documentation requirements and customs clearance procedures
- Reduce checkpoints to a minimum
- Continue to improve inland transportation

Enforcing Contracts

- Keep statistics and measure the impact of reforms
- Clarify the legal framework, enact missing regulation and publicize applicable legislation
- Increase the number of legal professionals
- Establish specialized judges or specialized commercial sections within existing courts

Closing a Business

- Undertake a review of the insolvency system to understand why there are so few insolvency proceedings
- Revise insolvency legislation to conform to international leading practices, including the introduction of up-to-date reorganization provisions
- Develop and implement an insolvency practitioner regulatory framework
- Increase the capacity of institutions that implement the insolvency framework
- Train designated judges to handle insolvency cases
- Adopt guidelines that facilitate out-of-court workouts
- Consider whether provisions should be implemented to specifically address the needs of micro, small, and medium-size enterprises that have fallen into bankruptcy.

Source: "Doing Business in Juba 2011", World Bank

## 15.4 STRENGTHENING OF RESEARCH, DEVELOPMENT AND EXTENSION SERVICES

A strengthening of the research and development function is an important challenge in promoting primary sector activities such as agriculture, livestock, poultry and fishery in Malakal and the surrounding areas.

The Ministry of Animal Resources and Fisheries (MOARF), Republic of South Sudan (ROSS) prepared “Policy Framework and Strategic Plans 2012-2016” recently. The State Ministry of Animal Resources and Fisheries, UNS plans to start preparing their own version of the strategic plan within the framework provided by the national strategic plan.

The MOARF’s National Strategic Plan sets forth the following as strategic objective, strategy, activity and output in the aspect of research and development on livestock and fishery.

**Table 15.4-1 Strategic Objective, Strategy, Activity and Output on Research and Development by Ministry of Animal Resources and Fisheries ROSS**

| Strategic Objective   | Strategy  | Activity   | Output   |
|---|---|--|--|
| To develop and strengthen the capacity of veterinary research and diagnostic laboratories | Construct Central Diagnostic Laboratory and rehabilitate two satellite laboratories | Construction of the units and provision of equipment, consumables, chemicals and reagents                          | 3 main disciplines - veterinary laboratory, diagnostic and experimental animal units at Rejaf West in place and in use |
|   |   | rehabilitation, renovation and construction of the satellite laboratories  | Two satellite laboratories of Malakal and Wau in place and in use  |
| To develop sustainable livestock and fisheries activities in South Sudan                  | Reduce food security in rural households  | Implementation of PATTEC modalities- mapping of tsetse flies and ticks (disease vectors) of economic importance    | Production and productivity increased and enhanced. Livestock livelihoods and human welfare improved                   |
|   |   | Socio-economic impact of East Coast fever (ECF) on cattle production determined                                    | Milk production increased and productivity increased   |
|   |   | Stock assessment of fisheries and aquaculture development  | Investment map for fisheries projects in place and in use  |
|   |   | Study on genetic improvement of dairy goats/dairy and beef cattle, feed formulation analysis and quality assurance | Milk and meat production increased and productivity increased  |

Source: “Policy Framework and Strategic Plans 2012-2016”, MOARF, ROSS

Research and development on animal resources and fisheries in UNS needs to be planned within this framework and in consideration of rich livestock and fishery resources the State is endowed with. Strengthening the research and development function is an important challenge for Ministry of Agriculture as well.

## 15.5 HUMAN RESOURCES DEVELOPMENT

Malakal Vocational Training Centre (MVTC) established in 1974 had been functioning as the centre of vocational training and source of supplying trained workforce mainly to Sudan. After

many years of closure due to the civil war, MVTC resumed its activities in 2003. There are three types of courses: Apprenticeship Training, Short Courses and Upgrading Course for Technicians, of which the first has been the main activity. There are 289 students and 210 students in apprentice training and short courses respectively. The number of trainers is 24, although there are 56 posts. There are 17 courses, which are auto-mechanics, diesel machine, farm machinery, auto electricity, machine shop, glass blowing, carpentry, building, plumbing, fitting, welding/blacksmith/sheet metal fabrication, general electricity, food processing, tailoring/sewing, computer, driving and refrigeration/air conditioning.

MVTC is facing a number of problems, of which the most fundamental is the mismatching between the demand for and supply of graduates trained at MVTC. MVTC used to be sending its students to companies in the north for outside training, which is the obligation for the third year students, and its graduates to the labour market in the north. While this relationship with the north is no longer in place, the curriculum still remains the same resulting in difficulty for graduates to find jobs in Malakal or UNS. A detailed restructuring plan of MVTC needs to be prepared in consideration of strategic training subjects which could contribute to development of Malakal Town and UNS.

## **15.6 ECONOMIC DEVELOPMENT SECTOR PROJECTS**

Projects proposed in Economic Development Sector are presented below:

### **(1) EC-1: International Transportation Corridor Establishment Project**

Development of international all-weather road network including between Malakal and Ethiopia, and between Malakal and Kenya.

### **(2) EC-2: Malakal Airport Internationalization Project**

Planned in 2006: i) fence construction, ii) extension of the runway by 1km, iii) expansion of the airplane parking area (100m x 100m), iv) reconstruction of control tower and passenger building.

### **(3) EC-3: Malakal Rural Road Network Improvement Project**

Improvement of road network connecting local areas of UNS and Malakal, Deleib - Fadit - Panyikang, Melut - Malakal, and Maban - Tonga - Oriny reaches.

### **(4) EC-4: Upper Nile Fisheries Project**

MARF human resource development, improvement for fishery port, and provision of fishing equipment for increasing fish catch.

### **(5) EC-5: Malakal Dairy Farm Project**

Human resource development for MARF, dairy farmers, and UN University and provision of

machine and equipment.

**(6) EC-6: Malakal Poultry Breeding Farm Project**

Construction of large scale poultry breeding facilities.

**(7) EC-7: Malakal Slaughter House Construction Project**

Relocation of slaughter house to southern part of Malakal Town.

**(8) EC-8: Malakal Light Industrial Park Development Project**

Development of light industrial park in the northern Malakal (industrial cluster assumed, converting from government-led to private-led development).

**(9) EC-9: Logistics Hub Development Project**

Logistic hub development for cargo container transport for international traffic network, local road, airline, river in the southern Malakal.

**(10) EC-10: Research Function and Support Services Development Project**

Relization of "Policy Framework and Strategic Plans 2012 - 2016".

**(11) EC-11: Malakal Vocational Training Centre Reinforcement Project**

Programs related to industrial development in Malakal and neighbouring areas, and provision of equipment.

Note: The following port related projects are proposed under the Water Transport Sector in **Chapter 6**. Malakal Port is servicing not only Malakal Town, but UNS and Greater Upper Nile Region., These projects are categorized in the Region-wide Transport and Logistics Development program under Region-wide Economic Development Strategy in the Comprehensive Plan.

PT-1: Reconstruction of Jetty at Malakal Port Project

PT-2: Procurement of Crane Project

PT-3: Construction of New Port Project (Phase I)

PT-4: Construction of New Port Project (Phase II)

PT-5: Construction of Passenger Jetty Project

PT-6: Development of West Side (Left Bank) of River Nile Project

PT-7: Improvement of Malakal Port Project

PT-8: Procurement of Ferry Project

PT-9: Improvement of River Bank Protection Project

PT-10: Improvement of New Port Road Project

PT-11: Port Management Capacity Development Project

## **CHAPTER 16 SOCIAL WELFARE**

### **16.1 SOCIAL WELFARE**

The State Ministry of Gender and Social Welfare (MoG&SW) in Upper Nile State (UNS), is responsible for protecting and supporting the life of socially vulnerable people such as children, disabled people, senior citizens and women. While their activities must be undertaken within the policy framework of the ministry, it seems that officers are overwhelmingly occupied with day to day obligations directly contacting these people under vulnerable condition. They are protecting street children and abandoned children, supporting disabled people by providing wheel chairs and blind sticks, encouraging income generation by women by providing sewing machines and so on.

According to the ministry's management, the priorities for the ministry are;

- (i) Renovation of the existing orphanage.
- (ii) Establishment of a reformatory centre, which will accommodate the juvenile delinquents currently detained in the prison together with adult prisoners and the street children who are currently taken care of at a temporary street children centre
- (iii) Renovation of the old aged home
- (iv) Establishment of a home for war veterans and disabled
- (v) Enhancement of mobility of officers to enable them to undertake their duties such as rescuing rape victims, monitoring situation in the counties etc.

They regard technical upgrading in community development and empowerment of women also as high priorities.

Strengthening the collaboration between MOG&SW and other ministries is an important priority. MGSW is dispatching community development officers (CDOs) to each county in Upper Nile State (UNS) to support local people to initiate self-help activities. While the principle is for two community development officers to be stationed in each county, the reality is imbalanced allocation with some counties having two CDOs while others having none.

One problem is that there are no CDOs seconded to Malakal City Council since its establishment in 2011. Participation of people is required for Malakal Town to develop in a vibrant manner. Various activities proposed by the present study should involve local communities of Malakal Town. Communities, which have lost traditional values and human ties due to the long lasting civil war, should be strengthened and revitalized. The lowest tier of government such as Malakal Town is in the best position to support community development in this context. In this regard, the role of Malakal Town Council should be strengthened. Dispatch of CDOs from MoG&SW to Malakal City Council could be an initial step in this endeavour.

### **16.2 SOCIAL DEVELOPMENT SECTOR PROJECTS**

Projects proposed in Social Welfare Sector are presented below:

**(1) SW-1: BHN for Returnees Project**

Basic human needs (BHN) infrastructure improvement in residential areas of returnees for community development, geared with land use zoning.

**(2) SW-2: Malakal Street Children Centre Renovation Project**

Renovation of the street children centre which currently has poor sanitation and insufficient facilities.

**(3) SW-3: MoG&SW Speed Boat Project**

Securing means of transportation for improving government service of State Ministry of Gender and Social Welfare and Religious Affairs.

**(4) SW-4: Malakal Reformatory Centre Establishment Project**

Construction of juvenile reformatory facilities.

**(5) SW-5: Malakal Town Women's Group Community Empowerment Project**

Vocational training for women in the southern and eastern areas in Malakal for women empowerment.

**(6) SW-6: Upper Nile Culture Centre Establishment Project**

To promote the peaceful coexistence of different ethnic and tribal groups, in the large scale of Malakal Town, it is encouraged to foster respect and understanding among different groups and to promote cultural activities, or other kinds of events.

**(7) PD-1: Participatory Development Planning System Establishment Project**

Human resource development for UNS officials on participatory development planning and pilot project implementation.

**(8) PD-2: Human Resource Development for Community Development Officer (CDO) Project**

Capacity development for CDOs on planning, implementation, and evaluation.

**< PART IV >**

**FORMULATION OF THE COMPREHENSIVE PLAN**

## CHAPTER 17 ECONOMIC AND FINANCIAL ANALYSIS

This chapter presents the results of a preliminary analysis of the projects identified in **Chapter 6** to **Chapter 16** from a financial and economic viewpoint. Results obtained from the analysis were used as evaluation criteria for integration of the identified projects into the Comprehensive Plan. Economic and financial analyses are also conducted for some projects identified as urgently implemented projects.

### 17.1 GENERAL

This chapter deals with the financial and economic analyses of the projects with the object to quantitatively measure the financial and economic impacts of the public investment schemes as they are designed by the Project Team.

Using the framework of time-discount cash flow analysis, the measurement indices of Internal Rate of Return (IRR)<sup>1</sup> and Net Present Value (NPV) will be used to estimate the impacts, with a set of variables and assumptive parameters as summarized in the succeeding sections. The results of the analyses will be utilized either during or in the wake of project implementation so that financial and economic viabilities to be verified.

Economic benefits are estimated based on the Long-run Marginal Cost (LRMC) pricing in compliance with generally accepted guidelines for economic analysis.

### 17.2 ASSUMPTIVE VARIABLES AND PARAMETERS ADOPTED FOR FINANCIAL AND ECONOMIC ANALYSES

A set of variables and assumptive parameters shown in **Table 17.2-1** is used for financial and economic analyses of this Project.

**Table 17.2-1 Assumptive Variables and Parameters**

|   | Overall Variables  | Value  |
|---|--|--------|
| 1 | Project Life (construction period)                       | 30 (4) |
| 2 | GDP Real Growth rate (% , estimate 2012)                 | 1.1    |
| 3 | Inflation rate (% , June 2011 – June 2012)               | 71.7   |
| 4 | Economic Feasibility Criterion (EIRR, SDR)               | 8.0%   |
| 5 | Financial Viability Cut-off rate (FIRR-OCC) <sup>2</sup> | 25.0%  |

\*GDP: Gross Domestic Products, EIRR: Economic Internal Rate of Return,  
Source: JICA Project Team

<sup>1</sup> IRR, by definition, is a discount rate that equalizes discounted net benefits (benefit-cost) over the project life, and mathematically expression as follows.

$$IRR \equiv r : \text{that makes } \sum_{t=1}^n \{(B - C)_t \times (1 + r)^{-t}\} = 0$$

where;  $(B - C)_t$  represents net benefit in the year  $t$  ( $t = 1, 2, \dots, n$ ). The equation above is numerically solved by repeated calculation.

<sup>2</sup> Bank of Indonesia Reference Rate, January 2012. Only few data can be available as the Weighed Average Capital Cost, WACC, to use the estimate of opportunity cost. Here The World Bank data on WACC for Indonesia, the developing country same as South Sudan, was used.



Explanation of some key factors essential for the analysis is discussed in the following sections.

#### Project Life

Project life is estimated by taking into consideration prospective economic life of facilities, machineries, equipment, and others employed. In this light, 30 years for water supply sector projects is adopted.

#### Derivation of Financial Costs

Financial costs have been converted to economic costs as per international competitive (border) price by applying standard conversion factor (SCF) to eliminate “distortions” in the domestic economy. Further, transfer payments (taxes and duties) and price contingency have been eradicated from financial costs. Cost items by procurement sources (foreign and local) are realigned and streamlined in the way given in the World Bank Guidelines.

#### Physical Contingency and Price Contingency<sup>3</sup>

Taking into account an expected increase in cost estimates due to changes in quantities, technical specification, and/or engineering design and methods of implementation, physical contingency allowances is set by experience at 10.0% of the construction cost.

Regarding price contingency, current analysis assumes a rate 18.3% for the local cost portion, viz-à-viz, the recent inflationary pressure of 46.2% (July 2010 – July 2011) and 71.7% (July 2011 – July 2012)<sup>4</sup> prevailing in the country. Specifically, a price contingency rate of 18.3% is formulated by the summation of Sudanese inflationary pressure as measured by the 2000-12 Consumer Price Index (CPI) 3-year moving average of 10.8%<sup>5</sup> + country risk premium of 7.5%<sup>6</sup>. Just for reference, the Sudanese CPI over the period of 2000-12 is depicted in **Figure 17.2-1**. In the meantime, that for foreign cost portion is set at 1.8%, taking in view the 1.77% 3-year moving average inflation rates (2000 – 2012) of G7 countries (G8 minus Russia)<sup>7</sup>.

#### Operation and Maintenance (O-M) Cost

O-M cost incurred to the ordinary operation (fuel, deodorizers, and others of relevance) is set from experience at 7.0% of construction cost.

#### Annual Investment Schedules

Aggregate financial costs of the Project will be allocated annually during the construction period, with percentage shares.

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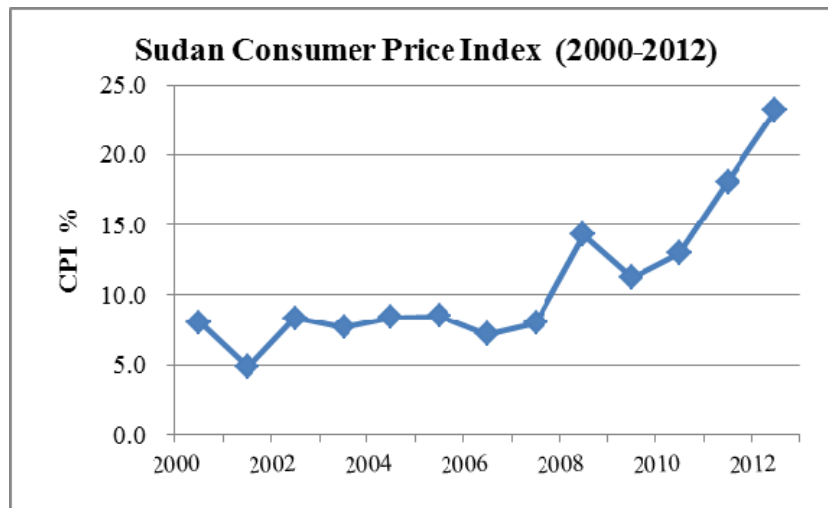
<sup>3</sup> Economic data of South Sudan is not available even in the latest International Monetary Fund (IMF) database (*World Economic Outlook*, April 2012), as such no direct source of information is available.

<sup>4</sup> Sources: <http://www.sudantribune.com/South-Sudan-inflation-still-a,43355>, <http://ssnbs.org/cpi/> (Central Bank of South Sudan)

<sup>5</sup> Source: [http://www.southsudaninfo.com/Economy\\_of\\_South\\_Sudan](http://www.southsudaninfo.com/Economy_of_South_Sudan)

<sup>6</sup> The World Bank, *Toolkit for Public-Private Partnerships in Roads and Highways*, Public-Private Infrastructure Advisory Facility (PPIAF), March 2009

<sup>7</sup> <http://www.marketresearch.com/Business-Monitor-International-v304/Sudan-South-Business-Forecast-Q3-7026542/>



Sources: Business Monitor International, Sudan and South Sudan Business Forecast Report Q3 2012.

**Figure 17.2-1 Inflationary Pressure in the Sudanese Economy (2000 – 2012)**

Financing Plan

Unlike Public and Private Partnership (PPP) financial modelling and analysis, the current analysis pursuing the Project Financial Internal Rate of Return (FIRR) and EIRR does not consider any financing sources in its financing plan. In compliance with generally accepted guidelines for financial and economic analysis, this current IRR analysis assumes project funds regardless of financing sources.

Financial and Economic Benefits

Economic benefit is estimated by the Long-run Marginal Cost pricing method.

FIRR cut-off rate (Proxy to Opportunity Cost of Capital)

The FIRR cut-off rate is set from experience at 25.0% that is a composition of 10% foreign exchange risk (devaluation) plus 15.0% hard currency-denominated return and other risk premium. While a weighted average cost of capital (WAC) with the parameters for Middle-income countries (South Sudan included) is normally estimated by the formula as given in the following box (WB PPIAF<sup>8</sup>, 2009), this rate would be provisional and hence subject to further discussion and elaboration since no monetary data and information (yields of Treasury Bills, Central Bank lending rate to commercial banks, and alike) is published.

| World Bank formula (the Capital Asset Pricing Model) for the estimation of the cost of equity |
|---|
| Cost of equity ( $C_e$ ) = $R_f + \beta \times (GMP + CRP)$                                   |
| Where   |
| $C_e$ : Required return on equity   |
| $R_f$ : Risk-free return that is equivalent to the Central Bank                               |
| $\beta$ : market risk sensitivity (0.78 for instance, the case of Indonesia)                  |
| GMP : Global Market Premium of 5.5%   |
| CRP : Country Risk Premium of 7.5%  |

<sup>8</sup> The World Bank, *Toolkit for Public-Private Partnerships in Roads and Highways*, Public-Private Infrastructure Advisory Facility :PPIAF), March 2009

EIRR cut-off rate 8.0% would be acceptable as public investment opportunities provided that the concerned projects are primarily considered as environment protection as well as human basic needs fulfilling schemes.

#### Standard Conversion Factor (SCF)

The economic cost is re-valued to reflect real competitive market prices by excluding built-in market failure or distortions such as monopoly, taxes, average cost diminishing industries, etc. Value added tax of 10% is levied on goods and services without clear legal ground<sup>9</sup>. With this value added tax and other taxes of relevance, standard conversion factor (SCF) is set as 0.85 for this analysis.

### 17.3 RESULTS OF PRELIMINARY ANALYSIS

Preliminary analysis of the proposed projects is made from the viewpoint of the expected benefits and degree of the investment return. Results of the analysis are shown in **Table 17.3-1** through **17.3-3**. In this analysis, projects contributing economic development are rather given higher standing than projects addressing basic human needs. These results are integrated in the overall evaluation of projects to give a priority for implementation.

**Table 17.3-1 Rating of Plausible Impacts (Financial and Economic Aspects)**

| Impact                         | Water Supply |      |      |      | Water Transport |      |      |      |      |           | Road Transport   |      |      |      |      |      |      |      |      |      |
|--------------------------------|--------------|------|------|------|-----------------|------|------|------|------|-----------|--|------|------|------|------|------|------|------|------|------|
|                                | WS-1         | WS-2 | WS-3 | WS-4 | PT-1            | PT-2 | PT-3 | PT-4 | PT-5 | PT-6 - 10 | PT-11  | RT-1 | RT-2 | RT-3 | RT-4 | RT-5 | RT-6 | RT-7 | RT-8 | RT-9 |
| Financial and Economic Impacts | C            | B    | C    | B    | A               | B    | A    | B    | C    | B         | A  | B    | B    | A    | B    | C    | C    | C    | B    | C    |
| Criteria                       |              |      |      |      |                 |      |      |      |      |           |  |      |      |      |      |      |      |      |      |      |
| Financial: Profitability       |              |      |      |      |                 |      |      |      |      |           | Economic: Productivity of Labour, Capital, and Technology, Expected Efficiency |      |      |      |      |      |      |      |      |      |
| A: Profoundly positive impact  |              |      |      |      |                 |      |      |      |      |           | B: Positive impact   |      |      |      |      |      |      |      |      |      |
| C: Little impact at this stage |              |      |      |      |                 |      |      |      |      |           | No Mark: Not to be considered  |      |      |      |      |      |      |      |      |      |

Source: JICA Project Team

<sup>9</sup> Deloitte, *International Tax South Sudan highlights*, 2012,

**Table 17.3-2 Rating of Plausible Impacts (Financial and Economic Aspects)**

| Impact                         | Energy |      |      | Sewage and Sanitation |      |      | Water Drainage |      |      |      |      | Solid Waste |  |      | Education |      |      |      |      | Health |      |      |      |      |      |  |
|--------------------------------|--------|------|------|-----------------------|------|------|----------------|------|------|------|------|-------------|--|------|-----------|------|------|------|------|--------|------|------|------|------|------|--|
|                                | EN-1   | EN-2 | EN-3 | SS-1                  | SS-2 | SS-3 | WD-1           | WD-2 | WD-3 | WD-4 | WD-5 | SM-1        | SM-2   | SM-3 | ED-1      | ED-2 | ED-3 | ED-4 | ED-5 | HE-1   | HE-2 | HE-3 | HE-4 | HE-5 | HE-6 |  |
| Financial and Economic Impacts | A      | A    | B    | B                     | C    | C    | B              | B    | C    | C    | C    | B           | B  | C    | B         | C    | B    | C    | C    | B      | C    | C    | C    | A    | B    |  |
| Criteria                       |        |      |      |                       |      |      |                |      |      |      |      |             |  |      |           |      |      |      |      |        |      |      |      |      |      |  |
| Financial: Profitability       |        |      |      |                       |      |      |                |      |      |      |      |             | Economic: Productivity of Labour, Capital, and Technology, Expected Efficiency |      |           |      |      |      |      |        |      |      |      |      |      |  |
| A: Profoundly positive impact  |        |      |      |                       |      |      |                |      |      |      |      |             | B: Positive impact   |      |           |      |      |      |      |        |      |      |      |      |      |  |
| C: Little impact at this stage |        |      |      |                       |      |      |                |      |      |      |      |             | No Mark: Not to be considered  |      |           |      |      |      |      |        |      |      |      |      |      |  |

Source: JICA Project Team

**Table 17.3-3 Rating of Plausible Impacts (Financial and Economic Aspects)**

| Impact                         | Economic Development |      |      |      |      |      |      |  | Social/Capacity Development |      |      |      |      |      |        |
|--------------------------------|----------------------|------|------|------|------|------|------|--|-----------------------------|------|------|------|------|------|--------|
|                                | EC-1                 | EC-2 | EC-3 | EC-4 | EC-5 | EC-6 | EC-7 | EC-8   | SW-1                        | SW-2 | SW-3 | SW-4 | SW-5 | SW-6 | CD-1~3 |
| Financial and Economic Impacts | A                    | B    | B    |      | C    | C    | A    | B  |                             |      |      |      |      |      | C      |
| Criteria                       |                      |      |      |      |      |      |      |  |                             |      |      |      |      |      |        |
| Financial: Profitability       |                      |      |      |      |      |      |      | Economic: Productivity of Labour, Capital, and Technology, Expected Efficiency |                             |      |      |      |      |      |        |
| A: Profoundly positive impact  |                      |      |      |      |      |      |      | B: Positive impact   |                             |      |      |      |      |      |        |
| C: Little impact at this stage |                      |      |      |      |      |      |      | No Mark: Not to be considered  |                             |      |      |      |      |      |        |

Source: JICA Project Team

## 17.4 RESULTS OF THE FINANCIAL AND ECONOMIC ANALYSIS BY SECTOR

Only the EIRRs of all of the cases are obtained through the analysis. The FIRRs are not derived and are shown in the following tables as “unable to estimate” due to lower sales revenues against costs incurred and “Not available” when due to non-profit operation. Summarized results of FIRR and EIRRs for each of the sector projects are given in **Table 17.4-1**. It must be noted that the amount of Expected Net Present Value (ENPV) varies widely among 7 sector projects because the magnitude of the projects is different.

**Table 17.4-1 Results of FIRRs, EIRRs, and ENPVs**

|                      | FIRR               | FNPV               | EIRR  | ENPV<br>with discount rate of 8%, mil. US\$ |
|----------------------|--------------------|--------------------|-------|---|
| WS-2                 | Unable to estimate | Unable to estimate | 10.1% | 6.3   |
| WS-4                 | Unable to estimate | Unable to estimate | 9.5%  | 2.5   |
| Water Transportation | Unable to estimate | Unable to estimate | 9.4%  | 3.0   |
| Road Transport       | N/A                | N/A                | 9.3%  | 8.2   |
| Energy               | N/A                | N/A                | 6.5%  | -2.2  |
| Storm Water Drainage | N/A                | N/A                | 9.5%  | 3.2   |

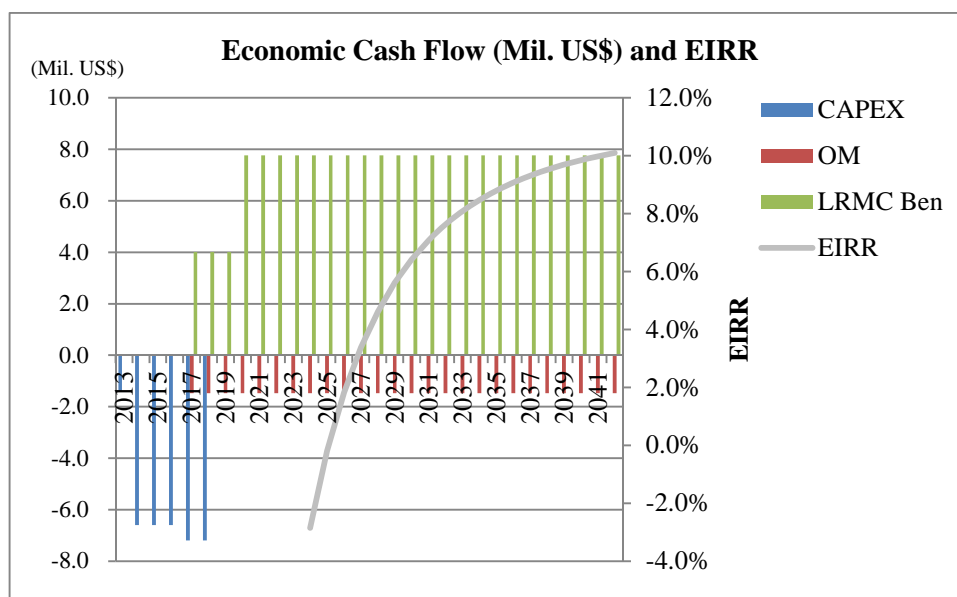
Note: The costs used in the cash were preliminary ones.

Source: JICA Project Team

### 17.4.1 Water Supply

#### (1) WS-2

FIRR and EIRR are calculated as N/A and 10.1%, with financial and economic net present values (FNPV and ENPV) of “unable to estimate” and US\$6.3 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow are shown in **Figure 17.4-1** and **Tables 17.4-2** and **17.4-3**.



Source: JICA Project Team

**Figure 17.4-1 Economic Cost and Benefit Streams and EIRR (WS-2)**

**Table 17.4-2 Summary Cash Flow (FIRR) (WS-2)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total   | Incremental Service | Benefit Total | Net Benefit   |
|--------------|-------------|-------------|--------------|---------------------|---------------|---------------|
| 2013         | 3.5         |             | 3.5          |                     |               | -3.5          |
| 2014         | 7.1         |             | 7.1          |                     |               | -7.1          |
| 2015         | 7.1         |             | 7.1          |                     |               | -7.1          |
| 2016         | 7.1         |             | 7.1          |                     |               | -7.1          |
| 2017         | 7.7         | 1.7         | 9.5          | 0.2                 | 0.2           | -9.3          |
| 2018         | 7.7         | 1.7         | 9.5          | 0.2                 | 0.2           | -9.3          |
| 2019         |             | 1.7         | 1.7          | 0.2                 | 0.2           | -1.6          |
| 2020         |             | 3.4         | 3.4          | 0.3                 | 0.3           | -3.0          |
| ⋮            |             | ⋮           | ⋮            | ⋮                   | ⋮             | ⋮             |
| 2040         |             | 3.4         | 3.4          | 0.3                 | 0.3           | -3.0          |
| 2041         |             | 3.4         | 3.4          | 0.3                 | 0.3           | -3.0          |
| 2042         |             | 3.4         | 3.4          | 0.3                 | 0.3           | -3.0          |
| <b>Total</b> | <b>40.3</b> | <b>82.5</b> | <b>122.8</b> | <b>8.1</b>          | <b>8.1</b>    | <b>-114.7</b> |

Source: JICA Project Team

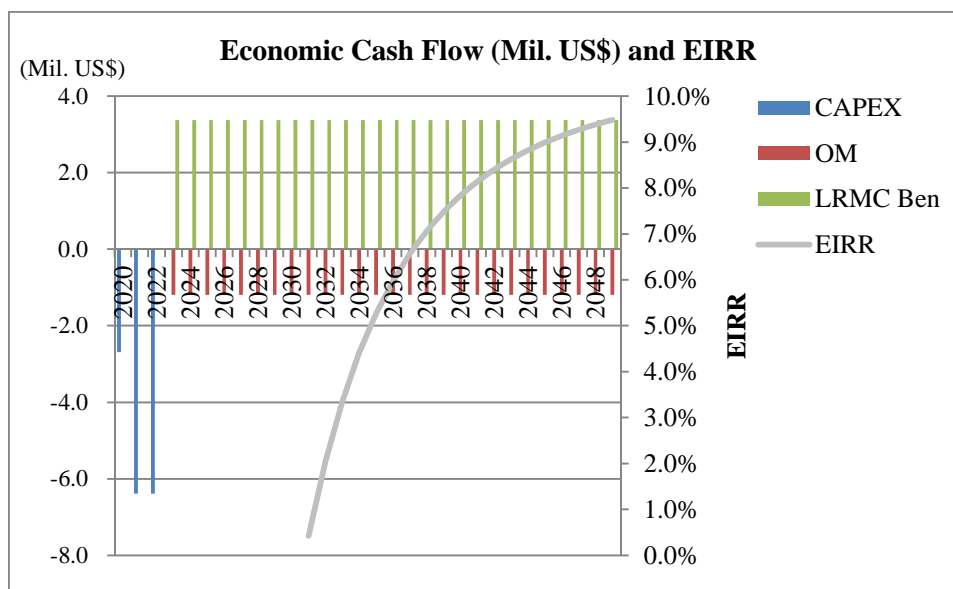
**Table 17.4-3 Summary Cash Flow (EIRR) (WS-2)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total   | LRMC Benefit | Benefit Total | Net Benefit |
|--------------|-------------|-------------|--------------|--------------|---------------|-------------|
| 2013         | 1.4         |             | 1.4          |              |               | -3.3        |
| 2014         | 6.6         |             | 6.6          |              |               | -6.6        |
| 2015         | 6.6         |             | 6.6          |              |               | -6.6        |
| 2016         | 6.6         |             | 6.6          |              |               | -6.6        |
| 2017         |             | 1.5         | 1.5          | 4.0          | 4.0           | -4.7        |
| 2018         |             | 1.5         | 1.5          | 4.0          | 4.0           | -4.7        |
| 2019         |             | 1.5         | 1.5          | 4.0          | 4.0           | 2.5         |
| 2020         |             | 2.9         | 2.9          | 7.8          | 7.8           | 4.9         |
| ⋮            |             | ⋮           | ⋮            | ⋮            | ⋮             | ⋮           |
| 2040         |             | 2.9         | 2.9          | 7.8          | 7.8           | 4.9         |
| 2041         |             | 2.9         | 2.9          | 7.8          | 7.8           | 4.9         |
| 2042         |             | 2.9         | 2.9          | 7.8          | 7.8           | 4.9         |
| <b>Total</b> | <b>37.5</b> | <b>70.1</b> | <b>107.6</b> | <b>190.6</b> | <b>190.6</b>  | <b>83.0</b> |

(2) WS-4

FIRR and EIRR are calculated as N/A and 9.5%, with financial and economic net present values (FNPV and ENPV) of “unable to estimate” and US\$2.5 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow are shown in **Figure 17.4-2** and **Tables 17.4-4** and **17.4-5**.



Source: JICA Project Team

**Figure 17.4-2 Economic Cost and Benefit Streams and EIRR (WS-4)**

**Table 17.4-4 Summary Cash Flow (FIRR)**  
**(WS-4)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | Incremental Service | Benefit Total | Net Benefit  |
|--------------|-------------|-------------|-------------|---------------------|---------------|--------------|
| 2020         | 6.9         |             | 6.9         |                     |               | -6.9         |
| 2021         | 6.9         |             | 6.9         |                     |               | -6.9         |
| 2022         | 6.9         |             | 6.9         |                     |               | -6.9         |
| 2023         | 0.0         |             | 0.0         |                     |               | -1.2         |
| 2024         | 0.0         | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| 2025         | 0.0         | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| 2026         |             | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| 2027         |             | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| ⋮            |             | ⋮           | ⋮           | ⋮                   | ⋮             | ⋮            |
| 2047         |             | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| 2048         |             | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| 2049         |             | 1.4         | 1.4         | 0.2                 | 0.2           | -1.2         |
| <b>Total</b> | <b>20.6</b> | <b>37.8</b> | <b>58.4</b> | <b>6.7</b>          | <b>6.7</b>    | <b>-51.7</b> |

Source: JICA Project Team

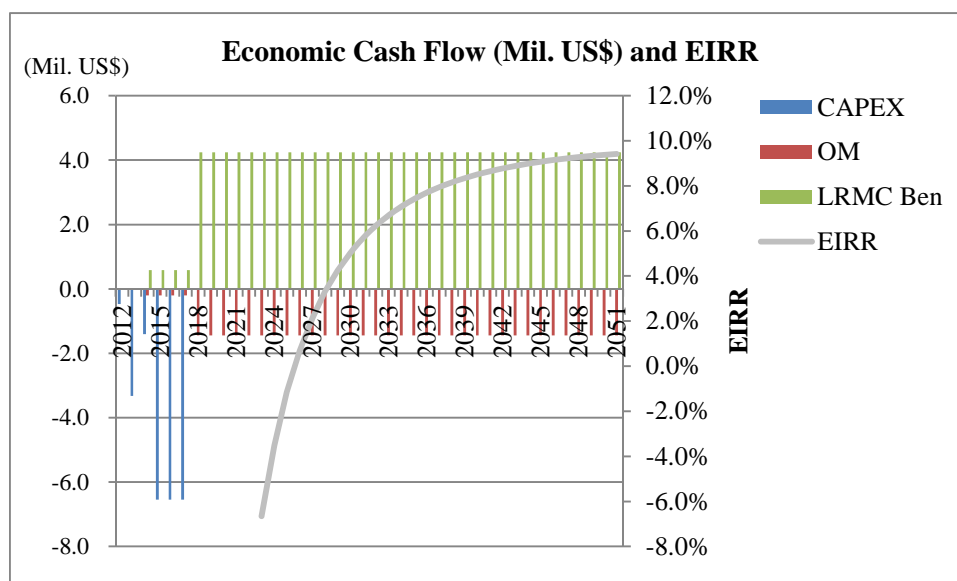
**Table 17.4-5 Summary Cash Flow (EIRR)**  
**(WS-4)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | LRMC Benefit | Benefit Total | Net Benefit |
|--------------|-------------|-------------|-------------|--------------|---------------|-------------|
| 2020         | 2.7         |             | 2.7         |              |               | -6.4        |
| 2021         | 6.4         |             | 6.4         |              |               | -6.4        |
| 2022         | 6.4         |             | 6.4         |              |               | -6.4        |
| 2023         | 0.0         |             | 0.0         |              |               | 2.2         |
| 2024         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| 2025         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| 2026         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| 2027         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| ⋮            |             | ⋮           | ⋮           | ⋮            | ⋮             | ⋮           |
| 2047         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| 2048         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| 2049         |             | 1.2         | 1.2         | 3.4          | 3.4           | 2.2         |
| <b>Total</b> | <b>19.2</b> | <b>32.1</b> | <b>51.3</b> | <b>91.1</b>  | <b>91.1</b>   | <b>39.8</b> |

## 17.4.2 Water Transport

The project in this sector comprises 5 subcomponents, namely, (i) Construction of Passenger Jetty, (ii) Reconstruction of Jetty at Malakal Port, (iii) Procurement of a Crane, (iv) Construction of New Port (phase 1), and (v) Construction of New Port (phase 2). FIRR and EIRR are calculated as “Unable to estimate” and 9.4%, with FNPV and ENPV of “unable to estimate” and US\$3 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow are shown in **Figure 17.4-3** and **Tables 17.4-6** and **17.4-7**.



Source: JICA Project Team

**Figure 17.4-3 Economic Cost and Benefit Streams and EIRR (Water Transport)**

**Table 17.4-6 Summary Cash Flow (FIRR)  
(Water Transport)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | Incremental Service | Benefit Total | Net Benefit  |
|--------------|-------------|-------------|-------------|---------------------|---------------|--------------|
| 2013         | 1.3         | 0.0         | 1.3         |                     |               | -1.3         |
| 2014         | 3.6         | 0.0         | 3.6         |                     |               | -3.6         |
| 2015         | 1.5         | 0.2         | 1.7         |                     |               | -1.7         |
| 2016         | 7.0         | 0.2         | 7.2         |                     |               | -7.2         |
| 2017         |             | 0.2         | 0.2         | 0.0                 | 0.0           | -7.2         |
| 2018         |             | 0.2         | 0.2         | 0.0                 | 0.0           | -7.2         |
| 2019         |             | 1.7         | 1.7         | 0.1                 | 0.1           | -1.6         |
| 2020         |             | 1.7         | 1.7         | 0.1                 | 0.1           | -1.6         |
| ⋮            | ⋮           | ⋮           | ⋮           | ⋮                   | ⋮             | ⋮            |
| 2050         |             | 1.7         | 1.7         | 0.1                 | 0.1           | -1.6         |
| 2041         |             | 1.7         | 1.7         | 0.1                 | 0.1           | -1.6         |
| 2042         |             | 1.7         | 1.7         | 0.1                 | 0.1           | -1.6         |
| <b>Total</b> | <b>27.4</b> | <b>58.9</b> | <b>86.2</b> | <b>4.7</b>          | <b>4.7</b>    | <b>-81.5</b> |

Source: JICA Project Team

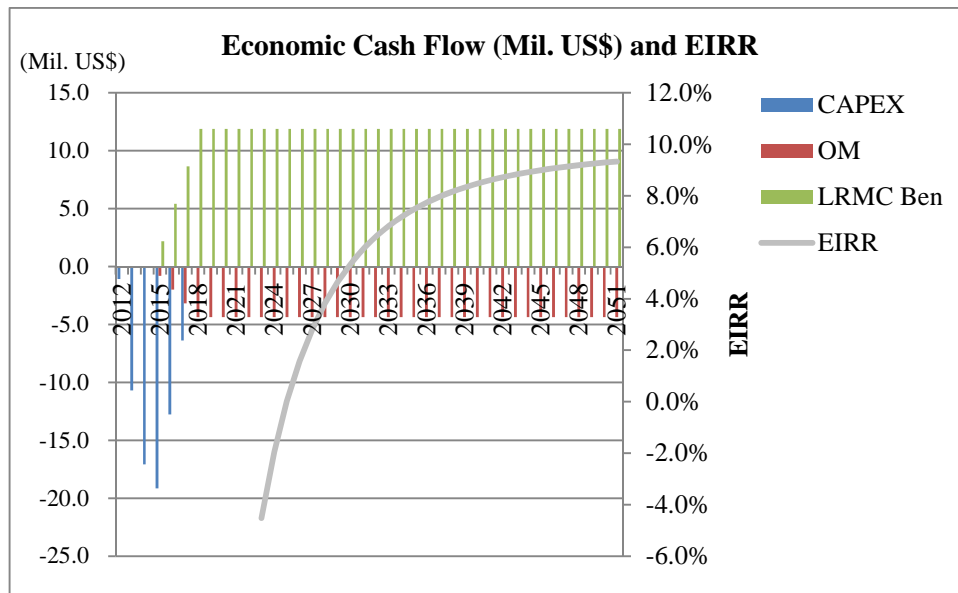
**Table 17.4-7 Summary Cash Flow (EIRR)  
(Water Transport)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | LRMC Benefit | Benefit Total | Net Benefit |
|--------------|-------------|-------------|-------------|--------------|---------------|-------------|
| 2013         | 0.5         |             | 0.5         |              |               | -1.2        |
| 2014         | 3.3         |             | 3.3         |              |               | -3.3        |
| 2015         | 1.4         |             | 1.4         |              |               | -1.0        |
| 2016         | 6.5         |             | 6.5         |              |               | -6.2        |
| 2017         |             | 0.2         | 0.2         | 0.6          | 0.6           | -6.2        |
| 2018         |             | 0.2         | 0.2         | 0.6          | 0.6           | -6.2        |
| 2019         |             | 1.4         | 1.4         | 4.2          | 4.2           | 2.8         |
| 2020         |             | 1.4         | 1.4         | 4.2          | 4.2           | 2.8         |
| ⋮            | ⋮           | ⋮           | ⋮           | ⋮            | ⋮             | ⋮           |
| 2050         |             | 1.4         | 1.4         | 4.2          | 4.2           | 2.8         |
| 2041         |             | 1.4         | 1.4         | 4.2          | 4.2           | 2.8         |
| 2042         |             | 1.4         | 1.4         | 4.2          | 4.2           | 2.8         |
| <b>Total</b> | <b>25.6</b> | <b>50.1</b> | <b>75.6</b> | <b>146.7</b> | <b>146.7</b>  | <b>71.0</b> |

### 17.4.3 Road Transport

The project in this sector comprises 2 subcomponents, (i) Arterial Road Improvement, (ii) Secondary Arterial Road Improvement. FIRR and EIRR are NA and 9.3% with FNPV and ENPV of NA and US\$8.2 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow are shown in **Figure 17.4-4** and **Tables 17.4-8** and **17.4-9**.



Source: JICA Project Team

**Figure 17.4-4 Economic Cost and Benefit Streams and EIRR (Road Transport)**

**Table 17.4-8 Summary Cash Flow (FIRR) (Road Transport)**

**Table 17.4-9 Summary Cash Flow (EIRR) (Road Transport)**

(Unit: million US\$)

|              | CAPEX       | OM           | Cost Total   | Incremental Service | Benefit Total | Net Benefit   |
|--------------|-------------|--------------|--------------|---------------------|---------------|---------------|
| 2014         | 4.5         | 0.0          | 4.5          |                     |               | -4.5          |
| 2015         | 11.2        | 0.0          | 11.2         |                     |               | -11.2         |
| 2016         | 17.8        | 0.0          | 17.8         |                     |               | -17.8         |
| 2017         | 20.0        | 0.9          | 20.9         |                     |               | -20.9         |
| 2018         |             | 2.3          | 2.3          | 0.0                 | 0.0           | -15.7         |
| 2019         |             | 3.7          | 3.7          | 0.0                 | 0.0           | -10.4         |
| 2020         |             | 5.1          | 5.1          | 0.0                 | 0.0           | -5.1          |
| 2021         |             | 5.1          | 5.1          | 0.0                 | 0.0           | -5.1          |
| ⋮            | ⋮           | ⋮            | ⋮            | ⋮                   | ⋮             | ⋮             |
| 2051         |             | 5.1          | 5.1          | 0.0                 | 0.0           | -5.1          |
| 2052         |             | 5.1          | 5.1          | 0.0                 | 0.0           | -5.1          |
| 2053         |             | 5.1          | 5.1          | 0.0                 | 0.0           | -5.1          |
| <b>Total</b> | <b>73.5</b> | <b>182.0</b> | <b>255.5</b> | <b>0.0</b>          | <b>0.0</b>    | <b>-255.5</b> |

(Unit: million US\$)

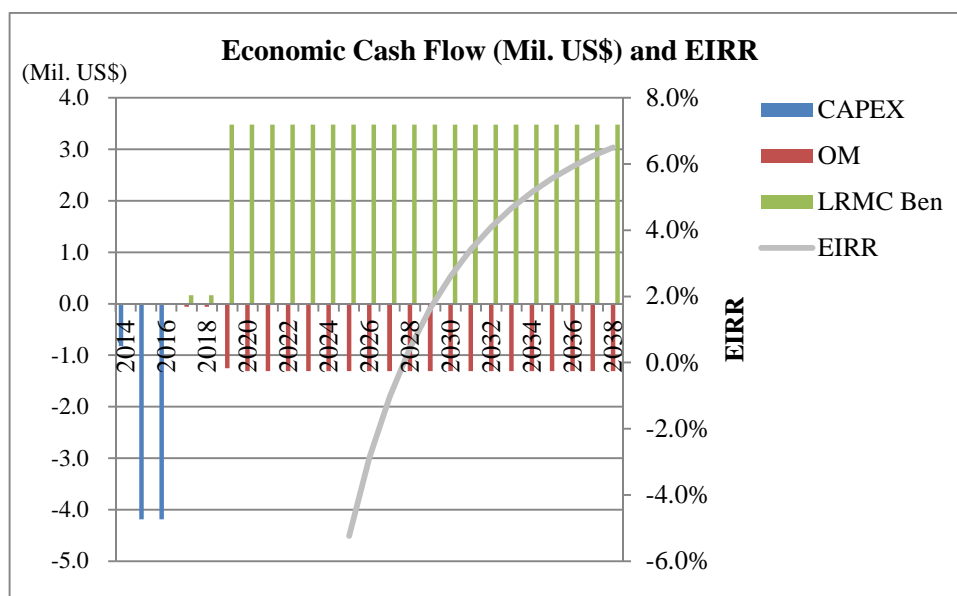
|              | CAPEX       | OM           | Cost Total   | LRMC Benefit | Benefit Total | Net Benefit  |
|--------------|-------------|--------------|--------------|--------------|---------------|--------------|
| 2014         | 1.1         |              | 1.1          |              |               | -4.3         |
| 2015         | 10.7        |              | 10.7         |              |               | -10.7        |
| 2016         | 17.1        |              | 17.1         |              |               | -17.1        |
| 2017         | 19.1        |              | 19.1         |              |               | -17.8        |
| 2018         |             | 2.0          | 2.0          | 5.4          | 5.4           | -9.3         |
| 2019         |             | 3.2          | 3.2          | 8.7          | 8.7           | -0.9         |
| 2020         |             | 4.4          | 4.4          | 11.9         | 11.9          | 7.5          |
| 2021         |             | 4.4          | 4.4          | 11.9         | 11.9          | 7.5          |
| ⋮            | ⋮           | ⋮            | ⋮            | ⋮            | ⋮             | ⋮            |
| 2051         |             | 4.4          | 4.4          | 11.9         | 11.9          | 7.5          |
| 2052         |             | 4.4          | 4.4          | 11.9         | 11.9          | 7.5          |
| 2053         |             | 4.4          | 4.4          | 11.9         | 11.9          | 7.5          |
| <b>Total</b> | <b>70.4</b> | <b>154.7</b> | <b>225.0</b> | <b>420.5</b> | <b>420.5</b>  | <b>195.5</b> |

Source: JICA Project Team



### 17.4.4 Energy

The project in this sector comprises 2 subcomponents, namely, (i) Power Plant Rehabilitation, and (ii) Expansion of 11 KV Distribution Network. FIRR and EIRR are calculated as “unable to estimate” and 6.5%, with FNPV and ENPV of “unable to estimate” and US\$-2.2 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow tables are shown in **Figure 17.4-5** and **Tables 17.4-10** and **17.4-11**.



Source: JICA Project Team

**Figure 17.4-5 Economic Cost and Benefit Streams and EIRR (Energy)**

**Table 17.4-10 Summary Cash Flow (FIRR) (Energy)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | Incremental Service | Benefit Total | Net Benefit  |
|--------------|-------------|-------------|-------------|---------------------|---------------|--------------|
| 2014         | 4.3         |             | 4.3         |                     |               | -4.3         |
| 2015         | 4.3         |             | 4.3         |                     |               | -4.3         |
| 2016         | 4.3         |             | 4.3         |                     |               | -4.3         |
| 2017         | 4.3         |             | 4.3         |                     |               | -4.4         |
| 2018         | 4.3         | 0.1         | 4.4         | 0.0                 | 0.0           | -4.4         |
| 2019         | 0.3         | 1.5         | 1.8         | 0.0                 | 0.0           | -1.8         |
| 2020         |             | 1.5         | 1.5         | 0.0                 | 0.0           | -1.5         |
| 2021         |             | 1.5         | 1.5         | 0.0                 | 0.0           | -1.5         |
| ⋮            | ⋮           | ⋮           | ⋮           | ⋮                   | ⋮             | ⋮            |
| 2036         |             | 1.5         | 1.5         | 0.0                 | 0.0           | 0.0          |
| 2037         |             | 1.5         | 1.5         | 0.0                 | 0.0           | 0.0          |
| 2038         |             | 1.5         | 1.5         | 0.0                 | 0.0           | 0.0          |
| <b>Total</b> | <b>22.0</b> | <b>30.9</b> | <b>52.9</b> | <b>0.0</b>          | <b>0.0</b>    | <b>-52.9</b> |

Source: JICA Project Team

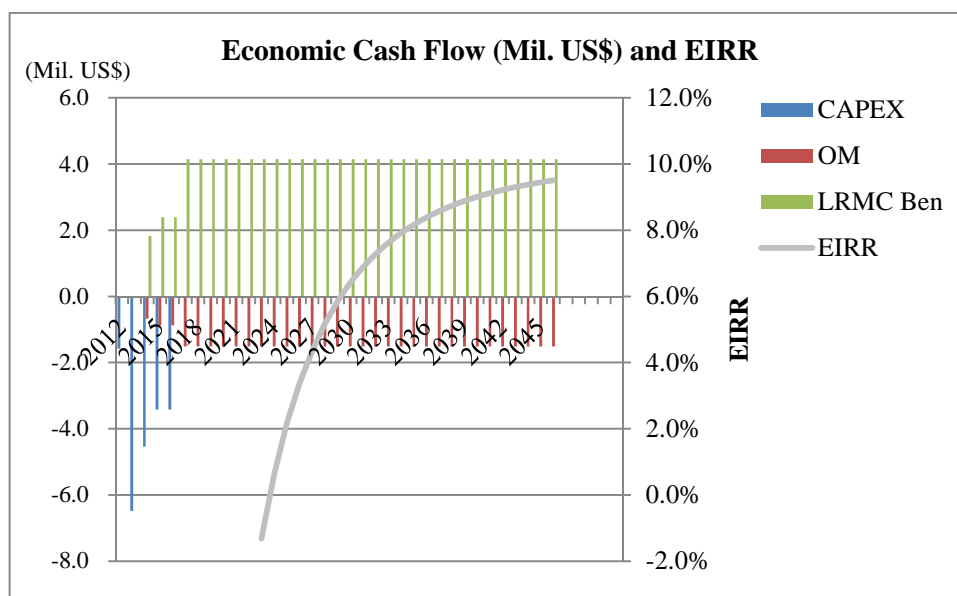
**Table 17.4-11 Summary Cash Flow (EIRR) (Energy)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | LRMC Benefit | Benefit Total | Net Benefit |
|--------------|-------------|-------------|-------------|--------------|---------------|-------------|
| 2014         | 0.8         |             | 0.8         |              |               | -4.2        |
| 2015         | 4.2         |             | 4.2         |              |               | -4.2        |
| 2016         | 4.2         |             | 4.2         |              |               | -4.2        |
| 2017         | 4.2         |             | 4.2         |              |               | -4.1        |
| 2018         |             | 0.1         | 0.1         | 0.2          | 0.2           | -4.1        |
| 2019         |             | 1.2         | 1.2         | 3.5          | 3.5           | 1.9         |
| 2020         |             | 1.3         | 1.3         | 3.5          | 3.5           | 2.2         |
| 2021         |             | 1.3         | 1.3         | 3.5          | 3.5           | 2.2         |
| ⋮            | ⋮           | ⋮           | ⋮           | ⋮            | ⋮             | ⋮           |
| 2036         |             | 1.3         | 1.3         | 3.5          | 3.5           | 0.0         |
| 2037         |             | 1.3         | 1.3         | 3.5          | 3.5           | 0.0         |
| 2038         |             | 1.3         | 1.3         | 3.5          | 3.5           | 0.0         |
| <b>Total</b> | <b>21.3</b> | <b>26.2</b> | <b>47.5</b> | <b>69.9</b>  | <b>69.9</b>   | <b>22.4</b> |

### 17.4.5 Storm Water Drainage

The project in this sector comprises 4 subcomponents, namely, (i) Reconstruction of Main Drains in Central Malakal, (ii) Reconstruction of Main Drains, (iii) Extension of Trunk Drain 1, and (iv) Construction of Trunk Drain 2. FIRR and EIRR are calculated as NA and 9.5%, with FNPV and ENPV of NA and US\$3.2 million respectively. Economic cost-benefit streams over the designated project period with EIRR and a summary FIRR and EIRR cash flow are shown in **Figure 17.4-6** and **Tables 17.4-12** and **17.4-13**.



Source: JICA Project Team

**Figure 17.4-6 Economic Cost and Benefit Streams and EIRR (Storm Water Drainage)**

**Table 17.4-12 Summary Cash Flow (FIRR) (Storm Water Drainage)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | Incremental Service | Benefit Total | Net Benefit  |
|--------------|-------------|-------------|-------------|---------------------|---------------|--------------|
| 2014         | 6.8         | 0.0         | 6.8         |                     |               | -6.8         |
| 2015         | 6.8         | 0.0         | 6.8         |                     |               | -6.8         |
| 2016         | 4.7         | 0.8         | 5.5         |                     |               | -5.5         |
| 2017         | 3.6         | 1.0         | 4.6         |                     |               | -4.6         |
| 2018         |             | 1.0         | 1.0         | 0.0                 | 0.0           | -4.6         |
| 2019         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| 2020         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| 2021         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| ⋮            |             | ⋮           | ⋮           | ⋮                   | ⋮             | ⋮            |
| 2044         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| 2045         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| 2046         |             | 1.8         | 1.8         | 0.0                 | 0.0           | -1.8         |
| <b>Total</b> | <b>25.4</b> | <b>56.2</b> | <b>81.6</b> | <b>0.0</b>          | <b>0.0</b>    | <b>-81.6</b> |

Source: JICA Project Team

**Table 17.4-13 Summary Cash Flow (EIRR) (Storm Water Drainage)**

(Unit: million US\$)

|              | CAPEX       | OM          | Cost Total  | LRMC Benefit | Benefit Total | Net Benefit |
|--------------|-------------|-------------|-------------|--------------|---------------|-------------|
| 2014         | 1.6         |             | 1.6         |              |               | -6.5        |
| 2015         | 6.5         |             | 6.5         |              |               | -6.5        |
| 2016         | 4.5         |             | 4.5         |              |               | -3.4        |
| 2017         | 3.4         |             | 3.4         |              |               | -1.9        |
| 2018         |             | 0.9         | 0.9         | 2.4          | 2.4           | -1.9        |
| 2019         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| 2020         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| 2021         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| ⋮            |             | ⋮           | ⋮           | ⋮            | ⋮             | ⋮           |
| 2044         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| 2045         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| 2046         |             | 1.5         | 1.5         | 4.1          | 4.1           | 2.6         |
| <b>Total</b> | <b>24.4</b> | <b>47.8</b> | <b>72.1</b> | <b>131.0</b> | <b>131.0</b>  | <b>58.9</b> |

## 17.5 RESULT OF SENSITIVITY ANALYSIS

Results of the analysis are summarized in **Table 17.5-1**, followed by 2-variable-simultaneous simulation models for each of the projects as shown in **Tables 17.5-2** through **17.5-7**.

**Table 17.5-1 Summary of Sensitivity Analysis**

(Unit: %)

|                      | FIRR |           |              |                  | EIRR |           |              |                  |
|----------------------|------|-----------|--------------|------------------|------|-----------|--------------|------------------|
|                      | Base | Cost ▲10% | Benefit ▼10% | C-B Simultaneous | Base | Cost ▲10% | Benefit ▼10% | C-B Simultaneous |
| WS-2                 | UE*  | UE        | UE           | UE               | 10.1 | 8.5       | 8.3          | 6.7              |
| WS-4                 | UE   | UE        | UE           | UE               | 9.5  | 7.9       | 7.7          | 6.2              |
| Water Transportation | UE   | UE        | UE           | NA               | 9.4  | 8.0       | 7.9          | 6.5              |
| Roads                | NA   | NA        | NA           | NA               | 9.3  | 7.9       | 7.7          | 6.3              |
| Energy               | NA** | NA        | NA           | NA               | 6.5  | 4.9       | 4.8          | 3.2              |
| Storm Water Drainage | NA   | NA        | NA           | NA               | 9.5  | 8.0       | 7.8          | 6.3              |

UE\*: Unable to estimate, NA\*\*: Not applicable

Source: JICA Project Team

**Table 17.5-2 Results of Sensitivity Analysis (WS-2)**

| Cost Variation | Benefit Valriation |       |       |       |       |       |        |        |        |  |
|----------------|--------------------|-------|-------|-------|-------|-------|--------|--------|--------|--|
|                | 10.1%              | 75.0% | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |  |
|                | 125.0%             | 1.2%  | 2.4%  | 3.5%  | 4.5%  | 5.4%  | 6.3%   | 7.1%   | 7.9%   |  |
|                | 120.0%             | 1.9%  | 3.1%  | 4.2%  | 5.2%  | 6.1%  | 7.0%   | 7.8%   | 8.6%   |  |
|                | 115.0%             | 2.7%  | 3.9%  | 4.9%  | 5.9%  | 6.8%  | 7.7%   | 8.5%   | 9.3%   |  |
|                | 110.0%             | 3.5%  | 4.6%  | 5.7%  | 6.7%  | 7.6%  | 8.5%   | 9.3%   | 10.1%  |  |
|                | 105.0%             | 4.3%  | 5.4%  | 6.5%  | 7.5%  | 8.4%  | 9.3%   | 10.1%  | 10.9%  |  |
|                | 100.0%             | 5.2%  | 6.3%  | 7.3%  | 8.3%  | 9.2%  | 10.1%  | 10.9%  | 11.8%  |  |
|                | 95.0%              | 6.1%  | 7.2%  | 8.2%  | 9.2%  | 10.1% | 11.0%  | 11.9%  | 12.7%  |  |
|                | 90.0%              | 7.0%  | 8.1%  | 9.1%  | 10.1% | 11.0% | 11.9%  | 12.8%  | 13.7%  |  |
|                | 85.0%              | 8.0%  | 9.1%  | 10.1% | 11.1% | 12.0% | 13.0%  | 13.8%  | 14.7%  |  |
|                | 80.0%              | 9.0%  | 10.1% | 11.2% | 12.2% | 13.1% | 14.1%  | 15.0%  | 15.8%  |  |
|                | 75.0%              | 10.1% | 11.2% | 12.3% | 13.3% | 14.3% | 15.3%  | 16.2%  | 17.1%  |  |

Source: JICA Project Team

**Table 17.5-3 Results of Sensitivity Analysis (WS-4)**

| Cost Variation | Benefit Valriation |       |       |       |       |       |        |        |        |  |
|----------------|--------------------|-------|-------|-------|-------|-------|--------|--------|--------|--|
|                | 9.5%               | 75.0% | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |  |
|                | 125.0%             | 1.1%  | 2.2%  | 3.2%  | 4.1%  | 5.0%  | 5.8%   | 6.6%   | 7.4%   |  |
|                | 120.0%             | 1.8%  | 2.9%  | 3.9%  | 4.8%  | 5.7%  | 6.5%   | 7.3%   | 8.0%   |  |
|                | 115.0%             | 2.5%  | 3.6%  | 4.5%  | 5.5%  | 6.3%  | 7.2%   | 8.0%   | 8.7%   |  |
|                | 110.0%             | 3.2%  | 4.3%  | 5.3%  | 6.2%  | 7.1%  | 7.9%   | 8.7%   | 9.5%   |  |
|                | 105.0%             | 4.0%  | 5.0%  | 6.0%  | 6.9%  | 7.8%  | 8.7%   | 9.5%   | 10.3%  |  |
|                | 100.0%             | 4.8%  | 5.8%  | 6.8%  | 7.7%  | 8.6%  | 9.5%   | 10.3%  | 11.1%  |  |
|                | 95.0%              | 5.6%  | 6.7%  | 7.6%  | 8.6%  | 9.5%  | 10.4%  | 11.2%  | 12.0%  |  |
|                | 90.0%              | 6.5%  | 7.5%  | 8.5%  | 9.5%  | 10.4% | 11.3%  | 12.1%  | 13.0%  |  |
|                | 85.0%              | 7.4%  | 8.5%  | 9.5%  | 10.5% | 11.4% | 12.3%  | 13.2%  | 14.0%  |  |
|                | 80.0%              | 8.4%  | 9.5%  | 10.5% | 11.5% | 12.5% | 13.4%  | 14.3%  | 15.2%  |  |
|                | 75.0%              | 9.5%  | 10.6% | 11.6% | 12.7% | 13.6% | 14.6%  | 15.5%  | 16.4%  |  |

Source: JICA Project Team

**Table 17.5-4 Results of Sensitivity Analysis (Water Transport)**

|                |        | Benefit Valriation |       |       |       |       |        |        |        |  |
|----------------|--------|--------------------|-------|-------|-------|-------|--------|--------|--------|--|
| Cost Variation | 9.4%   | 75.0%              | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |  |
|                | 125.0% | 2.2%               | 3.1%  | 4.0%  | 4.8%  | 5.5%  | 6.2%   | 6.9%   | 7.6%   |  |
|                | 120.0% | 2.8%               | 3.7%  | 4.5%  | 5.3%  | 6.1%  | 6.8%   | 7.5%   | 8.1%   |  |
|                | 115.0% | 3.4%               | 4.3%  | 5.1%  | 5.9%  | 6.7%  | 7.4%   | 8.1%   | 8.8%   |  |
|                | 110.0% | 4.0%               | 4.9%  | 5.7%  | 6.5%  | 7.3%  | 8.0%   | 8.7%   | 9.4%   |  |
|                | 105.0% | 4.7%               | 5.5%  | 6.4%  | 7.2%  | 8.0%  | 8.7%   | 9.4%   | 10.1%  |  |
|                | 100.0% | 5.3%               | 6.2%  | 7.1%  | 7.9%  | 8.7%  | 9.4%   | 10.2%  | 10.9%  |  |
|                | 95.0%  | 6.0%               | 6.9%  | 7.8%  | 8.6%  | 9.4%  | 10.2%  | 10.9%  | 11.7%  |  |
|                | 90.0%  | 6.8%               | 7.7%  | 8.6%  | 9.4%  | 10.2% | 11.0%  | 11.8%  | 12.6%  |  |
|                | 85.0%  | 7.6%               | 8.5%  | 9.4%  | 10.3% | 11.1% | 11.9%  | 12.7%  | 13.5%  |  |
|                | 80.0%  | 8.5%               | 9.4%  | 10.3% | 11.2% | 12.1% | 12.9%  | 13.7%  | 14.5%  |  |
|                | 75.0%  | 9.4%               | 10.4% | 11.3% | 12.3% | 13.1% | 14.0%  | 14.9%  | 15.7%  |  |

Source: JICA Project Team

**Table 17.5-5 Results of Sensitivity Analysis (Road Transport)**

|                |        | Benefit Valriation |       |       |       |       |        |        |        |  |
|----------------|--------|--------------------|-------|-------|-------|-------|--------|--------|--------|--|
| Cost Variation | 9.3%   | 75.0%              | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |  |
|                | 125.0% | 1.8%               | 2.8%  | 3.7%  | 4.5%  | 5.3%  | 6.0%   | 6.7%   | 7.4%   |  |
|                | 120.0% | 2.4%               | 3.4%  | 4.3%  | 5.1%  | 5.9%  | 6.6%   | 7.3%   | 8.0%   |  |
|                | 115.0% | 3.1%               | 4.0%  | 4.9%  | 5.7%  | 6.5%  | 7.2%   | 8.0%   | 8.7%   |  |
|                | 110.0% | 3.7%               | 4.6%  | 5.5%  | 6.3%  | 7.1%  | 7.9%   | 8.6%   | 9.3%   |  |
|                | 105.0% | 4.4%               | 5.3%  | 6.2%  | 7.0%  | 7.8%  | 8.6%   | 9.3%   | 10.1%  |  |
|                | 100.0% | 5.1%               | 6.0%  | 6.9%  | 7.7%  | 8.5%  | 9.3%   | 10.1%  | 10.8%  |  |
|                | 95.0%  | 5.8%               | 6.8%  | 7.6%  | 8.5%  | 9.3%  | 10.1%  | 10.9%  | 11.7%  |  |
|                | 90.0%  | 6.6%               | 7.6%  | 8.5%  | 9.3%  | 10.2% | 11.0%  | 11.8%  | 12.6%  |  |
|                | 85.0%  | 7.4%               | 8.4%  | 9.3%  | 10.2% | 11.1% | 11.9%  | 12.8%  | 13.6%  |  |
|                | 80.0%  | 8.3%               | 9.3%  | 10.3% | 11.2% | 12.1% | 13.0%  | 13.8%  | 14.6%  |  |
|                | 75.0%  | 9.3%               | 10.3% | 11.3% | 12.3% | 13.2% | 14.1%  | 15.0%  | 15.8%  |  |

Source: JICA Project Team

**Table 17.5-6 Results of Sensitivity Analysis (Energy)**

|                |        | Benefit Valriation |       |       |       |       |        |        |        |  |
|----------------|--------|--------------------|-------|-------|-------|-------|--------|--------|--------|--|
| Cost Variation | 6.5%   | 75.0%              | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |  |
|                | 125.0% | -2.4%              | -1.1% | 0.0%  | 1.0%  | 2.0%  | 2.8%   | 3.6%   | 4.4%   |  |
|                | 120.0% | -1.6%              | -0.4% | 0.7%  | 1.7%  | 2.7%  | 3.5%   | 4.3%   | 5.1%   |  |
|                | 115.0% | -0.8%              | 0.4%  | 1.5%  | 2.5%  | 3.4%  | 4.2%   | 5.0%   | 5.8%   |  |
|                | 110.0% | 0.1%               | 1.2%  | 2.2%  | 3.2%  | 4.1%  | 4.9%   | 5.7%   | 6.5%   |  |
|                | 105.0% | 0.9%               | 2.0%  | 3.0%  | 4.0%  | 4.9%  | 5.7%   | 6.5%   | 7.3%   |  |
|                | 100.0% | 1.7%               | 2.8%  | 3.8%  | 4.8%  | 5.7%  | 6.5%   | 7.3%   | 8.1%   |  |
|                | 95.0%  | 2.6%               | 3.7%  | 4.7%  | 5.6%  | 6.5%  | 7.3%   | 8.1%   | 8.9%   |  |
|                | 90.0%  | 3.5%               | 4.6%  | 5.6%  | 6.5%  | 7.4%  | 8.2%   | 9.0%   | 9.8%   |  |
|                | 85.0%  | 4.5%               | 5.5%  | 6.5%  | 7.4%  | 8.3%  | 9.2%   | 10.0%  | 10.7%  |  |
|                | 80.0%  | 5.5%               | 6.5%  | 7.5%  | 8.4%  | 9.3%  | 10.2%  | 11.0%  | 11.7%  |  |
|                | 75.0%  | 6.5%               | 7.6%  | 8.6%  | 9.5%  | 10.4% | 11.2%  | 12.1%  | 12.8%  |  |

Source: JICA Project Team

**Table 17.5-7 Results of Sensitivity Analysis (Storm Water Drainage)**

|                |        | Benefit Valriation |       |       |       |       |       |        |        |        |
|----------------|--------|--------------------|-------|-------|-------|-------|-------|--------|--------|--------|
|                |        | 9.5%               | 75.0% | 80.0% | 85.0% | 90.0% | 95.0% | 100.0% | 105.0% | 110.0% |
| Cost Variation | 125.0% | 1.4%               | 2.5%  | 3.4%  | 4.3%  | 5.2%  | 5.9%  | 6.7%   | 7.4%   | 7.4%   |
|                | 120.0% | 2.1%               | 3.1%  | 4.1%  | 4.9%  | 5.8%  | 6.6%  | 7.4%   | 8.1%   | 8.1%   |
|                | 115.0% | 2.8%               | 3.8%  | 4.7%  | 5.6%  | 6.4%  | 7.3%  | 8.0%   | 8.8%   | 8.8%   |
|                | 110.0% | 3.5%               | 4.5%  | 5.4%  | 6.3%  | 7.1%  | 8.0%  | 8.7%   | 9.5%   | 9.5%   |
|                | 105.0% | 4.2%               | 5.2%  | 6.1%  | 7.0%  | 7.9%  | 8.7%  | 9.5%   | 10.3%  | 10.3%  |
|                | 100.0% | 4.9%               | 5.9%  | 6.9%  | 7.8%  | 8.7%  | 9.5%  | 10.3%  | 11.1%  | 11.1%  |
|                | 95.0%  | 5.7%               | 6.7%  | 7.7%  | 8.6%  | 9.5%  | 10.4% | 11.2%  | 12.0%  | 12.0%  |
|                | 90.0%  | 6.6%               | 7.6%  | 8.6%  | 9.5%  | 10.4% | 11.3% | 12.2%  | 13.0%  | 13.0%  |
|                | 85.0%  | 7.5%               | 8.5%  | 9.5%  | 10.5% | 11.4% | 12.3% | 13.2%  | 14.1%  | 14.1%  |
|                | 80.0%  | 8.5%               | 9.5%  | 10.5% | 11.5% | 12.5% | 13.4% | 14.3%  | 15.2%  | 15.2%  |
|                | 75.0%  | 9.5%               | 10.6% | 11.6% | 12.7% | 13.7% | 14.6% | 15.6%  | 16.5%  | 16.5%  |

Source: JICA Project Team

## 17.6 CONCLUSION

In the light of the calculated outcomes of the preceding sections of **17.4** and **17.5**, some of the interim conclusions at this early moment in time would be useful for discussions that come. These include, among others, the following.

Project EIRRs with the feasibility cut-off rate of 8.0% would be acceptable as public investment opportunities, provided that the concerned projects are primarily considered as environment protection and urgent human basic needs fulfilling schemes. Furthermore, the social and economic infrastructure development secured in the region may incubate industrial and tourism sector growth. With this in mind, these projects would be better if implemented by the central and state governments, regional residents/private sectors, with financing facilities extended by international financing institutions.

The calculated financial performance of the projects gives grave concern for the financial sustainability and sound operation of South Sudan Urban Water Corporation (SSUWC) and the departments responsible for river-transport (National Directorate of River Transport and UNS State Government (River Transport Department)) over the mid- and long-term. In view of this, either or both policy discussions and firm actions to restructure tariffs and saving project costs needs to be sought.

It should be reiterated that the analysis undertaken in this section is somewhat indicative, with limited research and information at this early stage of project planning. With this in view, further study and analysis for each of the project components would be needed in the succeeding project development stage.

## **CHAPTER 18 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS**

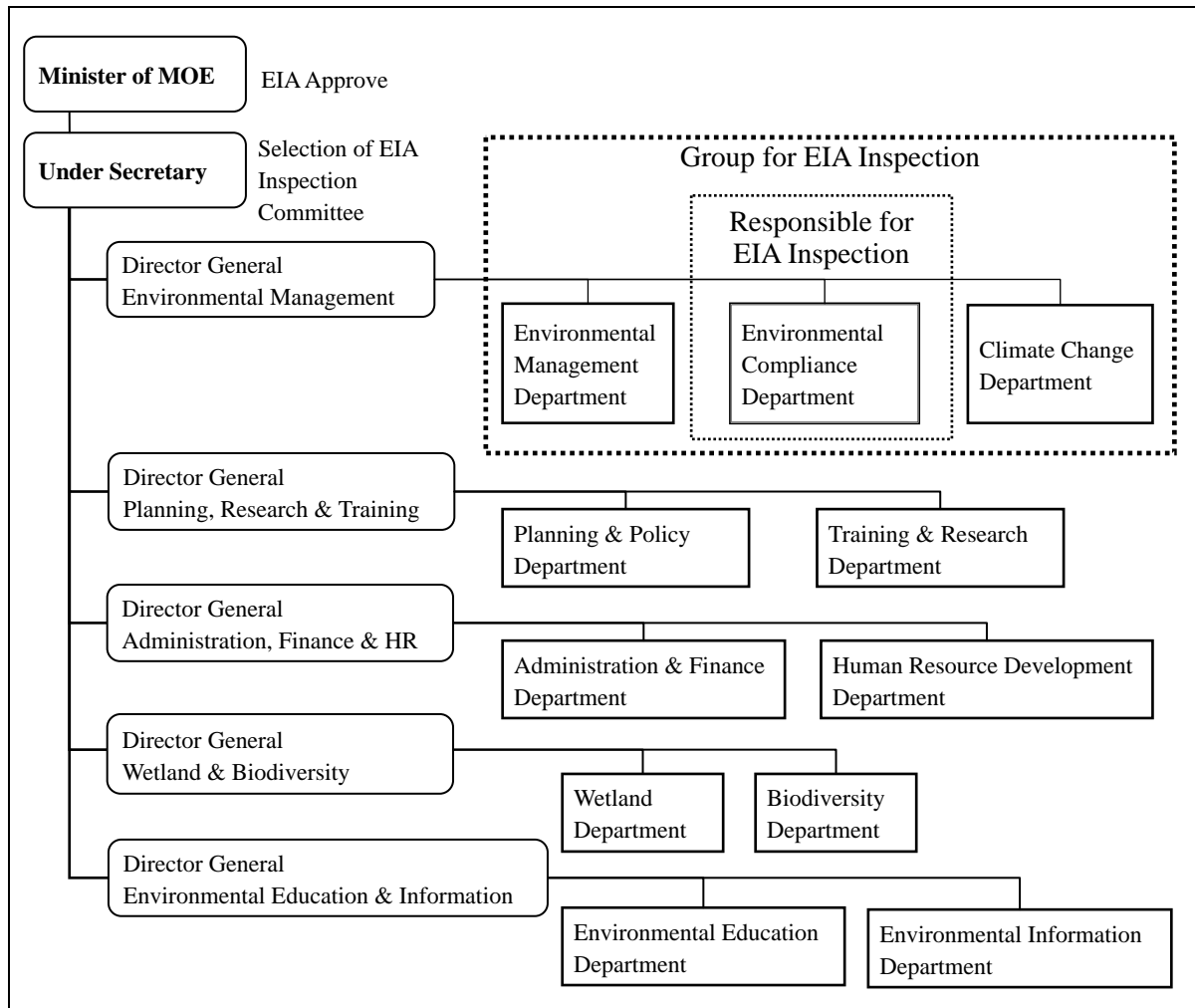
**Chapter 18** reviews Environmental Impact Assessment (EIA) system in South Sudan and presents the impact assessments of the proposed projects. The mitigation measures and degree of necessity are identified at IEE (Initial Environmental Examination) level to provide basic information for the formulating the Comprehensive Development Plan.

### **18.1 SOUTH SUDAN EIA SYSTEM**

#### **18.1.1 The Ministry of Environment (MOE), Republic of South Sudan (ROSS)**

The MOE has jurisdiction over the general administration of environment in South Sudan. Up to December 31, 2008, the Ministry of Wildlife Conservation & Tourism (MOWC&T) was in charge of the environmental administration. Then January 1, 2009, the Ministry of Housing, Physical Planning and Environment (MOHPP&E) was set up with responsibility for the environment. In May, 2010, it was separated from MOHPP&E, and the MOE started to work as an independent Ministry. The organization chart of the MOE is shown in **Figure 18.1-1**.

At present there are many vacant posts, and the process to build the organizational structure is still ongoing. They plan to expand the number of staff depending on the budget allocation for the MOE. On the other hand, according to the explanation of the Undersecretary of the MOE, the budget for 2012 was decreased by 50% compared to the previous year. As a result of these budget cuts, many activities were stopped, and many projects that were planned by the MOE could not be carried out.



Source: Proposed Organizational Chart for the Ministry of Environmental and Interview to the MOE Staff

**Figure 18.1-1 Organization Chart of the Ministry of Environment, ROSS**

The Environmental Compliance Department is responsible for EIA reviewing. Due to the shortage of staff, the Environmental Management Department and Climate Change Department are also in charge of reviewing.

### 18.1.2 Environmental Protection Bill, 2010

As for the law (draft), “*Environmental Protection Bill 2010*” is concerning environmental preservation, in the South Sudan Government. This bill is not approved by Parliament at the time of the report from the Ministry of Environment to the environmental group meeting in March, 2012 (ECG: Environmental Cluster Group). Moreover, there is a schedule stipulating steps which includes a public hearing.

**Table 18.1-1 Contents of Environmental Protection Bill, 2010**

| Chapter | Contents of Environmental Protection Bill, 2010                |
|---------|--|
| 1       | Preliminary Provision  |
| 2       | General Principles   |
| 3       | Establishment and Structure                                    |
| 4       | Secretariat  |
| 5       | Ministerial, State and Local Government Environment Committees |
| 6       | Environmental Planning   |
| 7       | Environmental Regulation                                       |
| 8       | Establishment of Environmental Standards                       |
| 9       | Management of the Environment                                  |
| 10      | Waste Management   |
| 11      | Control of Pollution   |
| 12      | Environmental Restoration Orders and Environmental Easement    |
| 13      | Records, Inspection and Analysis                               |
| 14      | Information, Education and Public Awareness                    |
| 15      | Finance, Audit and Reporting                                   |
| 16      | Offences and Penalties   |
| 17      | Judicial Proceedings   |
| 18      | Miscellaneous Provisions                                       |

Source: "Environmental Protection Bill, 2010" and hearing to the MOE staff

Chapters 1 to 5 set out general rules, the purpose and the organs or committee concerned. In Chapter 6, an Environment plan is expected to form every five years, and information is supposed to be publically released. Chapter 7 describes the process of the Environmental Impact Assessment. For projects which need to consider their influence on the environment, agencies have to carry out an Environmental Impact Assessment. When serious negative influence is foreseen, mitigation measures are demanded. Moreover, the audit of activity and monitoring concerning an Environmental Impact Assessment are also described.

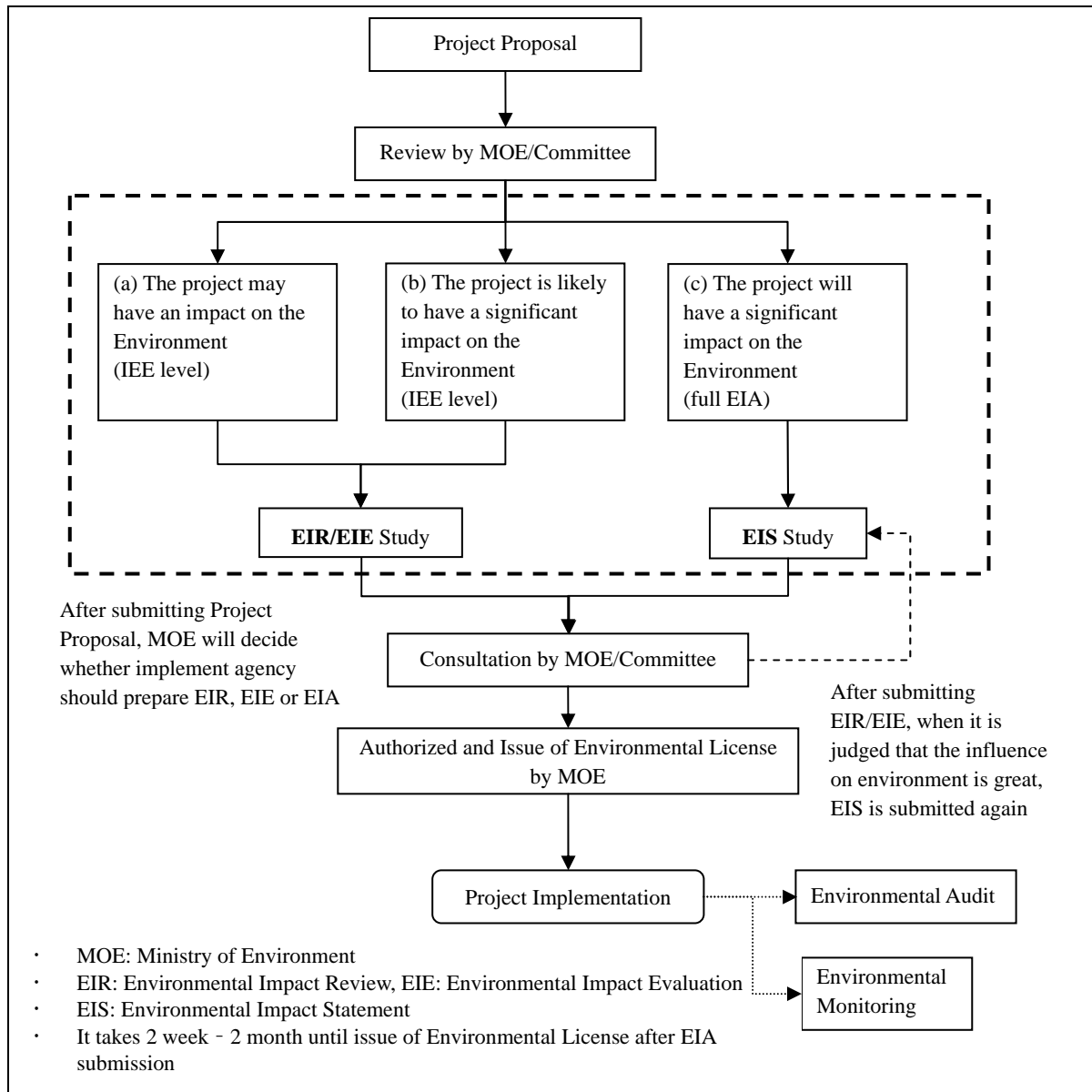
Chapter 8 describes the standard of the Air and Water Quality and Waste Management etc. And Chapter 9 has provisions concerning land use, lake and river, traditional community organization, biodiversity conservation, grazing land, natural heritage protection, and protection of an ozone layer at about the standard of the atmosphere, water quality, waste, etc. Chapter 10-11 have the regulations and standards for handling and necessary antipollution measures for dangerous materials.

However in particular, neither standards nor guidelines have yet been made. In order for the MOE to perform environment management including EIA laws, standard and guidelines need to be established.

### 18.1.3 EIA Procedure

According to the Environmental Protection Bill, 2010 (Chapter 7, Article 29-33), the Environmental Impact Assessment procedure is shown in **Figure 18.1-2**.





Source: "Environmental Protection Bill, 2010" and hearing to MOE staff

**Figure 18.1-2 The Environmental Impact Assessment Procedure**

## 18.2 PREDICTED MAJOR ENVIRONMENTAL AND SOCIAL IMPACTS BY SECTOR

From the development projects identified, short and medium infrastructure projects that may have a degree of environmental and social impacts are selected and their predicted impacts are assessed. This section presents the results of preliminary environmental and social impact assessment for the selected projects.

### 18.2.1 Profile of Short and Medium Term Projects

Summary profiles of the Short and Medium Term Projects for 10 sectors are as follows:

**Table 18.2-1 Summary of Project Profile (Water Supply Sector)**

| Water Supply Sector: WS |      |                   |  |
|-------------------------|------|-------------------|--|
| Proposed Project        | WS-1 | Project Name      | Small-Scale Water Supply Development Project   |
|                         |      | Scope of Work     | <p>The project includes the following scopes:</p> <ul style="list-style-type: none"> <li>• Unit Type Treatment Plant (150m<sup>3</sup>/day x 1 plant, Chemical Dosing, pressurized rapid Sand Filtration, Engine Pumps x 4 sets)</li> <li>• Water Trucks x 3 vehicles, Small Storage Tank 5m<sup>3</sup> x 12 sets</li> <li>• Polyethylene Pipes (L=5,019m, 40mm-150mm, PN10)</li> <li>• Replacement of Pipes (L=4,000m, 150mm, PN10)</li> <li>• Elevated Tank x 1 set (2.5m<sup>3</sup> x 4 tanks), Public Taps x 22 sets</li> <li>• Service connections x 475 households (13mm x 10m)</li> </ul> |
|                         |      | Proposed Schedule | Design & Bidding: 2013, Construction: 2013-2014  |
|                         | WS-2 | Project Name      | Rehabilitation Project of the Treatment Plant & Distribution Pipe Network  |
|                         |      | Scope of Work     | <p>The project includes the following scopes:</p> <ul style="list-style-type: none"> <li>• Restoration of Treatment Plant (7,500m<sup>3</sup>/day x 1 plant, Chemical Clarifier, Flocculator, Rapid Sand Filtration, Rising Pumps, Generator)</li> <li>• Replacement of pipes (Approximately 55km x φ100mm- 300mm, Polyethylene, PN10)</li> <li>• Construction of elevated tank (1,000m<sup>3</sup> x 6 tanks, Reinforced Concrete made)</li> </ul>  |
|                         |      | Proposed Schedule | Phase 1: Design & Bidding: 2013, Construction: 2014-2016, Phase 2 Design & Bidding 2017, Construction 2018-2019  |
|                         | WS-3 | Project Name      | Technical Cooperation Project on Improvement of Water Supply Service   |
|                         |      | Scope of Work     | The project includes the following scopes: Water audit, Select pilot project area, Digitize network pipelines in pilot plot project area using GIS software, Site reconnaissance for checking network pipelines, Install water meters and check the existing water meters in pilot project area, Check the minimum water flow at night in pilot project area, Conduct leakage detection in pilot project area, Repair leakage points in pilot project area, Improve water tariff collection system including meter reading, billing, etc.  |
|                         |      | Proposed Schedule | Technical Assistance: 2013-2016  |
|                         | WS-4 | Project Name      | Expansion of Treatment Plant and the Distribution Pipe Network Project   |
|                         |      | Scope of Work     | <p>The project includes the following scopes: Preconditions</p> <ul style="list-style-type: none"> <li>• Restoration of Treatment Plant (5,000m<sup>3</sup>/day x 1 plant, Chemical Clarifier, Flocculator, Rapid Sand Filtration, Rising Pumps, Generator)</li> <li>• Replacement of pipes (Approximately 50km x φ100mm- 150mm, Polyethylene, PN10)</li> <li>• Construction of elevated tank (1,000m<sup>3</sup> x 3 tank, Reinforced Concrete made)</li> </ul>   |
|                         |      | Proposed Schedule | Design & Bidding: 2020, Construction: 2020-2022  |

Source: JICA Project Team

**Table 18.2-2 Summary of Project Profile (Water Transport Sector)**

| Water Transport Sector: PT |                   |  |   |
|----------------------------|-------------------|--|---|
| Proposed Project           | PT-1              | Project Name   | Reconstruction of Jetty at Malakal Port Project   |
|                            |                   | Scope of Work  | <ul style="list-style-type: none"> <li>• Removal of old jetty and construction of new jetty</li> <li>• Removal of sunken barge</li> </ul> |
|                            |                   | Proposed Schedule  | Design & Bidding: 2013, Construction: 2013-2014   |
|                            | PT-2              | Project Name   | Procurement of Crane Project  |
|                            |                   | Scope of Work  | Procurement of a mobile crane (40-50t/crane)  |
|                            |                   | Proposed Schedule  | Specification & Bidding: 2014, Construction: 2014   |
|                            | PT-3              | Project Name   | Construction of New Port Project (Phase 1)  |
|                            |                   | Scope of Work  | Construction of a new port including feasibility study in which roles of existing Malakal Port and New port will be examined.             |
|                            |                   | Proposed Schedule  | Design & Bidding: 2014-2015, Construction: 2016-2017  |
|                            | PT-4              | Project Name   | Construction of New Port project (Phase 2)  |
|                            |                   | Scope of Work  | Extension of the jetty at new site and building related facilities such as warehouse, office, power etc.                                  |
| Proposed Schedule          |                   | Design & Bidding: 2013, Construction: 2016-2018            |   |
| PT-5                       | Project Name      | Construction of Passenger Jetty Project                    |   |
|                            | Scope of Work     | Construction of jetty for passengers                       |   |
|                            | Proposed Schedule | Design & Bidding: 2013, Construction: 2013-2014            |   |
| PT-6                       | Project Name      | Development of West Side (Left Bank) of Nile River Project |   |
|                            | Scope of Work     | Provision of a floating platform at west bank              |   |
|                            | Proposed Schedule | 2017-2018  |   |
| PT-7                       | Project Name      | Improvement of Malakal Port Project                        |   |
|                            | Scope of Work     | Improvement of waterfront of present Malakal Port          |   |
|                            | Proposed Schedule | Design & Bidding: 2015, Construction: 2016-2017            |   |
| PT-8                       | Project Name      | Procurement of Ferry Project                               |   |
|                            | Scope of Work     | Procurement of a 300t class ferry                          |   |
|                            | Proposed Schedule | 2019   |   |
| PT-9                       | Project Name      | Improvement of River Bank Protection Project               |   |
|                            | Scope of Work     | Rehabilitation of revetment at present Malakal Port        |   |
|                            | Proposed Schedule | 2020-2021  |   |
| PT-10                      | Project Name      | Improvement of New Port Road Project                       |   |
|                            | Scope of Work     | Construction of port road to the new port                  |   |
|                            | Proposed Schedule | 2015   |   |
| PT-11                      | Project Name      | Port Management Capacity Development Project               |   |
|                            | Scope of Work     | Conduct workshop and seminar for technical transfer        |   |
|                            | Proposed Schedule | 2013-2015  |   |

Source: JICA Project Team

**Table 18.2-3 Summary of Project Profile (Road Transport Sector)**

| Road Sector: RT  |      |                   |   |
|------------------|------|-------------------|---|
| Proposed Project | RT-1 | Project Name      | Community Road Construction Project ( LBT)  |
|                  |      | Scope of Work     | Construction of 6km community Roads by LBT  |
|                  |      | Proposed Schedule | Design & Bidding: 2012, Construction 2012-2013  |
|                  | RT-2 | Project Name      | Malakal Town Secondary Arterial Road Improvement Project  |
|                  |      | Scope of Work     | Construction of 18km roads of Local & Distributors  |
|                  |      | Proposed Schedule | Design & Bidding: 2013, Construction: 2014-2015   |
|                  | RT-3 | Project Name      | Malakal Town Arterial Road Improvement Project  |
|                  |      | Scope of Work     | Construction of 15km roads of Collectors and Arterials  |
|                  |      | Proposed Schedule | Design & Bidding: 2014-2015, Construction: 2015-2018  |
|                  | RT-4 | Project Name      | Road Maintenance & Management Project   |
|                  |      | Scope of Work     | Capacity building of road maintenance and management method, equipment maintenance, management and reparation   |
|                  |      | Proposed Schedule | 2016-2018   |
|                  | RT-5 | Project Name      | Public Transport Management Project   |
|                  |      | Scope of Work     | Establish a public transport management department, management technique of public transport service is learned, bus route which meet passenger needs and reasonable bus fare will be planned |
|                  |      | Proposed Schedule | 2016-2018   |
|                  | RT-6 | Project Name      | Bus Terminal and Bus Stops Facilities Construction Project  |
|                  |      | Scope of Work     | Construction /improvement of bus terminals, construction of bus/taxi bays   |
|                  |      | Proposed Schedule | 2018-2021   |
|                  | RT-7 | Project Name      | Traffic Management Project  |
|                  |      | Scope of Work     | Enhance traffic management capability with infrastructure development   |
|                  |      | Proposed Schedule | 2014-2016   |
|                  | RT-8 | Project Name      | Intersection and Traffic Facility Improvement Project   |
|                  |      | Scope of Work     | Construction of roundabout, instalment of walk path, crossing etc.  |
|                  |      | Proposed Schedule | 2016-2018   |
|                  | RT-9 | Project Name      | Malakal Town Traffic Safety Management Project  |
|                  |      | Scope of Work     | Road traffic safety education manual is prepared.<br>Traffic safety education is carried out for students, drivers, and traffic offenders.<br>Implementation of traffic safety campaign       |
|                  |      | Proposed Schedule | 2018-2021   |

Source: JICA Project Team

**Table 18.2-4 Summary of Project Profile (Energy Sector)**

| Energy Sector: EN |      |                   |   |
|-------------------|------|-------------------|---|
| Proposed Project  | EN-1 | Project Name      | Power Plant Rehabilitation Project  |
|                   |      | Scope of Work     | <ul style="list-style-type: none"> <li>• Diesel Generators (2.5MW x 4 sets, medium speed, continuous operation mode)</li> <li>• Power house for above generators</li> <li>• Fuel storage tanks (600m<sup>3</sup> x 2 sets) and fuel unloading system</li> <li>• Mechanical and electrical auxiliary system</li> </ul> |
|                   |      | Proposed Schedule | Design & Bidding 2012-2013, Manufacturing 2013, Construction 2013-2018  |
|                   | EN-2 | Project Name      | Expansion of 11kV Distribution Network Project  |
|                   |      | Scope of Work     | <ul style="list-style-type: none"> <li>• 11kV distribution lines (approx. 5.2km)</li> <li>Distribution poles, pole fitting materials, aluminium conductor, distribution transformers</li> </ul>   |
|                   |      | Proposed Schedule | Design & Bidding 2014, Manufacturing 2015, Construction 2017-2020   |
|                   | EN-3 | Project Name      | Solar Power Pilot Project   |
|                   |      | Scope of Work     | Power for street lighting and small area is provided by solar energy  |
|                   |      | Proposed Schedule | 2014-2016   |

Source: JICA Project Team

**Table 18.2-5 Summary of Project Profile (Sewage and Sanitation Sector)**

| Sewage and Sanitation Sector: SS |      |                   |  |
|----------------------------------|------|-------------------|--|
| Proposed Project                 | SS-1 | Project Name      | Community Sanitary System and Public Toilet Installation Project   |
|                                  |      | Scope of Work     | The Project includes the following items; Construction of 492 public toilets with septic tank, Provision of 18 vacuum trucks           |
|                                  |      | Proposed Schedule | 2013-2022  |
|                                  | SS-2 | Project Name      | Construction of Sludge Treatment Facilities Project  |
|                                  |      | Scope of Work     | The Project includes the following items; Construction of sludge treatment Facilities, the capacity of which is 150m <sup>3</sup> /day |
|                                  |      | Proposed Schedule | 2013-2020  |

Source: JICA Project Team

**Table 18.2-6 Summary of Project Profile (Storm Water Drainage)**

| Storm Water Drainage Sector: WD |      |                   |  |
|---------------------------------|------|-------------------|--|
| Proposed Project                | WD-1 | Project Name      | Reconstruction of Main Drains in Central Malakal Project   |
|                                 |      | Scope of Work     | Reconstruction of 11.6km existing main drains  |
|                                 |      | Proposed Schedule | 2013-2014  |
|                                 | WD-2 | Project Name      | Reconstruction of Main Drains Project  |
|                                 |      | Scope of Work     | To construct the existing main drains with proper vertical slope (0.1 to 0.2%) toward the Nile River for west end toward the Trunk Drain for east;<br>To line the channel with sandbag<br>To install the RC pipe culverts at intersections |
|                                 |      | Proposed Schedule | 2015-2016  |
|                                 |      | Project Name      | Construction of Trunk Drain 1 Project  |
|                                 | WD-3 | Scope of Work     | 10.9km   |
|                                 |      | Proposed Schedule | 2017-2018  |
|                                 |      | Project Name      | Construction of Trunk Drain 2 Project  |
|                                 | WD-4 | Scope of Work     | 16.5km   |
|                                 |      | Proposed Schedule | 2019-2020  |
|                                 |      | Project Name      | Construction of Main Drains in New Urban Area Project  |
|                                 | WD-5 | Scope of Work     | Construction of main drains in the new urban area to the east of Ring Road and southern part of existing urbanized area  |
|                                 |      | Proposed Schedule | 2018-2022  |

Source: JICA Project Team

**Table 18.2-7 Summary of Project Profile (Solid Waste Management Sector)**

| Solid Waste Management Sector: SM |                   |   |  |
|-----------------------------------|-------------------|---|--|
| Proposed Project                  | SM-1              | Project Name                                    | Solid Waste Collection Activities Improvement Project  |
|                                   |                   | Scope of Work                                   | Set up of collection points (73sites) and holding workshop<br>Procurement of collection vehicles (13vehicles)  |
|                                   |                   | Proposed Schedule                               | 2014-2021  |
|                                   | SM-2              | Project Name                                    | Landfill Management Improvement Project  |
|                                   |                   | Scope of Work                                   | Construction of administrative building, drainage (3,000m), gate and fence (2,000m), and set up of truck scale   |
|                                   | Proposed Schedule | Design & Bidding: 2014, Construction: 2015-2017 |  |
|                                   | SM-3              | Project Name                                    | Medical Waste Management Improvement Project   |
|                                   |                   | Scope of Work                                   | Medical waste is properly managed by medical staff<br>Source separation of medical waste is enhanced at hospital<br>Infectious medical waste is properly incinerated |
|                                   |                   | Proposed Schedule                               | 2015-2018  |

Source: JICA Project Team

**Table 18.2-8 Summary of Project Profile (Education Sector)**

| Education Sector: ED |                   |   |
|----------------------|-------------------|---|
| ED-1                 | Project Name      | Primary School Establishment and Renovation Project   |
|                      | Scope of Work     | Construction of 4 primary schools ( Hai Saha, Hai El Matar, Assossa and Dengershufu)  |
|                      | Proposed Schedule | Promotion/survey, BD, mobilization 2012-2013, Design & Build 2013-2014  |
| ED-2                 | Project Name      | Strengthening Mathematics and Science Education Project   |
|                      | Scope of Work     | To provide technical guidance and advice on training for mathematics and science teachers at the primary level  |
|                      | Proposed Schedule | 2013-2015 (3 years)   |
| ED-3                 | Project Name      | Capacity Building of MOE Project  |
|                      | Scope of Work     | Capacity building of Assessing current teacher capacity<br>Capacity building of the government to plan and implement teacher training<br>Cooperation for current teacher training |
|                      | Proposed Schedule | 2013-2014   |
| ED-4                 | Project Name      | Malakal Teachers' Training School Construction and Renovation Project   |
|                      | Scope of Work     | Construction of Teachers Training Dormitory that was used for SAF dormitory during civil war, and renovation of water supply facilities.  |
|                      | Proposed Schedule | 2019-2020   |
| ED-5                 | Project Name      | Malakal Teacher's Dormitory Reconstruction Project  |
|                      | Scope of Work     | Construction of teachers' dormitories in 10 sites (100 teachers targeted).  |
|                      | Proposed Schedule | 2021-2022   |
| ED-6                 | Project Name      | Malakal Primary School Construction Project   |
|                      | Scope of Work     | Construction of 8 primary schools.  |
|                      | Proposed Schedule | 2016-2018   |
| ED-7                 | Project Name      | Malakal Middle School Construction Project  |
|                      | Scope of Work     | Construction of 4 middle schools  |
|                      | Proposed Schedule | 2016-2018   |

Source: JICA Project Team

**Table 18.2-9 Summary of Project Profile (Health Sector)**

| Health Sector: HE |      |                   |   |
|-------------------|------|-------------------|---|
| Proposed Project  | HE-1 | Project Name      | Primary Health Care Centre Construction Project   |
|                   |      | Scope of Work     | Construction of new Primary Health Care Centres and provision of medical equipment  |
|                   |      | Proposed Schedule | 2017-2019   |
|                   | HE-2 | Project Name      | Malakal Teaching Hospital Health Infrastructures Improvement Project  |
|                   |      | Scope of Work     | Construction and Rehabilitation of health facilities and provision of medical equipment   |
|                   |      | Proposed Schedule | DD and Tender 2013-2015, Implementation 2015-2016   |
|                   | HE-3 | Project Name      | Health Service Capacity of 4 Major Health Centres Upgrade Project   |
|                   |      | Scope of Work     | Expansion of the Inpatient Wards (20 beds), water supply improvement, power supply improvement and procurement of medical equipment, etc. |
|                   |      | Proposed Schedule | Implementation 2016-2017  |
|                   | HE-4 | Project Name      | Revitalisation of Medical/Health Faculty in UNU Project   |
|                   |      | Scope of Work     | Construction of medical faculty, arrangement of personnel in medical/health sector, etc.  |
|                   |      | Proposed Schedule | 2015-2016   |
|                   | HE-5 | Project Name      | Urban Malaria Control Program   |
|                   |      | Scope of Work     | To ensure provision of insecticides and equipment for vector control  |
|                   |      | Proposed Schedule | Implementation 2016-2020  |
|                   | HE-6 | Project Name      | EPI (DPT3, Measles) Vaccination Promotion Project   |
|                   |      | Scope of Work     | Provision of vaccines and improvement of cold chain system with necessary infrastructures   |
|                   |      | Proposed Schedule | Implementation 2014-2016  |
|                   | HE-7 | Project Name      | Human Resource Development for Maternal and Child Health  |
|                   |      | Scope of Work     | To develop education and training curriculum for nurses and midwives  |
|                   |      | Proposed Schedule | Preparatory Survey 2013-2015, Implementation 2015-2019  |

Source: JICA Project Team

**Table 18.2-10 Summary of Project Profile (Socio-Economic Sector)**

| Socio-Economic Sector: EC, SD, CD |      |                   |  |
|-----------------------------------|------|-------------------|--|
| Proposed Project                  | EC-1 | Project Name      | Intra- and Inter-national Road Network Development Project   |
|                                   |      | Scope of Work     | Development of international all-weather road network including between Malakal and Ethiopia, and Malakal and Kenya.   |
|                                   |      | Proposed Schedule | Ongoing  |
|                                   | EC-2 | Project Name      | Malakal Airport Internationalization Project   |
|                                   |      | Scope of Work     | Planned in 2006: i) fence construction, ii) extension of the runway, iii) expansion of the airplane parking area, iv) reconstruction of control tower and passenger building                     |
|                                   |      | Proposed Schedule |  |
|                                   | EC-3 | Project Name      | Malakal Rural Road Network Improvement Project   |
|                                   |      | Scope of Work     | Improvement of road network connecting local areas of UNS and Malakal  |
|                                   |      | Proposed Schedule | 2019-2022  |
|                                   | EC-4 | Project Name      | Upper Nile Fisheries Promotion Project   |
|                                   |      | Scope of Work     | Provision of fishing gears and equipment, establishment of landing site, etc.  |
|                                   |      | Proposed Schedule | Capacity Development and Implementation 2017-2022  |
|                                   | EC-5 | Project Name      | Malakal Dairy Farm Project   |
|                                   |      | Scope of Work     | Establishment of facilities and provision of equipment   |
|                                   |      | Proposed Schedule | 2019-2022  |
|                                   | EC-6 | Project Name      | Malakal Poultry Breeding Farm Project  |
|                                   |      | Scope of Work     | <ul style="list-style-type: none"> <li>To establish a poultry farm with modern equipment</li> <li>To provide training about modern breeding methods for the graduates and technicians</li> </ul> |
|                                   |      | Proposed Schedule | 2016-2022  |



| Socio-Economic Sector: EC, SD, CD |                   |  |
|-----------------------------------|-------------------|--|
| EC-7                              | Project Name      | Malakal Slaughterhouse Construction Project  |
|                                   | Scope of Work     | <ul style="list-style-type: none"> <li>To establish a slaughter house with sanitary equipment and tools</li> <li>To provide training to slaughter house management officers and slaughters</li> </ul>  |
|                                   | Proposed Schedule | Construction 2014, CD 2014-2016  |
| EC-8                              | Project Name      | Malakal Light Industrial Park Development Project  |
|                                   | Scope of Work     | To create a small scale industrial park equipped with all kinds of infrastructure  |
|                                   | Proposed Schedule | 2015-2018  |
| EC-9                              | Project Name      | Logistics Hub Development Project  |
|                                   | Scope of Work     | Logistic hub development for international/domestic cargo container transport  |
|                                   | Proposed Schedule | 2019-2021  |
| EC-10                             | Project Name      | Research Function and Support Services Development Project   |
|                                   | Scope of Work     | Realization of "Policy Framework and Strategic Plans 2012 - 2016"  |
|                                   | Proposed Schedule | 2017-2019  |
| EC-II                             | Project Name      | Malakal Vocational Training Centre Reinforcement Project   |
|                                   | Scope of Work     | Provision of training materials, equipment and tools   |
|                                   | Proposed Schedule |  |
| EC-12                             | Project Name      | Upper Nile Agriculture Project   |
|                                   | Scope of Work     | Not decide yet   |
|                                   | Proposed Schedule | Not decide yet   |
| SW-1                              | Project Name      | BHN for Returnees Project  |
|                                   | Scope of Work     | BHN infrastructure improvement in residential areas of returnees for community development geared with land use zoning   |
|                                   | Proposed Schedule | 2014-2015  |
| SW-2                              | Project Name      | Malakal Street Children Centre Renovation Project  |
|                                   | Scope of Work     | <ul style="list-style-type: none"> <li>Renovation of the existing structure for children rooms, canteen and toilets</li> <li>Construction of security guard watch house</li> <li>Provision of beds, sheets, blanket, mosquito nets, tables and chairs, utensils</li> </ul> |
|                                   | Proposed Schedule | 2014-2020  |
| SW-3                              | Project Name      | MoG&SW Speed Boat Project  |
|                                   | Scope of Work     | Provision of 2 speed boats   |
|                                   | Proposed Schedule | 2014-2022  |
| SW-4                              | Project Name      | Malakal Reformatory Centre Establishment Project   |
|                                   | Scope of Work     | <ul style="list-style-type: none"> <li>Construction of reformatory building and exterior</li> <li>Provision of beds, sheets, blanket, mosquito nets, tables, chairs, utensils etc.</li> </ul>  |
|                                   | Proposed Schedule | 2016-2022  |
| SW-5                              | Project Name      | Upper Nile Culture Centre Project  |
|                                   | Scope of Work     | <ul style="list-style-type: none"> <li>Construction of a culture centre building</li> </ul>  |
|                                   | Proposed Schedule |  |
| SW-6                              | Project Name      | Malakal Town Women's Group Community Empowerment Project   |
|                                   | Scope of Work     | <ul style="list-style-type: none"> <li>To organize workshops for women water users.</li> <li>To select a training course (cooking, sewing, hygiene, home economics, forestation, kitchen garden, literacy education, etc.)</li> </ul>                                      |
|                                   | Proposed Schedule | 2013-2015  |

Source: JICA Project Team

### 18.2.2 Rating of Predicted Impacts

The rating of the predicted impact by 10 sectors and the rating of each proposed project are as follows:

**Table 18.2-11 The Rating of the Predicted Impact (Water Supply, Water Transport, Road Transport Sector)**

| Impact                               |  | A: Serious adverse impact are expected       |              |      |      |      |      |                 |      |      |           | B: Some adverse impact are expected |                |      |      |      |      |      |      |      |   |
|--------------------------------------|--|--|--------------|------|------|------|------|-----------------|------|------|-----------|-------------------------------------|----------------|------|------|------|------|------|------|------|---|
|                                      |  | C: Extent of impact is unknown at this stage |              |      |      |      |      |                 |      |      |           | No Mark: No impact is expected      |                |      |      |      |      |      |      |      |   |
|                                      |  | Overall Rating                               | Water Supply |      |      |      |      | Water Transport |      |      |           |                                     | Road Transport |      |      |      |      |      |      |      |   |
| WS-1                                 | WS-2                                       |  | WS-3         | WS-4 | WS-5 | PT-1 | PT-2 | PT-3            | PT-4 | PT-5 | PT-6 - 10 | RT-1                                | RT-2           | RT-3 | RT-4 | RT-5 | RT-6 | RT-7 | RT-8 | RT-9 |   |
| Social Environment                   | Involuntary Resettlement                   | B  | B            | B    | B    | B    |      |                 | B    | B    |           | B                                   |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Local Economy, Employment, Livelihood      | B  | B            | B    | B    | B    |      |                 | B    | B    |           | B                                   |                |      |      |      |      |      |      |      |   |
|                                      | Land Use, Utilization of Local Resources   | B  |              | B    | B    | B    |      |                 |      |      |           |                                     |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Local Community                            | C  | C            | C    | C    | C    |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Existing Social Infrastructures & Services | B  | B            | B    | B    | B    |      |                 | B    | B    |           | B                                   | B              | B    |      |      |      | B    |      | B    |   |
|                                      | The poor, Indigenous and Ethnic People     |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Misdistribution of Benefit and Damage      | C  | C            | C    | C    | C    | C    |                 | C    | C    | C         | C                                   | C              | C    | C    |      |      | C    |      | C    |   |
|                                      | Cultural Heritage                          |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Local Conflict of Interests                | C  | C            | C    | C    | C    | C    |                 | C    | C    | C         | C                                   | C              | C    | C    |      |      | C    |      | C    |   |
|                                      | Water Usage and Rights                     | B  |              |      |      |      | B    |                 | B    | B    | B         | B                                   | B              | B    | B    |      |      | B    |      | B    |   |
|                                      | Sanitation                                 | B  |              | C    | C    | C    |      |                 | C    | C    |           | B                                   |                | C    | C    |      |      | C    |      | C    |   |
|                                      | Accident                                   | B  | B            | B    | B    | B    | B    |                 | B    | B    | B         | B                                   | B              | B    | B    |      |      | B    |      | B    |   |
| Infectious Diseases such as HIV/AIDS | B  |  | C            | C    | C    | B    |      | B               | B    | B    | B         |                                     | C              | C    |      |      | C    |      | C    |      |   |
| Natural Environment                  | Geographical Features                      |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Soil Erosion                               | B  |              |      |      |      |      |                 | B    | B    |           | B                                   |                |      |      |      |      |      |      |      |   |
|                                      | Groundwater                                |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Coastal Zone                               | B  |              |      |      |      | B    |                 | B    | B    |           | B                                   |                |      |      |      |      |      |      |      |   |
|                                      | Fauna, Flora, Biodiversity                 | B  | B            | B    | B    | B    |      |                 | B    | B    |           | B                                   |                | B    | B    |      | B    |      | B    |      |   |
|                                      | Meteorology                                |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Landscape                                  |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Global Warming                             |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
| Pollution                            | Air Pollution                              | B  | B            | B    | B    | B    | B    | B               | B    | B    | B         | B                                   |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Water Pollution                            | B  |              |      |      |      |      |                 | B    | B    |           | B                                   |                |      |      |      |      |      |      |      |   |
|                                      | Soil Contamination                         | B  |              |      |      |      |      |                 | B    | B    |           | B                                   |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Solid Waste                                | B  |              |      |      |      | B    |                 | B    | B    | B         | B                                   |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Noise and Vibration                        | B  | B            | B    | B    | B    | B    | B               | B    | B    | B         | B                                   | C              | B    | B    |      |      | B    |      | B    |   |
|                                      | Ground Subsidence                          |  |              |      |      |      |      |                 |      |      |           |                                     |                |      |      |      |      |      |      |      |   |
|                                      | Offensive Odour                            | B  |              |      |      |      |      |                 | B    | B    |           | B                                   |                | B    | B    |      |      | B    |      | B    |   |
|                                      | Bottom Sediment                            | B  |              |      |      |      | B    |                 | B    | B    |           | B                                   |                |      |      |      |      |      |      |      |   |
| Number of (B)                        |  | 6  | 8            | 0    | 8    | 8    | 8    | 2               | 16   | 16   | 6         | 17                                  | 3              | 11   | 11   | 0    | 0    | 11   | 0    | 11   | 0 |
| EVALUATION                           |  | a  | b            | -    | b    | b    | b    | a               | b    | b    | a         | b                                   | a              | b    | b    | -    | -    | b    | -    | b    | - |

Evaluation: (a) Not Serious Environmental Impact (0-7), (b) Some Serious Environmental Impact (8-17)  
Source: JICA Project Team



**Table 18.2-13 The Rating of the Predicted Impact (Socio-Economic Sector)**

| Impact              | Overall Rating                             | A: Serious adverse impact are expected B: Some adverse impact are expected<br>C: Extent of impact is unknown at this stage No Mark: No impact is expected |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|---------------------|--|---|------|------|------|------|------|------|------|------|-------|-------|------|------|------|------|------|------|
|                     |  | Economic/ Social Development  |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     |  | EC-1  | EC-2 | EC-3 | EC-4 | EC-5 | EC-6 | EC-7 | EC-8 | EC-9 | EC-10 | EC-11 | SW-1 | SW-2 | SW-3 | SW-4 | SW-5 | SW-6 |
| Social Environment  | Involuntary Resettlement                   | A   | A    | C    | A    | C    |      |      | C    | A    | C     |       |      | C    |      |      | C    |      |
|                     | Local Economy, Employment Livelihood       |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Land Use, Utilization of Local Resources   | B   | B    | B    | B    | C    |      |      | C    | B    | C     |       |      | C    | C    |      | C    |      |
|                     | Local Community                            | C   | C    | C    | C    | C    | C    |      | C    | C    |       |       | C    | C    | C    |      | C    |      |
|                     | Existing Social Infrastructures & Services | B   |      | B    |      | C    |      |      | C    |      |       |       |      |      |      |      |      |      |
|                     | The poor, Indigenous and Ethnic People     |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Misdistribution of Benefit and Damage      | C   |      |      |      |      |      |      |      |      |       |       |      | C    |      | C    |      |      |
|                     | Cultural Heritage                          |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Local Conflict of Interests                | C   | C    | C    | C    | C    | C    |      | C    | C    |       |       | C    | C    |      | C    | C    |      |
|                     | Water Usage and Rights                     | B   |      | B    |      | C    | C    |      | C    | B    | C     |       | C    | C    |      | C    |      |      |
|                     | Sanitation                                 | B   |      | B    |      | B    |      |      | B    | C    |       |       |      | B    |      | C    |      |      |
|                     | Accident                                   | B   | B    |      | B    | B    | C    |      | B    | B    | C     |       | C    |      | B    | C    | C    |      |
|                     | Infectious Diseases such as HIV/AIDS       |   | B    |      |      |      |      |      |      |      | B     |       |      |      |      |      |      |      |
| Natural Environment | Geographical Features                      | C   |      | C    |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Soil Erosion                               |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Groundwater                                | C   |      |      |      | C    |      |      | C    |      |       |       |      |      |      |      |      |      |
|                     | Coastal Zone                               |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Fauna, Flora, Biodiversity                 | B   |      |      |      | C    |      |      | B    |      |       |       | C    |      | B    | C    | C    |      |
|                     | Meteorology                                |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
|                     | Landscape                                  |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
| Global Warming      |  |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
| Pollution           | Air Pollution                              | B   | B    | B    | B    | B    |      |      | B    | B    | B     |       | C    |      | B    | C    | B    |      |
|                     | Water Pollution                            | B   |      |      |      | C    |      |      | C    | B    | B     |       |      |      | C    | C    | B    |      |
|                     | Soil Contamination                         | B   |      |      |      |      |      |      |      | B    |       |       |      |      |      |      |      |      |
|                     | Solid Waste                                | B   |      |      |      | C    |      |      | B    | B    | B     |       |      |      | B    |      | B    |      |
|                     | Noise and Vibration                        | B   | B    | B    | B    | B    |      |      | B    | B    | B     |       | C    | B    | B    | C    | B    |      |
|                     | Ground Subsidence                          | B   |      |      |      |      |      |      |      | B    |       |       |      |      |      |      |      |      |
|                     | Offensive Odour                            | B   |      |      |      |      |      |      | B    | B    |       |       |      |      | C    | C    | C    |      |
|                     | Bottom Sediment                            |   |      |      |      |      |      |      |      |      |       |       |      |      |      |      |      |      |
| Number of (B)       |  | 5   | 5    | 4    | 4    | 0    | 0    | 7    | 10   | 5    | 0     | 0     | 1    | 6    | 0    | 4    | 0    | 0    |
| EVALUATION          |  | a   | a    | a    | a    | a    | -    | a    | b    | a    | -     | a     | a    | a    | a    | a    | -    | -    |

Evaluation: (a) Not Serious Environmental Impact (0-7), (b) Some Serious Environmental Impact (8-17)

Source: JICA Project Team

### 18.2.3 Outline of Predicted Impacts

The outline of predicted impact by sector and/or sub-project are shown in **Table 18-2.14**.

**Table 18.2-14 Outline of Predicted Impact**

|                    | Impact                                     | Rate | Description   |
|--------------------|--|------|---|
| Social Environment | Involuntary Resettlement                   | B    | <p>(WS) Most of the water supply pipes will be set up along existing roads. A treatment plant and elevated tanks will be constructed in a zone where small scale shop locates in case of WS-1.</p> <p>(RT) No resettlement is likely to occur in the case of RT-1 because construction works only takes place on existing roads. However it is likely to cause resettlement in the case of RT-2, 3, because the length of road will be around 18km for RT-2 and 15km for each phase of RT-3. Involuntary resettlement is likely to occur in RT-6, although the space for the bus terminal hasn't been identified yet. In addition, due to the expanding residential area, it is likely to increase the amount of resettlement.</p> <p>(PT) There are some small shops and temporary houses along the river. No resettlement is likely to occur in case of PT-1 and 5. In case of PT-3 and 4, the number of affected people is not known at this moment. F/S survey is necessary.</p> <p>(WD) Resettlement is likely to occur in case of WD-3 and 4, because the length of drainage 10.9km and 16.5km, respectively, will cut the settled areas.</p> <p>(SS) (SM) Resettlement will be expected within project area of SS-2, SM-2.</p> <p>(EN) The construction of a power station may cause some involuntary resettlement.</p> <p>(ED) The school construction may cause some involuntary resettlement, which is likely to be small scale.</p> <p>(HE) No resettlement is expected.</p> <p>(EC) (SW) (CD) Extent of impact is unknown at present.</p> |
|                    | Local Economy, Employment Livelihood       | B    | <p>(WS) There are many water sellers in Malakal Town. However considering the predicted increase in the population of Malakal Town, demand of water will also be increased. Hence it is likely that adverse impact for water sellers will not be serious.</p> <p>(WS) (RT) (PT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) Construction works will create employment, and most of workers will be hired in Malakal Town.</p> <p>(PT) During construction, few activities to provoke adverse impact are likely to be observed.</p>   |
|                    | Land Use, Utilization of Local Resources   | B    | <p>(WS) Most of the water supply pipes will be set up along existing roads. Some adverse impact is expected due to the plant and tank construction.</p> <p>(RT) Expansion of current roads or construction of new roads may cut through farm or residential areas, in RT-2, 3 and 6.</p> <p>(PT) (WD) (EN) (ED) (HE) Few activities to provoke adverse impact are likely to be observed.</p> <p>(SS) The exact location of Sludge Treatment facilities is not decided yet. However it is necessary to obtain land for these facilities (around 200m<sup>2</sup>) and for the 482 public toilets.</p> <p>(SM) An exact location of sludge treatment facilities is not decided yet. However It is necessary to obtain land for waste management facilities (around 25 ha) and 73 collection points.</p> <p>(EC) (SW) (CD) Extent of impact is unknown at present.</p>   |
|                    | Local Community                            | C    | (ALL) Development programs and relevant projects will give benefit to all communities.  |
|                    | Existing Social Infrastructures & Services | B    | <p>(WS) (PT) (WD) (SS) (SM) (EC) (SW) (CD) Traffic congestion is likely to increase during construction.</p> <p>(RT) Transport projects will promote social infrastructure development system. It is likely to improve the current situation. However traffic congestion is likely to increase during construction.</p> <p>(EN) Power projects will promote social infrastructure development. It is likely to improve the current situation.</p> <p>(ED) School construction project will improve access to education. It is likely to improve current situation.</p> <p>(HE) Access to medical service will be improved.</p>  |

|                     | Impact                                 | Rate | Description  |
|---------------------|--|------|--|
| Natural Environment | The poor, Indigenous and Ethnic People | -    | (ALL) No activities have been found that would cause a significant negative impact.  |
|                     | Misdistribution of Benefit and Damage  | C    | (ALL) Relevant projects are likely to influence positively all community members, or a few activities are likely to occur.   |
|                     | Cultural Heritage                      | -    | (ALL) Cultural and Historical Heritage does not exist at proposed projects sites.  |
|                     | Local Conflict of Interests            | C    | (ALL) Few activities have been found that would cause a significant negative impact.   |
|                     | Water Usage and Rights                 | B    | (WS) It is likely to improve access to water.<br>(RT) Transport projects will promote social infrastructure development system. It is likely to improve the current situation. However during construction, roads will be closed for construction that makes people difficult to access and carry water.<br>(PT) During construction the area that people take water is limited.<br>(WD) (SS) (SM) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(ED) It is necessary to obtain enough water for school.<br>(HE) It is necessary to obtain enough and clean water for Health Centre and Malakal Teaching Hospital.  |
|                     | Sanitation                             | B    | (ALL) Sanitary conditions around construction sites are likely to become worse due to generation of waste and unsuitable human waste treatment.  |
|                     | Accident                               | B    | (ALL) Risk of traffic accidents is likely to increase due to growth of construction vehicles and cargoes handling heavy machineries during construction and operation.   |
|                     | Infectious Diseases such as HIV/AIDS   | B    | (WS) (RT) (WD) (SS) (SM) (EN) (ED) (EC) (SW) (CD) Few or no activities to provoke adverse impact are likely to be observed.<br>(PT) Infectious diseases are likely to increase during construction due to the increase of construction workers from different regions working together.<br>(HE) Some activities to provoke positive impact are likely to be observed.  |
|                     | Geographical Features                  | -    | (ALL) No activities to provoke adverse impact are likely to be observed.   |
|                     | Soil Erosion                           | B    | (WS) (WD) (SS) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(RT) (EN) The land cut for slope and the creation of an embankment zone without implementation of mitigation measure may result in soil erosion.<br>(PT) Cutting slopes and creating embankments in PT-3, 4, 9 and 10 can result in soil erosion without proper design of measures to prevent it.<br>(SM) During construction stage, eroded soil may flow off the site in SM-2.  |
|                     | Groundwater                            | B    | (WS) (RT) (PT) (WD) (EN) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(SS) Few activities to provoke adverse impact are likely to observe.<br>(SM) Effluents from the landfill site may pollute inflow water and ground water.   |
|                     | Coastal Zone                           | B    | (WS) (RT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(PT) There is possibility of sedimentation due to the type of wharf, in PT-3, 4, 7, 9 and 10.   |
|                     | Flora, Fauna, Biodiversity             | B    | (ALL) There are game preserves; one named EZ Zeraf located south of Malakal Town and one named Fanikang located on the west side of the Nile River. However protected conversation areas such as national park and forest reserves are not found in the study area. A few rare and endangered species such as listed by IUCN* <sup>1</sup> and CITES* <sup>2</sup> may be found in the area. However, the Nile crocodile which is on the IUCN list and whose habitat is in the River Nile may be affected negatively.<br>(WS) (EC) (SW) (CD) Few or many tree may be cut due to construction.<br>(RT) It is likely to occur that many trees will be cut during construction considering the length of road, in RT-2, 3 and 6.<br>(PT) There are not many trees along the Nile River. However a few activities to provoke adverse impact are likely to be observed.<br>(WD) It is likely to occur that many trees will be cut during construction considering the length of drainage, in WD-2, 3 and 4.<br>(SS) It is likely to occur that many trees will be cut during construction considering the |

|           | Impact              | Rate | Description  |
|-----------|---------------------|------|--|
|           |                     |      | dimension of sludge treatment facilities.<br>(SM) It is likely to occur that many trees will be cut during construction considering the dimension of waste management facilities.<br>(EN) (ED) (HE) A few to many trees may be cut as a result of construction activities according to the project   |
|           | Meteorology         | -    | (ALL) No activities have been found that would cause a significant negative impact.  |
|           | Landscape           | -    | (ALL) No activities have been found that would cause a significant negative impact   |
|           | Global Warming      | -    | (ALL) No activities have been found that would cause a significant negative impact.  |
| Pollution | Air Pollution       | B    | (WS) (PT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) Air pollution is likely to occur during construction and operation due to the increase of traffic, and usage of machineries and generators.<br>(RT) Air pollution is likely to occur during construction and operation due to the increase of traffic, and use of machineries and generators. In addition, levels of dust, NO <sub>x</sub> , SO <sub>x</sub> , CO may increase as a result of growing traffic volumes.  |
|           | Water Pollution     | B    | (WS) (RT) (WD) (SS) (EN) (ED) (HE) (EC) (SW) (CD) Few or no activities to provoke adverse impact are likely to be observed.<br>(PT) During construction, sediment disturbance and inflow of eroded soil may pollute the river water. Additionally oil spills from vessels may pollute the river water.<br>(SM) Effluents from the landfill site pollute inflow waters and ground water in SM-2.  |
|           | Soil Contamination  | B    | (WS) (WD) (SS) (EN) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(RT) Oil spillage from construction vehicles during construction is likely to occur.<br>(PT) Oil Spillage from construction vehicles during construction and cargoes handling equipment and generators during operation is likely to occur. Additionally if riverbed soil dredged is contaminated, environment of soil disposal site is likely to be heavily polluted.<br>(SS) Sludge needs to be periodically removed from the sewage plant; however it will not be a toxic substance.<br>(SM) Soil contamination will be produced from the toxic waste solid. |
|           | Solid Waste         | B    | (WS) (RT) (PT) (WD) (SS) (SM) (EN) (ED) (EC) (SW) (CD) Construction debris such as soil is likely to be generated during construction. Human waste will be generated from workers during construction and operation.<br>(SM) It is likely to improve current situation.<br>(ED) It is likely to increase the amount of waste by school activities.<br>(HE) It is likely to increase the amount of waste from health centre and hospital.   |
|           | Noise and Vibration | B    | (WS) (PT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) Noise and vibration arising from construction works and cargoes handling activities are expected.<br>(RT) Noise and vibration arising from construction works and cargoes handling activities are expected. In addition, as road conditions are improved by paving, increase of traffic volume may also increase noise, vibration, pollution seriously.   |
|           | Ground Subsidence   | B    | (ALL) No activities to provoke adverse impact are likely to be observed.   |
|           | Offensive Odour     | B    | (WS) (WD) (SS) (EN) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(RT) (PT) Emission of offensive fumes by construction vehicles during construction will be increased.<br>(SM) The landfill site is likely to emit a strong smell if no appropriate mitigation is adopted.   |
|           | Bottom Sediment     | B    | (WS) (RT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) No activities to provoke adverse impact are likely to be observed.<br>(PT) There are some possibilities of bottom sediment deterioration due to inflow of eroded oil from construction sites. Baseline survey for regular observation is necessary.   |

\*IUCN:International Union for Conservation of Nature and Natural Resources, \*2 CITES :The Convention on International Trade in Endangered Species of Wild Fauna and Flora

Source: JICA Project Team

#### 18.2.4 Analysis of Alternatives

There is a possibility that the development process can cause adverse impacts on the environment. Environmental loads, not only depend on the volume of fuel consumption, materials and water consumption or on the production of solid waste and liquid gases, but also the damage to the existing natural environment like tree cutting, and degradation of social environment that undermines public health. Even though this can be an unavoidable phenomenon, the strategic measures adopted in the latter sections should mitigate considerably any serious impacts.

If no projects are implemented, the pressing issues and challenges that face on Malakal Town currently will never be resolved. Furthermore as the population is increasing rapidly because of due to many people returning from Sudan, it will be difficult for them to establish their livelihood under current conditions. In addition, industrial and economic development and reconstruction of South Sudan is expected to be stagnant without projects.

#### 18.2.5 Proposed Mitigation Measures and Monitoring for Key Impacts

Proposed mitigation measures are shown in following **Table 18.2-15**.

**Table 18.2-15 Proposed Mitigation Measure and Monitoring Item**

|                    | Items  | Rate | Mitigation Measure   | Monitoring Item  |
|--------------------|--|------|--|--|
| Social Environment | Involuntary Resettlement                     | B    | <ul style="list-style-type: none"> <li>- Counting the number of houses.</li> <li>- The holding of stakeholder meeting for information disclosure and confirmation of agreement with stakeholder.</li> <li>- The establishment of a community coordination committee for smooth land acquisition and required compensation.</li> <li>- Proponent shall tell a law-based process for land acquisition and compensation.</li> <li>- Preparation of RAP (Resettlement Action Plan).</li> </ul> | <ul style="list-style-type: none"> <li>- Observation of adequate land acquisition process and compensation during construction</li> <li>- Holding the stakeholder meeting</li> </ul>             |
|                    | Local Economy, Employment, Livelihood        | B    | <ul style="list-style-type: none"> <li>- Interview survey to inhabitants (job, income household structure etc.).</li> <li>- Introduction and provision of equal job opportunity for Malakal Town People.</li> </ul>  | <ul style="list-style-type: none"> <li>- Work condition, and salary of labours, and livelihood of residents, etc.</li> </ul>   |
|                    | Land Use and Utilization of Local Resources  | B    | <ul style="list-style-type: none"> <li>- Topographical survey (residential area, agriculture etc.) / making map.</li> <li>- All properties shall be avoided in the design.</li> <li>- Transplant and replant trees instead of cutting trees.</li> </ul>  | <ul style="list-style-type: none"> <li>- Land acquisition process and compensation during construction.</li> </ul>   |
|                    | Existing Social Infrastructures and Services | B    | <ul style="list-style-type: none"> <li>- Survey existing social infrastructures at target area (school, hospital, church and mosque, water pipe line etc.).</li> <li>- Advance announcement of the traffic information and construction period through public media.</li> <li>- Holding the stakeholder meeting.</li> </ul>  | <ul style="list-style-type: none"> <li>- Announcement of the traffic information through public media.</li> <li>- Number of allocated traffic control staff during construction.</li> </ul>      |
|                    | Water Usage and Right                        | B    | <ul style="list-style-type: none"> <li>- Advance announcement of the traffic information during construction period.</li> <li>- Holding the stakeholder meeting.</li> </ul>  | <ul style="list-style-type: none"> <li>- Implementation of site inspection, holding consultation meeting to exchange opinions.</li> <li>- Social Survey on water use with Boma chiefs</li> </ul> |
|                    | Sanitation                                   | B    | <ul style="list-style-type: none"> <li>- Installation of temporary toilets for workers during construction and maintain in clean condition.</li> </ul>   | <ul style="list-style-type: none"> <li>- Condition of the temporary toilets.</li> </ul>  |



|                    | Items   | Rate   | Mitigation Measure  | Monitoring Item  |                                   |                 |  |                 |                              |    |   |  |
|--------------------|---|--|---|--|-----------------------------------|-----------------|--|-----------------|------------------------------|----|---|--|
|                    | Accident  | B  | <ul style="list-style-type: none"> <li>- Education on traffic rules for construction workers and inhabitants.</li> <li>- Staffing for traffic control during construction.</li> <li>- Advanced announcement of construction period.</li> <li>- Cooperation with traffic police.</li> </ul>  | <ul style="list-style-type: none"> <li>- Traffic survey (number of traffic accident etc.)</li> <li>- Staffing for traffic control.</li> </ul>                                  |                                   |                 |  |                 |                              |    |   |  |
|                    | Infectious Diseases such as HIV/AIDS                    | B  | <ul style="list-style-type: none"> <li>- Healthcare education for workers and inhabitants.</li> <li>- Implementation of periodical prevention campaigns.</li> </ul>   | <ul style="list-style-type: none"> <li>- Health condition of workers, inhabitants, (interview with medical doctors/nurse etc.).</li> </ul>                                     |                                   |                 |  |                 |                              |    |   |  |
| Environment        | Soil Erosion  | B  | <ul style="list-style-type: none"> <li>- Select construction methods minimizing soil erosion</li> <li>- Set up of slope protection measures</li> <li>- Data gathering from authorities such as geological agency</li> </ul>   | <ul style="list-style-type: none"> <li>- Condition of soil erosion.</li> <li>- Measures for soil erosion.</li> </ul>   |                                   |                 |  |                 |                              |    |   |  |
|                    | Groundwater   | B  | <ul style="list-style-type: none"> <li>- Install Toilets that do not affect ground water quality.</li> <li>- Interview and discuss with water supply agency.</li> </ul>   | <ul style="list-style-type: none"> <li>- Water quality.</li> </ul>   |                                   |                 |  |                 |                              |    |   |  |
|                    | Coastal Zone  | B  | <ul style="list-style-type: none"> <li>- Consideration and selection of adequate wharf type.</li> <li>- Sounding survey</li> </ul>  | <ul style="list-style-type: none"> <li>- Sand sedimentation.</li> </ul>  |                                   |                 |  |                 |                              |    |   |  |
| Natural            | Flora, Fauna, Biodiversity                              | B  | <ul style="list-style-type: none"> <li>- Affected trees shall be confirmed though survey.</li> <li>- Set up the markings of boundaries of construction area.</li> <li>- Transplant and replant trees instead of cutting.</li> <li>- Avoid sensitive and protected areas and relevant species habitats for project site.</li> <li>- Minimization of felling trees such as trees along roads, those of community's forest.</li> <li>- Survey regarding species in the Nile River such as Nile crocodile, if necessary</li> </ul>  | <ul style="list-style-type: none"> <li>- Visual observation of the condition of vegetation</li> <li>- Interviews to specialists, MOE and Ministry of Wildlife, UNEP</li> </ul> |                                   |                 |  |                 |                              |    |   |  |
| Pollution          | Air Pollution   | B  | <ul style="list-style-type: none"> <li>- Air quality analysis periodically</li> <li>- Advance notice of construction schedule</li> <li>- Using heavy machine and equipment matching with low pollution standard, and maintenance of those regularly</li> <li>- Keeping maintenance record of machines and equipment</li> <li>- Avoiding unnecessary idling</li> <li>- Interview to MOE and WHO to collect information and related document.</li> <li>- Sprinkling of water near residential areas to reduce SPM.</li> </ul> <p style="text-align: center;"><b>Guideline of WHO</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>T-SPM</td> <td>150-230µg/m<sup>3</sup>/24hours</td> </tr> <tr> <td>SO<sub>2</sub></td> <td>350µg/m<sup>3</sup>/1hour, 125µg/m<sup>3</sup>/24hours</td> </tr> <tr> <td>NO<sub>2</sub></td> <td>120µg/m<sup>3</sup>/8hours</td> </tr> <tr> <td>CO</td> <td>30mg/m<sup>3</sup>/1hour, 10mg/m<sup>3</sup>/8hours</td> </tr> </tbody> </table> <p style="text-align: center;">Source: Air quality assessment at the Juba Port in Southern Sudan<br/>Chemical &amp; Industrial Consultancy Unit, Department of Chemistry, University of Nairobi, 2010</p> | T-SPM  | 150-230µg/m <sup>3</sup> /24hours | SO <sub>2</sub> | 350µg/m <sup>3</sup> /1hour, 125µg/m <sup>3</sup> /24hours | NO <sub>2</sub> | 120µg/m <sup>3</sup> /8hours | CO | 30mg/m <sup>3</sup> /1hour, 10mg/m <sup>3</sup> /8hours | <ul style="list-style-type: none"> <li>- Visual observation of the condition of dust distribution during construction.</li> <li>- Air quality analysis periodically (before start, during, and post construction).</li> <li>- Maintenance machine record.</li> <li>- Interview with MOE</li> </ul> |
|                    | T-SPM   | 150-230µg/m <sup>3</sup> /24hours  |   |  |                                   |                 |  |                 |                              |    |   |  |
|                    | SO <sub>2</sub>   | 350µg/m <sup>3</sup> /1hour, 125µg/m <sup>3</sup> /24hours   |   |  |                                   |                 |  |                 |                              |    |   |  |
| NO <sub>2</sub>    | 120µg/m <sup>3</sup> /8hours                            |  |   |  |                                   |                 |  |                 |                              |    |   |  |
| CO                 | 30mg/m <sup>3</sup> /1hour, 10mg/m <sup>3</sup> /8hours |  |   |  |                                   |                 |  |                 |                              |    |   |  |
| Water Pollution    | B   | <ul style="list-style-type: none"> <li>- Water quality analysis periodically</li> <li>- Advance notice of construction schedule</li> <li>- Prevention oil spillage from vessel and/or lorries and vehicle, and setting oil fence in case of accident</li> <li>- Install oil separation tank at car washing area</li> <li>- Set up system for sedimentation of turbid water and treatment facilities for discharged water</li> <li>- Interview to MOE and WHO to collect information and related document.</li> </ul> | <ul style="list-style-type: none"> <li>- Visual observation of water quality from earthwork area and base camp site</li> <li>- Water quality survey such as turbidity, BOD, SS and inorganic matter (before start, during, and post construction)</li> <li>- Interview with MOE, and WHO</li> </ul>   |  |                                   |                 |  |                 |                              |    |   |  |
| Soil Contamination | B   | <ul style="list-style-type: none"> <li>- Examination of riverbed sediment (if contaminated, necessary countermeasure shall be proposed)</li> <li>- Using heavy machine and equipment matching with low</li> </ul>  | <ul style="list-style-type: none"> <li>- Interview with MOE (history of land use and industries)</li> </ul>   |  |                                   |                 |  |                 |                              |    |   |  |

| Items               | Rate                                | Mitigation Measure  | Monitoring Item  |                               |           |                                     |  |
|---------------------|-------------------------------------|---|--|-------------------------------|-----------|-------------------------------------|--|
|                     |                                     | pollution standard, and regular maintenance of these<br>- Install toilets that do not affect ground water quality<br>- No use of polluted soil from borrow pit and quarry during construction   | - Soil Surveys, as necessary.  |                               |           |                                     |  |
| Solid Waste         | B                                   | - Selection of Environmental friendly disposal system (selected, separate and inspect)<br>- Education on waste separation and appropriate disposal for workers during construction.<br>- Human waste is treated properly at the designated disposal place.  | - Visual observation of disposal condition at site and designated place.<br>- Condition of solid waste/disposal (interview to district office and resident). |                               |           |                                     |  |
| Noise and Vibration | B                                   | - Select construction methods which do not generate noise and vibration as much as possible<br>- Adjustment of work time (limited work time in daytime)<br>- Using noise attenuated type machines and vehicles matching with low pollution standard, and maintenance of those.<br>- Keeping maintenance records<br><b>Guideline of WHO</b> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Noise</td> <td>Less than 100-110 dB (4hours)</td> </tr> <tr> <td>Vibration</td> <td>No guideline (ref. less than 75 dB)</td> </tr> </table> Source: Assessment of Noise and Ground Vibration levels at the Juba Port in Southern Sudan Chemical & Industrial Consultancy Unit, Department of Chemistry, University of Nairobi, 2010 | Noise  | Less than 100-110 dB (4hours) | Vibration | No guideline (ref. less than 75 dB) | - Interview with residents on noise<br>- Maintenance records of machine and vehicles |
| Noise               | Less than 100-110 dB (4hours)       |   |  |                               |           |                                     |  |
| Vibration           | No guideline (ref. less than 75 dB) |   |  |                               |           |                                     |  |
| Offensive Odour     | B                                   | - Appropriate management of solid and liquid waste<br>- Using heavy machine and equipment matching with low pollution standard, and maintenance of those regularly<br>- Keeping maintenance record of machine and equipment<br>- Avoiding unnecessary idling  | - Interview with residents<br>- Maintenance machine and equipment regularly<br>- Sensory tests on the site, if necessary                                     |                               |           |                                     |  |
| Bottom sediment     | B                                   | - Backwashed drainage and sludge shall be discharged in the centre of the river, if necessary.  | - Sounding survey and monitor bottom sediment regularly  |                               |           |                                     |  |

Source: JICA Project Team

### 18.3 CONCLUSION

As mentioned in 8.1.1, the “*Environmental Protection Bill 2010*” is not yet adopted by the Parliament of South Sudan. In the Bill, Chapter 7, the EIA process is described, however Environmental Standards and other Environmental Regulations do not officially exist in South Sudan at present. In addition, EIA inspection and many related development projects and activities cannot be implemented as needed due to a shortage of MOE staff and their lack of budget. It may therefore be said that MOE has not been fully functional as a governmental organization. On the other hand, some agencies like USAID, UNEP implement capacity development programs for MOE staff and the Environmental departments of other ministries.

The outline of major predicted impact and list of abbreviation in the table are as following;

**Table 18.3-1 Outline of Predicted Impact**

|                       | Impact                                     | Rate                                 | Description  |
|-----------------------|--|--------------------------------------|--|
| Social Environment    | Involuntary Resettlement                   | B                                    | (WS) A treatment plant and elevated tanks will be constructed in a zone where small scale shop locates.<br>(RT) Some projects will require resettlement.<br>(PT) The number of affected people is not known at this moment. F/S survey is necessary.<br>(WD) Resettlement is likely to occur.<br>(SS) (SM) Resettlement will be expected within project area.<br>(EN) (ED) The construction may cause some involuntary resettlement.   |
|                       | Local Economy, Employment Livelihood       | B                                    | (WS) There are many water sellers in Malakal Town. However considering the predicted increase in the population of Malakal Town, demand of water will also be increased. Hence it is likely that adverse impact for water sellers will not be serious.<br>(WS) (RT) (PT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) Construction works will create employment, and most of workers will be hired in Malakal Town.<br>(PT) During construction, few activities to provoke adverse impact are likely to be observed. |
|                       | Land Use, Utilization of Local Resources   | B                                    | (WS) Some adverse impact is expected due to the plant and tank construction.<br>(RT) Expansion of current roads or construction of new roads may cut through farm or residential areas.<br>(PT) (WD) (EN) (ED) (HE) Few activities to provoke adverse impact are likely to be observed.<br>(EC) (SW) (CD) Extent of impact is unknown at present.  |
|                       | Local Community                            | C                                    | (ALL) Development programs and relevant projects will give benefit to all communities.   |
|                       | Existing Social Infrastructures & Services | B                                    | (WS) (PT) (WD) (SS) (SM) (EC) (SW) (CD) (RT) Traffic congestion is likely to increase during construction.<br>(RT) Transport projects will promote development of the social infrastructure system.<br>(EN) (ED) (HE) It is likely to improve current situation.   |
|                       | The poor, Indigenous and Ethnic People     | -                                    | (ALL)<br>No activities have been found that would cause a significant negative impact.   |
|                       | Misdistribution of Benefit and Damage      | C                                    | (ALL)<br>Relevant projects are likely to influence positively all community members, or few activities to provoke adverse impact are likely to be observed.  |
|                       | Cultural Heritage                          | -                                    | (ALL) No Cultural and Historical Heritage is present at proposed projects sites.   |
|                       | Local Conflict of Interests                | C                                    | (ALL) Few activities to provoke adverse impact are likely to be observed.  |
|                       | Water Usage and Rights                     | B                                    | (WS) It is likely to improve access to water.<br>(RT) Transport projects will promote development of the social infrastructure system. So it is likely to improve current situation. However during construction, roads will be closed for and this makes it difficult for people to access and carry water.<br>(PT) During construction the area that people take water is limited.   |
|                       | Sanitation                                 | B                                    | (ALL) Sanitary conditions around construction sites are likely to become worse due to generation of waste and unsuitable human waste treatment.  |
|                       | Accident                                   | B                                    | (ALL) Risk of the traffic accident is likely to increase due to growth of construction vehicles and cargoes handling heavy machineries during construction and operation.  |
|                       | Natural                                    | Infectious Diseases such as HIV/AIDS | B  |
| Geographical Features |  | -                                    | (ALL) No activities to provoke adverse impact are likely to be observed.   |
| Soil Erosion          |  | B                                    | (RT) (EN) Cutting slopes and creating embankments can result in soil erosion without proper design of measures to prevent it.<br>(PT) (SM) During construction stage, eroded soil is likely to flow.   |
|                       | Groundwater                                | B                                    | (SS) No activities have been found that would cause a significant negative impact.   |

|                     | Impact                     | Rate          | Description   |
|---------------------|----------------------------|---------------|---|
|                     |                            |               | (SM) Effluents from the landfill site may provoke water pollution in the inflow and underground water.  |
|                     | Coastal Zone               | B             | (PT) There is possibility of sedimentation due to the type of wharf.  |
|                     | Flora, Fauna, Biodiversity | B             | (ALL) There are game preserves; one named EZ Zeraf located south of Malakal Town and one named Fanikang located the west side of the River Nile. However protected conversation area such as national park and forest reserves are not found in study area. A few rare and endangered species such as listed by IUCN and CITES may be found in the area. However, the Nile crocodile which is on the IUCN list and whose habitat are in the River Nile may be affected negatively.<br>A few or many trees may be cut as a result of construction activities according to the project. |
|                     | Meteorology                | -             | (ALL) No activities to provoke adverse impact are likely to be observed.  |
|                     | Landscape                  | -             | (ALL) No activities to provoke adverse impact are likely to be observed.  |
|                     | Global Warming             | -             | (ALL) No activities to provoke adverse impact are likely to be observed.  |
|                     | Pollution                  | Air Pollution | B   |
| Water Pollution     |                            | B             | (PT) During construction, sediment disturbance and eroded soils flowing into the river may pollute the river water. Additionally oil spill from vessels may pollute the river water.<br>(SM) Effluents from the landfill site may provoke water pollution in the inflow and underground water in SM-2.  |
| Soil Contamination  |                            | B             | (RT) (PT) Oil spillage from construction vehicles during construction are likely to occur.<br>(SM) Soil contamination will be produced from the toxic waste solids.   |
| Solid Waste         |                            | B             | (WS) (RT) (PT) (WD) (SS) (SM) (EN) (ED) (EC) (SW) (CD) Construction debris such as soil is likely to be generated during construction. (SM) It is likely to improve current situation.<br>(ED) (HE) It is likely to increase the amount of waste by school activities.  |
| Noise and Vibration |                            | B             | (WS) (PT) (WD) (SS) (SM) (EN) (ED) (HE) (EC) (SW) (CD) (RT) Noise and vibration arising from construction works and cargoes handling activities are expected.<br>(RT) Increase of traffic volume may also increase noise, vibration and pollution significantly.  |
| Ground Subsidence   |                            | B             | (ALL) No activities to provoke adverse impact are likely to be observed.  |
| Offensive Odor      |                            | B             | (RT) (PT) Emission of offensive fumes from construction vehicles during construction will be increased.<br>(SM) The landfill site is likely to emit a strong smell.   |
| Bottom Sediment     |                            | B             | (PT) There are some possibilities of bottom sediment deterioration due to inflow of soil eroded from construction site. Baseline survey for regular observation is necessary.   |

## **CHAPTER 19 THE COMPREHENSIVE PLAN**

This chapter presents the process for formulating the Comprehensive Plan. Based on the implementation schedule of the projects, the required funds for investment, operations and management are also estimated and presented in this chapter.

Firstly, the proposed sector-wide projects identified in **Part III** are grouped according to the Development Programmes and the Development Strategies prepared in **Chapter 4**. Implementation priorities for the proposed projects are evaluated from the perspectives of urgency, economic impacts, population that would benefit, maturity, necessity of socio-environmental consideration and relevance to other projects. Project rankings as “A: Excellent”, “B: Ordinary” and “C: Inferior” also feed into the prioritisation process. The project implementation schedule is drawn up based on the implementation priority of each project, budgetary constraints and sectoral balance.

The sector-wise capital outlay cost and corresponding budgetary capacity of Upper Nile State (UNS) is evaluated and summarised in tables together with sector-wise operational and maintenance costs against locally available financial resources. Some notable projects are briefly described in the project sheets. Methods to meet the required funds for investment and costs for operations and management are studied and presented in this chapter.

Urgent support projects are selected in this chapter in consideration of needs assessment results obtained through the Household Survey, potential for technology transfer to the counterparts, several possible JICA assistance schemes, and opinions of UNS government officials.

### **19.1 DEFINITION OF THE COMPREHENSIVE PLAN**

The Comprehensive Plan consists of Development Programmes corresponding to Development Strategies. The Programmes consist of a combination of the proposed projects in a way that maximises development.

### **19.2 APPROACH TO FORMULATING THE IMPLEMENTATION PLAN**

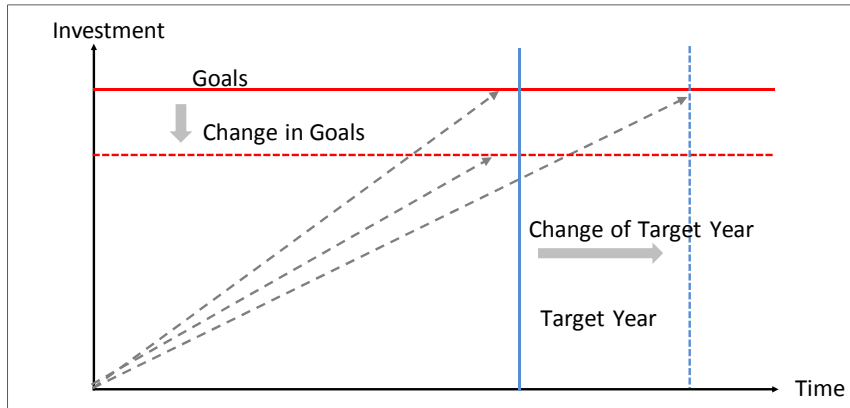
#### **19.2.1 Principles for the Formulation of the Project Implementation Plan**

A set of projects and measures proposed in each sector and further cross-cutting projects and measures are reviewed and organised to effectively achieve the established vision, objectives and strategies. Based on the review, projects are organised in a timeframe of 10 years up to the year 2022.

The Comprehensive Plan is formulated to allocate projects throughout the planning time horizon under the budgetary constraints in an iterative way so that the maximum total effect can be obtained.

However, the timeframe of 10 years should be perceived as somewhat flexible. It may happen

that some projects may not proceed as proposed in the master plan due to unforeseeable factors. In that event, the implementation schedule should be adjusted flexibly. The target year could be deferred or the level of achievement by 2022 could be lowered. This is shown in **Figure 19.2-1**.



Source: JICA Project Team

**Figure 19.2-1 Flexibility in Time Horizon and Achievement Level**

In formulating a comprehensive plan, it is more meaningful to comprehensively accommodate cross-cutting social economic infrastructure restoration/improvement issues and capacity development in a common socio-economic framework than to individually and separately accommodate sectoral issues. In this context, issues are studied together as a package and are mutually adjusted to balance requirements for space, schedule and resources, and to incorporate techniques for smooth project implementation and synergy effects to formulate a master plan.

The following principles were adopted in preparing the comprehensive plan:


- a. Staged development
- b. Packaging of projects/measures to formulate a master plan

### **(1) Staged Development**

The type of development, that is combination of restoration, reconstruction, and development and balance of livelihood improvement and economic development, suitable for each stage of development should be carefully considered. The planning horizon of ten years up to 2022 can be divided into three stages: (a) restoration and rehabilitation stage, (b) reconstruction stage, and (c) development stage.

The features in each stage are shown in **Figure 9.2-2**.

| Urgent-term<br>(Urgent Phase)<br>2012-2014  | Short-term<br>(Phase II)<br>2015-2018   | Medium-term<br>(Phase III)<br>2019-2022   |
|---|---|---|
| Restoration & Rehabilitation<br>(restore to original condition)   | Reconstruction<br>(establish the base for socio-economic development)   | Development<br>(Private sector gain momentum.)  |
| <ul style="list-style-type: none"> <li>• Rehabilitation of existing social and economic infrastructures, fulfilling immediate needs of people (water, medical facility, electricity)</li> <li>• Recovery of economic activities (river port improvement)</li> <li>• Capacity development for government officers (planning, implementation, operation and management of projects)</li> <li>• Integration of returnees (land allotment and registration, basic human needs)</li> </ul> | <ul style="list-style-type: none"> <li>• Reconstruction of social and economic facilities (road, drainage, education, regional transport system)</li> <li>• Creation of livelihoods and economic opportunities (employment and self-employment)</li> <li>• Continuation &amp; expansion of capacity development (vocational training)</li> <li>• Improvement of investment environment for industrial development (tax incentives, simplified procedure)</li> </ul> | <ul style="list-style-type: none"> <li>• Expansion of social and economic infrastructures (industrial park, enhancement of capacity for economic activities)</li> <li>• Continuation &amp; expansion of capacity development</li> <li>• Further improvement of investment environment for industrial development</li> <li>• Development of agro-industry, construction industry, primary sector industries in the surrounding areas (agriculture, livestock, fishery, poultry)</li> </ul> |



Source: JICA Project Team

**Figure 19.2-2 Features of Each Stage**

## (2) Packaging of Projects to Formulate the Comprehensive Development Plan

The difference between the level of present conditions and targeted level for future conditions can be regarded as the required amount of restoration and improvement in forming projects. However, the established required amount should not be regarded unconditionally as constituting a project because the effective combination and timing of projects sometimes bring about cost efficiencies. In this Study, the required amount of restoration and improvement is broken down and integrated throughout packaged projects after studying the required funds, implementation schedule, and project schemes of various donor agencies.

For instance, candidate cases for project formulation package combinations include road reconstruction and drainage system improvement, port construction and access road improvement, water supply improvement and wastewater disposal system improvement, and capacity development and water supply system improvement. Projects and measures with a similar nature and those with synergy effects are grouped and allocated in the time horizon.

### 19.3 PROGRAMMES

The proposed projects in various sectors in Part III are reorganised into four Development Programmes. Development Programmes are formulated under Development Strategies with reference to the following frameworks: (i) Socio-economic Framework, and (ii) Spatial Framework.

#### 19.3.1 Programmes under Malakal Infrastructure Development Strategy

The objective of urban infrastructure development is to improve the living environment for the people and production environment for the private sector in Malakal. Eight programmes are shown in **Figure 19.3-1**. Proposed projects under each programme are presented in **Table 19.3-1**.



Source: JICA Project Team

**Figure 19.3-1 Programmes under Malakal Infrastructure Development Strategy**

#### (1) Water Supply Programme

Access to water supply was revealed as the highest need by the Town Profile Survey. This programme aims to cater to the outstanding needs of people in Malakal Town. Projects under this programme include rehabilitation of the existing plant to recover its original capacity, improvement of water supply services through detection of leakages and repair of leakage points in the pilot project area, and construction of water supply facilities and a new pipe network.

#### (2) Road Improvement Programme

The road network in Malakal Town forms a grid with the following types of road: trunk roads, arterial roads, collector roads, distribution roads, and local roads. This programme aims to construct roads inside the town and in the eastern area of Malakal Town, taking the future urban structure into consideration. Construction of roundabouts and technical transfer of Operation and Maintenance (O&M) are also included as components of the programme.

#### (3) Public Transportation and Traffic Safety Programme

This programme aims to improve public transportation and traffic safety through the



establishment of a public transport department in Ministry of Physical Planning and Rural Development, UNS (the MoPI&RD), construction of a bus terminal and taxi bay, technical transfer of traffic road safety measures, and so on.

**(4) Sanitation Improvement Programme**

This programme aims to improve the hygiene environment. The projects are roughly classified as construction of sanitation facilities such as public toilets and sludge treatment, and capacity development for public health workers and members of the community.

**(5) Drainage Improvement Programme**

This programme aims to enhance drainage capacity and to mitigate flood damage. In addition, construction projects for trunk drains along the Outer Ring Road and main drains for new development areas in eastern and southern Malakal are also planned.

**(6) Solid Waste Management Programme**

This programme aims to improve the collection and transport of wastes and landfill management for Malakal Town. As for medical waste, one project for Teaching Hospital staff is proposed under the programme.

**(7) Power Supply Programme**

This programme aims to supply stable and sufficient electricity to Malakal Town. Diesel generators with a total capacity of 10.0 Megavolts Amperes (MVA) will be installed to satisfy estimated power demand in 2022. In addition, solar powered street lights will be installed for reliable and steady operation at night time.

**(8) Emergency Services Reinforcement Programme**

This programme aims to procure equipment and human resources for firefighting and emergency medical support. (This programme was originally out of scope of the Comprehensive Plan but the projects under this programme were recommended by the JICA Project Team, although detailed plans are not mentioned in Part III.)

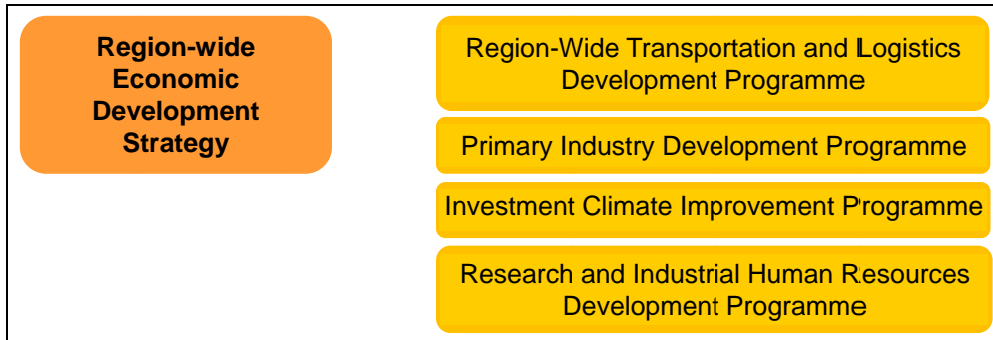
**Table 19.3-1 Programmes under Malakal Infrastructure Development Strategy**

|   | <b>Programme</b>                                   | <b>ID No</b> | <b>Project</b>  |
|---|--|--------------|---|
| 1 | Water Supply Programme                             | WS-1         | Small-scale Water Supply Development Project                              |
|   |  | WS-2         | Rehabilitation Project of the Treatment Plant & Distribution Pipe Network |
|   |  | WS-3         | Technical Cooperation Project on Improvement of Water Supply Service      |
|   |  | WS-4         | Expansion of the Treatment Plant and Distribution Pipe Network Project    |
| 2 | Road Improvement Programme                         | RT-1         | Community Road Construction Project (LBT)                                 |
|   |  | RT-2         | Malakal Town Secondary Arterial Road Improvement Project                  |
|   |  | RT-3         | Malakal Town Arterial Road Improvement Project                            |
|   |  | RT-4         | Road Maintenance and Management Project                                   |
|   |  | RT-8         | Intersection and Traffic Facility Improvement Project                     |
| 3 | Public Transportation and Traffic Safety Programme | RT-5         | Public Transport Management Project                                       |
|   |  | RT-6         | Malakal Town Bus Terminal and Bus Stop Facilities Construction Project    |
|   |  | RT-7         | Traffic Management Project  |
|   |  | RT-9         | Malakal Town Traffic Safety Management Project                            |
| 4 | Sanitation Improvement Programme                   | SS-1         | Community Sanitary System and Public Toilet Installation Project          |
|   |  | SS-2         | Construction of Sludge Treatment Facilities Project                       |
|   |  | SS-3         | Technical Project for Toilet Operation and Maintenance                    |
|   |  | SS-4         | Project for Improving the Sanitary Environment in Malakal Town            |
|   |  | SS-5         | Public Toilet Operation and Maintenance Project                           |
| 5 | Drainage Improvement Programme                     | WD-1         | Reconstruction of Main Drains in Central Malakal Project                  |
|   |  | WD-2         | Reconstruction of Main Drains Project                                     |
|   |  | WD-3         | Extension of Trunk Drain 1 Project  |
|   |  | WD-4         | Construction of Trunk Drain 2 Project                                     |
|   |  | WD-5         | Construction of Main Drains in New Urban Area Project                     |
|   |  | WD-6         | Capacity Development Project for Operation and Maintenance of Drains      |
| 6 | Solid Waste Management Programme                   | SM-1         | Solid Waste Collection Activities Improvement Project                     |
|   |  | SM-2         | Landfill Management Improvement Project                                   |
|   |  | SM-3         | Medical Waste Management Improvement Project                              |
| 7 | Power Supply Programme                             | EN-1         | Power Plant Rehabilitation Project  |
|   |  | EN-2         | Expansion of 11 kV Distribution Network Project                           |
|   |  | EN-3         | Solar Power Pilot Project   |
| 8 | Emergency Services Reinforcement Programme         | ES-1         | Firefighting System Improvement Project                                   |
|   |  | ES-2         | Project for Improving Support System for Emergency Medical Services       |

Source: JICA Project Team

### 19.3.2 Programmes under the Region-wide Economic Development Strategy

The objective of region-wide economic development is to improve road and water transport infrastructure not only for Malakal but also for the wider region, and to promote industry in Malakal and surrounding areas. The Region-wide Economic Development Programme is composed of the following programmes. **Figure 19.3-2** shows programmes formulated for the implementation of the Region-wide Economic Development Strategy.



Source: JICA Project Team

**Figure 19.3-2 Programmes under the Region-wide Economic Development Strategy**

#### (1) Region-wide Transportation and Logistics Development Programme

This programme aims to build a base for economic development through developing a region-wide transportation and logistics network connecting Malakal with other regions and neighbouring countries to ensure smooth traffic flows.

#### (2) Primary Industry Development Programme

This programme will promote growth of primary sector activities such as fisheries, livestock, poultry and agriculture in the areas surrounding Malakal.

#### (3) Investment Climate Improvement Programme

This programme aims to improve the investment climate for the private sector through such measures as creation of an industrial park and logistics base in the southern part of Malakal as well as institutional (non-physical) measures such as tax incentives and simplification of procedures.

#### (4) Research and Industrial Human Resources Development Programme

This programme will strengthen the research and development function of the livestock sector and reinforce the existing vocational training centre.

**Table 19.3-2** shows programmes formulated for the implementation of the economic development strategies.

**Table 19.3-2 Programmes under the Region-wide Economic Development Strategy**

|   | Programme  | ID No. | Title  |
|---|--|--------|--|
| 1 | Region-wide Transportation and Logistics Development Programme | EC-1   | International Transport Corridor Establishment Project     |
|   |  | EC-2   | Malakal Airport Internationalisation Project               |
|   |  | EC-3   | Malakal Rural Road Network Improvement Project             |
|   |  | PT-1   | Reconstruction of Jetty at Malakal Port Project            |
|   |  | PT-2   | Procurement of Crane Project                               |
|   |  | PT-3   | Construction of New Port Project (Phase 1)                 |
|   |  | PT-4   | Construction of New Port Project (Phase 2)                 |
|   |  | PT-5   | Construction of Passenger Jetty Project                    |
|   |  | PT-6   | Development of West Side (Left Bank) of River Nile Project |
|   |  | PT-7   | Improvement of Malakal Port Project                        |
|   |  | PT-8   | Procurement of Ferry Project                               |
| 2 | Primary Industry Development Programme                         | EC-4   | Upper Nile Fisheries Project                               |
|   |  | EC-5   | Malakal Dairy Farm Project                                 |
|   |  | EC-6   | Malakal Poultry Breeding Farm Project                      |
|   |  | EC-7   | Malakal Slaughter House Construction Project               |
| 3 | Investment Climate Improvement Programme                       | EC-8   | Malakal Light Industrial Park Development Project          |
|   |  | EC-9   | Logistics Hub Development Project                          |
| 4 | Research and Industrial Human Resource Development Programme   | EC-10  | Research Function and Support Services Development Project |
|   |  | EC-11  | Malakal Vocational Training Centre Reinforcement Project   |

Source: JICA Project Team

### 19.3.3 Programmes under the Social Development Strategy

The objective of social development is to contribute to the physical and internal fulfilment of citizens, both of which are required for ensuring a better quality of life. The five programmes in **Figure 19.3-3** were prepared under the Social Development Strategy.



Source: JICA Project Team

**Figure 19.3-3 Programmes under the Social Development Strategy**

#### (1) Health and Medical Improvement Programme

This programme aims to improve the health conditions of people through improving facilities, human resources development and disease control.

## (2) Education Improvement Programme

This programme aims to upgrade the education level of the people of Malakal through reinforcing education infrastructure, training of teachers and improved education administration management.

## (3) Social Safety Net Programme

This programme aims to establish a social safety net in various ways for socially vulnerable groups, targeting returnees, street children, women and others.

## (4) Culture and Sports Promotion Programme

This programme will provide venues for cultural and sports activities for Malakal citizens.

**Table 19.3-3 Programmes under Social Development Strategy**

|   | Programme                                     | ID No. | Title   |
|---|---|--------|---|
| 1 | Health and Medical Improvement Programme      | HE-1   | Primary Health Care Centre Construction Project                             |
|   |   | HE-2   | Malakal Teaching Hospital Health Infrastructure Improvement Project         |
|   |   | HE-3   | Health Service Capacity of Four Major Health Centres Upgrade Project        |
|   |   | HE-4   | Revitalisation of Medical/Health Faculty in UNU Project                     |
|   |   | HE-5   | Urban Malaria Control Programme   |
|   |   | HE-6   | EPI (DPT3, Measles) Vaccination Promotion Project                           |
|   |   | HE-7   | Human Resources Development for Maternal and Child Health Project           |
| 2 | Education Improvement Programme               | ED-1   | Primary School Establishment and Renovation Project                         |
|   |   | ED-2   | Strengthening Mathematics and Science Education Project                     |
|   |   | ED-3   | Capacity Building of MoE Project  |
|   |   | ED-4   | Malakal Teachers' Training School Construction and Renovation Project       |
|   |   | ED-5   | Malakal Teachers' Dormitory Reconstruction Project                          |
|   |   | ED-6   | Malakal Primary School Construction Project                                 |
|   |   | ED-7   | Malakal Middle School Construction Project                                  |
| 3 | Social Safety Net Programme                   | SW-1   | BHN for Returnees Project   |
|   |   | SW-2   | Malakal Street Children Centre Renovation Project                           |
|   |   | SW-3   | MoG&SW Speed Boat Project   |
|   |   | SW-4   | Malakal Reformatory Centre Establishment Project                            |
|   |   | SW-6   | Malakal Town Women's Group Community Empowerment Project                    |
| 4 | Culture and Sports Promotion Programme        | SW-5   | Upper Nile Culture Centre Project   |
| 5 | Participatory Development Promotion Programme | PD-1   | Participatory Development Planning System Establishment Project             |
|   |   | PD-2   | Human Resources Development for Community Development Officer (CDO) Project |

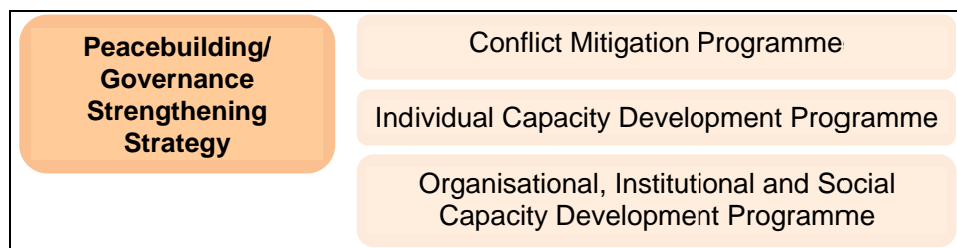
Source: JICA Project Team

## (5) Participatory Development Promotion Programme

This programme will promote the application of the participatory development methodology in government projects and measures through cross-sectoral capacity development for government officers and training of Community Development Officers (CDOs) for State Ministry of Gender and Social Welfare, UNS (MoG&SW).

### 19.3.4 Programmes under the Peacebuilding and Governance Strengthening

The three programmes shown in **Figure 19.3-4** were proposed under the Peacebuilding/Governance Strengthening Strategy. Proposed projects under each programme are shown in **Table 19.3-4**.



Source: JICA Project Team

**Figure 19.3-4 Programmes under the Peacebuilding/Governance Strengthening Strategy**

#### (1) Conflict Mitigation Programme

This programme comprises cross-sectoral conflict prevention measures and strengthening of security control through police reinforcement.

#### (2) Individual Capacity Development Programme

This programme aims to develop the skills of government officers related to common themes across different sectors. Individual capacity development projects specific to each area are included in each sector.

#### (3) Organisational, Institutional and Social Capacity Development Programme

This programme includes land management system strengthening and urban management as the major themes.

**Table 19.3-4 Programmes for Peacebuilding/Governance Strengthening Strategy**

|   | Programme  | ID No. | Title  |
|---|--|--------|--|
| 1 | Conflict Mitigation Programme                                    | -      | Measures for Conflict Prevention (included in every sector)  |
|   |  | ID-1   | Police Box and Community Police System Establishment Project |
| 2 | Individual Capacity Development Programme                        | CD-1   | Local Government Administration Improvement Project          |
|   |  | CD-2   | Cost Recovery System Improvement Project                     |
| 3 | Organisation/Institutional/Social Capacity Development Programme | ID-2   | Malakal-Juba Urban Management System Project                 |
|   |  | ID-3   | Land Registration System Improvement Project                 |

Source: JICA Project Team

## 19.4 PROJECT PROGRAMMING EVALUATION

All the projects and measures in each programme are prioritised according to a set of criteria. There are six criteria: “urgency”, “economic impact”, “benefiting population”, “maturity”, “necessity for socio-environmental consideration” and “relevance to other projects”. Each project and measure was given a score out of three levels: “excellent (A)”, “ordinary (B)”, or “inferior

(C)". The following **Table 19.4-1** presents the evaluation criteria in detail.

**Table 19.4-1 Programing Evaluation Criteria of the Projects**

| Evaluation Item                                   | Criteria   |
|---|--|
| 1. Urgency  | Urgency according to the seriousness of the problem, or from a humanitarian aid aspect   |
| 2. Economic impact                                | Feasibility of the project from the national economy perspective<br>A: Excellent B: Ordinary C: Poor   |
| 3. Benefiting population                          | The size of the benefiting population<br>A: (almost) all the population of Malakal Town B: 10,000-100,000 C: less than 10,000  |
| 4. Maturity                                       | Possibility of early implementation because of the project maturity<br>(The willingness of the residents for the project, readiness of the community organisation for the project, the implementing body and organisation of the project is sufficiently formulated) |
| 5. Necessity of socio-environmental consideration | Ease of project implementation in view of the necessity for socio-environmental consideration<br>A: Category C B: Category B C: Category A   |
| 6. Relevance to other projects                    | Necessity to adjust the implementation schedule in consideration of other relevant projects<br>(The project can be independently implemented, or can be implemented on the condition of the completion of another project)   |
| Other important matters                           | Description of important remarks in consideration of priorities and schedule of the project  |
| Overall evaluation                                | Overall evaluation of the project by totalling the evaluation scores by evaluation item  |

Evaluation rank: A: Excellent B: Ordinary C: Inferior

Source: JICA Project Team

**Table 19.4-2** presents the result of prioritisation.

**Table 19.4-2 Programming Evaluation Results of Projects**

| ID No.   | Project Name   | Project Type                                  | 1. Urgency             |   | 2. Economic Impact |   | 3. Beneficiary population |   | 4. Maturity |   | 5. Necessity of socio-environmental consideration |   | 6. Relevance to other project |   | Remarks                                      | Overall evaluation |
|--|--|---|------------------------|---|--------------------|---|---------------------------|---|-------------|---|---|---|-------------------------------|---|--|--------------------|
|  |  |   | A                      | C | A                  | A | A                         | A | A           | A | A   | A |                               |   |  |                    |
| Malakal Infrastructure Development Strategy        |  |   |                        |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| Water Supply Programme                             |  |   |                        |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| WS-1   | Small-scale Water Supply Development Project                               | Social Infrastructure Development             | A                      | C | A                  | A | A                         | A | A           | A | A   | A | A                             | A | Basic Human Needs                            | A                  |
| WS-2   | Rehabilitation Project of the Treatment Plant & Distribution Pipe Network  | Social Infrastructure Reconstruction          | A                      | B | A                  | A | B                         | B | B           | B | B   | B | B                             | B | Basic Human Needs                            | A                  |
| WS-3   | Technical Cooperation Project on Improvement of Water Supply Service       | Technical Assistance                          | A                      | C | A                  | A | -                         | - | A           | A | A   | A | A                             | A |  | A                  |
| WS-4   | Expansion of the Treatment Plant and the Distribution Pipe Network Project | Social Economic Infrastructure Reconstruction | B                      | B | A                  | B | B                         | A | A           | A | A   | A | A                             | A | Basic Human Needs                            | B                  |
| Road Improvement Programme                         |  |   |                        |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| RT-0   | Makal Town Internal Road   | Social Economic Infrastructure Reconstruction | On-going funded by UNS |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| RT-1   | Community Road Construction Project (LBT)                                  | Social Infrastructure Reconstruction          | A                      | B | B                  | A | A                         | B | B           | B | B   | B | B                             | B |  | A                  |
| RT-2   | Malakal Town Secondary Arterial Road Improvement Project                   | Social Economic Infrastructure Reconstruction | A                      | B | B                  | A | B                         | B | B           | B | B   | B | B                             | B |  | A                  |
| RT-3   | Malakal Town Arterial Road Improvement Project                             | Social Economic Infrastructure Reconstruction | A                      | A | A                  | A | B                         | B | B           | B | B   | B | B                             | B | Construction with drainage                   | A                  |
| RT-4   | Road Maintenance & Management Project                                      | Technical Assistance                          | A                      | B | A                  | A | -                         | - | B           | B | B   | B | B                             | B |  | A                  |
| RT-8   | Intersection and Traffic Facility Improvement Project                      | Social Economic Infrastructure Reconstruction | B                      | B | A                  | B | B                         | B | B           | B | B   | B | B                             | B |  | A                  |
| Public Transportation and Traffic Safety Programme |  |   |                        |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| RT-5   | Public Transport Management Project  | Social Infrastructure Reconstruction          | B                      | C | A                  | B | A                         | B | B           | B | B   | B | B                             | B |  | B                  |
| RT-6   | Malakal Town Bus Terminal & Bus Stop Facilities Construction Project       | Social Infrastructure Reconstruction          | B                      | C | A                  | B | A                         | B | B           | B | B   | B | B                             | B |  | B                  |
| RT-7   | Traffic Management Project   | Social Infrastructure Reconstruction          | B                      | C | A                  | B | B                         | A | B           | B | B   | B | B                             | B |  | B                  |
| RT-9   | Malakal Town Traffic Safety Management Project                             | Technical Assistance                          | C                      | C | A                  | B | A                         | B | B           | B | B   | B | B                             | B | International agreement required             | C                  |
| Sanitation Improvement Programme                   |  |   |                        |   |                    |   |                           |   |             |   |   |   |                               |   |  |                    |
| SS-1   | Community Sanitary System and Public Toilet Installation Project           | Social Infrastructure Development             | A                      | C | A                  | A | A                         | B | B           | B | B   | B | B                             | B | Strong relevance with other project schedule | A                  |
| SS-2   | Construction of Sludge Treatment Facilities Project                        | Social Infrastructure Development             | A                      | C | A                  | A | B                         | B | B           | B | B   | B | B                             | B |  | A                  |
| SS-3   | Technical Project for Toilet Operation and Maintenance                     | Technical Assistance                          | A                      | C | A                  | A | A                         | A | A           | A | A   | A | A                             | A |  | A                  |
| SS-4   | Project for Improving Sanitary Environment in Malakal Town                 | Technical Assistance                          | A                      | C | A                  | A | A                         | B | B           | B | B   | B | B                             | B | Relevant to sanitation project               | A                  |
| SS-5   | Public Toilet Operation and Management Project                             | Technical Assistance                          | A                      | C | A                  | A | A                         | B | B           | B | B   | B | B                             | B |  | A                  |

Source: JICA Project Team



Table 19.4-2 Continued.

| ID No.   | Project Name  | Project Type                                  | 1. Urgency               | 2. Economic Impact | 3. Beneficiary population | 4. Maturity | 5. Necessity of socio-environmental consideration | 6. Relevance to other project | Remarks               | Overall evaluation |
|--|---|---|--------------------------|--------------------|---------------------------|-------------|---|-------------------------------|-----------------------|--------------------|
| <b>Drainage Improvement Programme</b>                            |   |   |                          |                    |                           |             |   |                               |                       |                    |
| WD-1   | Reconstruction of Main Drains in Central Malakal Project                | Social Economic Infrastructure Development    | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | B<br>2                        |                       | A                  |
| WD-2   | Reconstruction of Main Drains Project                                   | Social Economic Infrastructure Development    | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | B<br>2                        |                       | A                  |
| WD-3   | Extension of Trunk Drain 1 Project                                      | Social Economic Infrastructure Development    | A<br>3                   | C<br>1             | A<br>3                    | A<br>3      | B<br>2  | B<br>2                        |                       | A                  |
| WD-4   | Construction of Trunk Drain 2 Project                                   | Social Economic Infrastructure Development    | A<br>3                   | C<br>1             | A<br>3                    | B<br>2      | B<br>2  | B<br>2                        |                       | B                  |
| WD-5   | Construction of Main Drains in New Urban Area Project                   | Social Economic Infrastructure Development    | B<br>2                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | B<br>2                        |                       | B                  |
| WD-6   | Capacity Development for Operation and Management of Drains             | Technical Assistance                          | B<br>2                   | B<br>2             | A<br>3                    | B<br>2      | -   | A<br>3                        |                       | B                  |
| <b>Solid Waste Management Programme</b>                          |   |   |                          |                    |                           |             |   |                               |                       |                    |
| SM-1   | Solid Waste Collection Activities Improvement Project                   | Technical Assistance                          | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | A<br>3                        |                       | A                  |
| SM-2   | Landfill Management Improvement Project                                 | Social Infrastructure Development             | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | B<br>2                        |                       | A                  |
| SM-3   | Medical Waste Management Improvement Project                            | Social Infrastructure Development             | B<br>2                   | C<br>1             | B<br>2                    | B<br>2      | -   | A<br>3                        |                       | B                  |
| <b>Power Supply Programme</b>                                    |   |   |                          |                    |                           |             |   |                               |                       |                    |
| EN-0   | Generator Installation Project  | Social Economic Infrastructure Reconstruction | On going                 |                    |                           |             |   |                               |                       |                    |
| EN-1   | Power Plant Rehabilitation Project                                      | Social Economic Infrastructure Reconstruction | A<br>2                   | A<br>3             | A<br>3                    | B<br>2      | B<br>2  | B<br>2                        |                       | A                  |
| EN-2   | Expansion of 11kV Distribution Network Project                          | Social Economic Infrastructure Reconstruction | B<br>2                   | A<br>3             | A<br>3                    | B<br>2      | B<br>2  | A<br>3                        |                       | B                  |
| EN-3   | Solar Power Pilot Project   | Social Economic Infrastructure Development    | A<br>2                   | B<br>2             | B<br>2                    | B<br>2      | A<br>3  | A<br>3                        | Depends on fuel price | A                  |
| <b>Emergency Seervice Reinforce Programme</b>                    |   |   |                          |                    |                           |             |   |                               |                       |                    |
| ES-1   | Firefighting System Improvement Project                                 | Social Infrastructure Development             | B<br>2                   | C<br>1             | A<br>3                    | B<br>2      | A<br>3  | C<br>1                        |                       | B                  |
| ES-2   | Project for Improving Support System for Emergency Medical Service      | Social Infrastructure Development             | B<br>2                   | C<br>1             | A<br>3                    | B<br>2      | A<br>3  | C<br>1                        |                       | B                  |
| <b>Region-wide Economic Development Strategy</b>                 |   |   |                          |                    |                           |             |   |                               |                       |                    |
| <b>Region-wide Transport and Logistics Development Programme</b> |   |   |                          |                    |                           |             |   |                               |                       |                    |
| PT-0   | Strengthening the Management Capacity of Inland Water Transport Project | Technical Assistance                          | On-going by donor agency |                    |                           |             |   |                               |                       |                    |
| EC-1   | International Transport Corridor Establishment Project                  | Social Economic Infrastructure Development    | A<br>3                   | A<br>3             | A<br>3                    | B<br>2      | C<br>1  | B<br>2                        |                       | B                  |
| EC-2   | Malakal Airport Internationalization Project                            | Social Economic Infrastructure Development    | C<br>1                   | B<br>2             | B<br>2                    | A<br>3      | A<br>3  | A<br>3                        |                       | B                  |
| EC-3   | Malakal Rural Road Network Improvement Project                          | Social Economic Infrastructure Development    | B<br>2                   | A<br>3             | A<br>3                    | B<br>2      | C<br>1  | B<br>2                        |                       | B                  |
| PT-1   | Reconstruction of Jetty at Malakal Port Project (Existing Port)         | Social Economic Infrastructure Reconstruction | A<br>3                   | A<br>3             | A<br>3                    | A<br>3      | A<br>3  | B<br>2                        |                       | A                  |
| PT-2   | Procurement of Crane Project (Existing Port)                            | Social Economic Infrastructure Reconstruction | A<br>3                   | B<br>2             | A<br>3                    | B<br>2      | A<br>3  | B<br>2                        |                       | A                  |
| PT-5   | Construction of Passenger Jetty Project (Existing Port)                 | Social Infrastructure Reconstruction          | A<br>3                   | B<br>2             | A<br>3                    | B<br>2      | A<br>3  | B<br>2                        |                       | A                  |

Source: JICA Project Team

Table 19.4-2 Continued.

| ID No.   | Project Name  | Project Type                                | 1. Urgency               | 2. Economic Impact | 3. Beneficiary population | 4. Maturity | 5. Necessity of socio-environmental consideration | 6. Relevance to other project | Remarks           | Overall evaluation |
|--|---|---|--------------------------|--------------------|---------------------------|-------------|---|-------------------------------|-------------------|--------------------|
| Continued...   |   |   |                          |                    |                           |             |   |                               |                   |                    |
| PT-7   | Improvement of Malakal Port Project (Existing Port)                   | Social Infrastructure Reconstruction        | A                        | B                  | A                         | B           | B   | B                             |                   | B                  |
|  |   |   | 3                        | 2                  | 3                         | 2           | 2   | 2                             |                   |                    |
| PT-8   | Procurement of Ferry Project (Existing Port)                          | Social Infrastructure Development           | A                        | B                  | A                         | B           | B   | B                             |                   | B                  |
|  |   |   | 3                        | 2                  | 3                         | 2           | 2   | 2                             |                   |                    |
| PT-9   | Improvement of River Bank Protection Project (Existing Port)          | Social Infrastructure Reconstruction        | B                        | B                  | B                         | B           | B   | B                             | Amenity oriented  | B                  |
|  |   |   | 2                        | 2                  | 2                         | 2           | 2   | 2                             |                   |                    |
| PT-3   | Construction of New Port Project (Phase 1)                            | Social Economic Infrastructure Development  | A                        | A                  | A                         | B           | B   | A                             | F/S required      | A                  |
|  |   |   | 3                        | 3                  | 3                         | 2           | 2   | 3                             |                   |                    |
| PT-4   | Construction of New Port Project (Phase 2)                            | Economic Infrastructure Development         | B                        | B                  | A                         | B           | B   | B                             | F/S required      | B                  |
|  |   |   | 2                        | 2                  | 3                         | 2           | 2   | 2                             |                   |                    |
| PT-6   | Development of West Side (Left Bank) of River Nile Project (New Port) | Social Infrastructure Development           | B                        | B                  | A                         | B           | B   | B                             |                   | B                  |
|  |   |   | 2                        | 2                  | 3                         | 2           | 2   | 2                             |                   |                    |
| PT-10  | Improvement of New Port Road Project (New Port)                       | Social Economic Infrastructure Development  | A                        | B                  | A                         | B           | B   | A                             |                   | A                  |
|  |   |   | 3                        | 2                  | 3                         | 2           | 2   | 3                             |                   |                    |
| PT-11  | Port Management Capacity Development Project                          | Technical Project                           | A                        | B                  | B                         | A           | A   | A                             |                   | A                  |
|  |   |   | 3                        | 2                  | 2                         | 3           | 3   | 3                             |                   |                    |
| <b>Primary Industry Development Programme</b>                        |   |   |                          |                    |                           |             |   |                               |                   |                    |
| EC-4   | Upper Nile Fisheries Project  | Economic Development                        | A                        | A                  | A                         | A           | B   | B                             |                   | A                  |
|  |   |   | 3                        | 3                  | 3                         | 3           | 2   | 2                             |                   |                    |
| EC-5   | Malakal Dairy Farm Project  | Economic Development                        | A                        | A                  | A                         | B           | B   | A                             |                   | A                  |
|  |   |   | 3                        | 3                  | 3                         | 2           | 2   | 3                             |                   |                    |
| EC-6   | Malakal Poultry Breeding Farm Project                                 | Economic Development                        | A                        | A                  | A                         | A           | B   | B                             |                   | A                  |
|  |   |   | 3                        | 3                  | 3                         | 3           | 2   | 2                             |                   |                    |
| EC-7   | Malakal Slaughter House Construction Project                          | Economic Infrastructure/Reconstruction      | A                        | A                  | A                         | A           | B   | B                             |                   | A                  |
|  |   |   | 3                        | 3                  | 3                         | 3           | 2   | 2                             |                   |                    |
| <b>Investment Climate Improvement Programme</b>                      |   |   |                          |                    |                           |             |   |                               |                   |                    |
| EC-8   | Malakal Light Industrial Park Development Project                     | Economic Infrastructure Construction        | A                        | A                  | A                         | B           | C   | C                             |                   | B                  |
|  |   |   | 3                        | 3                  | 3                         | 2           | 1   | 1                             |                   |                    |
| EC-9   | Logistics Hub Development Project                                     | Social Economic Infrastructure Construction | B                        | A                  | A                         | B           | A   | A                             |                   | A                  |
|  |   |   | 2                        | 3                  | 3                         | 2           | 3   | 3                             |                   |                    |
| <b>Research and Industrial Human Resources Development Programme</b> |   |   |                          |                    |                           |             |   |                               |                   |                    |
| EC-10  | Research Function and Support Services Development Project            | Economic Development                        | C                        | A                  | A                         | B           | -   | A                             |                   | B                  |
|  |   |   | 1                        | 3                  | 3                         | 2           |   | 3                             |                   |                    |
| EC-11  | Malakal Vocational Training Centre Reinforcement Project              | Economic Development                        | A                        | A                  | B                         | A           | A   | A                             |                   | A                  |
|  |   |   | 3                        | 3                  | 2                         | 3           | 3   | 3                             |                   |                    |
| <b>Social Development Strategy</b>                                   |   |   |                          |                    |                           |             |   |                               |                   |                    |
| <b>Health and Medical Improvement Programme</b>                      |   |   |                          |                    |                           |             |   |                               |                   |                    |
| HE-0   | Health Management Information System (HMIS) Project                   | Technical Assistance                        | on-going by donor agency |                    |                           |             |   |                               |                   |                    |
| HE-1   | Primary Health Care Centre Construction Project                       | Social Infrastructure Construction          | A                        | C                  | B                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 1                  | 2                         | 3           | 3   | 3                             |                   |                    |
| HE-2   | Malakal Teaching Hospital Health Infrastructure Improvement Project   | Social Infrastructure Reconstruction        | A                        | C                  | A                         | A           | A   | B                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 1                  | 3                         | 3           | 3   | 2                             |                   |                    |
| HE-3   | Health Service Capacity of 4 Major Health Centres Upgrade Project     | Technical assistance                        | A                        | B                  | A                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 2                  | 3                         | 3           | 3   | 3                             |                   |                    |
| HE-4   | Revitalisation of Medical/Health Faculty in UNU Project               | Technical assistance                        | B                        | A                  | A                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 2                        | 3                  | 3                         | 3           | 3   | 3                             |                   |                    |
| HE-5   | Urban Malaria Control Program   | Operational                                 | A                        | C                  | A                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 1                  | 3                         | 3           | 3   | 3                             |                   |                    |
| HE-6   | EPI (DPT3, Measles) Vaccination Promotion Project                     | Operational                                 | A                        | C                  | A                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 1                  | 3                         | 3           | 3   | 3                             |                   |                    |
| HE-7   | Human Resource Development for Maternal and Child Health Project      | Technical Assistance                        | A                        | C                  | A                         | A           | A   | A                             | Basic Human Needs | A                  |
|  |   |   | 3                        | 1                  | 3                         | 3           | 3   | 3                             |                   |                    |

Source: JICA Project Team

Table 19.4-2 Continued.

| ID No.  | Project Name   | Project Type                         | Evaluation Criteria      |                    |                           |             |   |                               |                   | Remarks | Overall evaluation |
|---|--|--------------------------------------|--------------------------|--------------------|---------------------------|-------------|---|-------------------------------|-------------------|---------|--------------------|
|   |  |                                      | 1. Urgency               | 2. Economic Impact | 3. Beneficiary population | 4. Maturity | 5. Necessity of socio-environmental consideration | 6. Relevance to other project |                   |         |                    |
| <b>Education Improvement Programme</b>                                |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| ED-0  | Rehabilitation of 4 existing primary schools                           | Social Infrastructure Reconstruction | On-going by donor agency |                    |                           |             |   |                               |                   |         |                    |
| ED-1  | Primary School Establishment and Renovation Project                    | Social Infrastructure Reconstruction | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | B<br>2                        | Basic Human Needs | A       |                    |
| ED-2  | Strengthening Mathematics and Science Education Project                | Technical Assistance                 | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | A<br>3  | A<br>3                        |                   |         |                    |
| ED-3  | Capacity Building of MoE Project                                       | Technical Assistance                 | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | A<br>3                        |                   | A       |                    |
| ED-4  | Malakal Teachers's Training School Construction and Renovation Project | Social Infrastructure Development    | B<br>2                   | C<br>1             | C<br>1                    | B<br>2      | A<br>3  | C<br>1                        |                   | B       |                    |
| ED-5  | Malakal Teachers's Dormitory Reconstruction Project                    | Social Infrastructure Reconstruction | B<br>2                   | C<br>1             | C<br>1                    | B<br>2      | A<br>3  | C<br>1                        |                   | B       |                    |
| ED-6  | Malakal Primary School Construction Project                            | Social Infrastructure Development    | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | B<br>2                        |                   | A       |                    |
| ED-7  | Malakal Middle School Construction Project                             | Social Infrastructure Development    | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | B<br>2                        |                   | A       |                    |
| <b>Social Safety Net Programme</b>                                    |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| SW-1  | BHN for Returnees Project  | Social Infrastructure Construction   | A<br>3                   | B<br>2             | A<br>3                    | A<br>3      | B<br>2  | A<br>3                        |                   | A       |                    |
| SW-2  | Malakal Street Children Centre Renovation Project                      | Social Infrastructure Reconstruction | A<br>3                   | C<br>1             | C<br>1                    | A<br>3      | A<br>3  | B<br>2                        |                   | A       |                    |
| SW-3  | MoG&SW Speed Boat Project  | Social Development                   | A<br>3                   | C<br>1             | C<br>1                    | B<br>2      | A<br>3  | A<br>3                        |                   | A       |                    |
| SW-4  | Malakal Reformatory Centre Establishment Project                       | Social Infrastructure Reconstruction | A<br>3                   | C<br>1             | A<br>3                    | A<br>3      | A<br>3  | A<br>3                        |                   | A       |                    |
| SW-6  | Malakal Town Women's Group Community Empowerment Project               |                                      | A<br>3                   | A<br>3             | A<br>3                    | A<br>3      | A<br>3  | B<br>2                        |                   | A       |                    |
| <b>Participatory Development Promotion Programme</b>                  |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| PD-1  | Participatory Development Planning System Establishment Project        | Technical Assistance                 | A<br>3                   | C<br>1             | B<br>2                    | B<br>2      | A<br>3  | A<br>3                        |                   | B       |                    |
| PD-2  | Human Resource Development for CDOs Project                            | Technical Assistance                 | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | A<br>3                        |                   | A       |                    |
| <b>Peace Building/Governance Enhancement Programme</b>                |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| <b>Conflict Mitigation Program</b>                                    |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
|   | Measures for Conflict Prevention (included in every sector)            |                                      | -                        | -                  | -                         | -           | -   | -                             |                   | -       |                    |
| ID-1  | Police Box and Community Police System Establishment Project           | Social Infrastructure Development    | B<br>2                   | C<br>1             | A<br>3                    | B<br>2      | A<br>3  | C<br>1                        |                   | B       |                    |
| <b>Individual Capacity Development</b>                                |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| CD-1  | Local Government Administration Improvement Project                    | Technical Assistance                 | A<br>3                   | C<br>1             | B<br>2                    | A<br>3      | A<br>3  | A<br>3                        |                   | A       |                    |
| CD-2  | Cost Recovery System Improvement Project                               | Technical Assistance                 | A<br>3                   | C<br>1             | A<br>3                    | A<br>3      | A<br>3  | B<br>2                        |                   | A       |                    |
| <b>Organization/Institution/Social Capacity Development Programme</b> |  |                                      |                          |                    |                           |             |   |                               |                   |         |                    |
| ID-2  | Malakal-Juba Urban Management System Project                           | Technical Assistance                 | B<br>2                   | B<br>2             | B<br>2                    | B<br>2      | A<br>3  | B<br>2                        |                   | B       |                    |
| ID-3  | Land Registration System Improvement Project                           | Technical Assistance                 | A<br>3                   | B<br>2             | A<br>3                    | B<br>2      | C<br>1  | A<br>3                        |                   | B       |                    |

Source: JICA Project Team

## **19.5 PROJECT IMPLEMENTATION PLAN**

### **19.5.1 Projects Programming**

Although the programs and projects were presented, the budgetary balance by sub-sector was used for checking in a conventional way. As a result of an iterative way of formulating the Comprehensive Plan, the implementation schedule for the Comprehensive Plan was formulated as shown in **Table 19.5-1**.

**Table 19.5-1 Implementation Schedule of the Comprehensive Plan**

| Programmes/Projects  | Year      |         |         |         |         |         |         |         |         |         |         |
|--|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|  | 2012      | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019    | 2020    | 2021    | 2022    |
| <b>Socio-economic Frame</b>  |           |         |         |         |         |         |         |         |         |         |         |
| Population of Malakal Town   | 153,000   | 165,900 | 179,200 | 192,900 | 199,100 | 205,500 | 212,100 | 218,800 | 225,800 | 233,100 | 241,000 |
| Value added (mil.SSP)  | 473       | 511     | 551     | 625     | 675     | 728     | 835     | 901     | 972     | 1,049   | 1,132   |
| Industrial Composition (percentage of workers)                                       | Primary   | 5%      | 5%      | 5%      | 4%      | 4%      | 4%      | 3%      | 3%      | 3%      | 3%      |
|  | Secondary | 5%      | 5%      | 5%      | 8%      | 8%      | 8%      | 12%     | 12%     | 12%     | 12%     |
|  | Tertiary  | 90%     | 90%     | 90%     | 88%     | 88%     | 88%     | 85%     | 85%     | 85%     | 85%     |
| <b>1. Malakal Infrastructure Development Strategy</b>                                |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.1 Water Supply Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| WS-1 Small-scale Water Supply Development Project                                    |           |         |         |         |         |         |         |         |         |         |         |
| WS-2 Rehabilitation Project of the Treatment Plant and Distribution Pipe Network     |           |         |         |         |         |         |         |         |         |         |         |
| WS-3 Technical Cooperation Project on Improvement of Water Supply Service            |           |         |         |         |         |         |         |         |         |         |         |
| WS-4 Expansion of the Treatment Plant and the Distribution Pipe                      |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.2 Road Improvement Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| RT-0 Malakal Town Internal Road Project (Kano)                                       |           |         |         |         |         |         |         |         |         |         |         |
| RT-0 Malakal Town Internal Road Project (Sinohydro)                                  |           |         |         |         |         |         |         |         |         |         |         |
| RT-1 Community Road Construction Project (LBT)                                       |           |         |         |         |         |         |         |         |         |         |         |
| RT-2 Malakal Town Secondary Arterial Road Improvement Project                        |           |         |         |         |         |         |         |         |         |         |         |
| RT-3 Malakal Town Arterial Road Improvement Project                                  |           |         |         |         |         |         |         |         |         |         |         |
| RT-4 Road Maintenance and Management Project   |           |         |         |         |         |         |         |         |         |         |         |
| RT-8 Intersection and Traffic Facility Improvement Project                           |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.3 Public Transportation and Traffic Safety Programme</b>                        |           |         |         |         |         |         |         |         |         |         |         |
| RT-5 Public Transport Management Project   |           |         |         |         |         |         |         |         |         |         |         |
| RT-6 Malakal Town Bus Terminal and Bus Stop Facilities Construction                  |           |         |         |         |         |         |         |         |         |         |         |
| RT-7 Traffic Management Project  |           |         |         |         |         |         |         |         |         |         |         |
| RT-9 Malakal Town Traffic Safety Management Project                                  |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.4 Sanitation Improvement Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| SS-0 Scaling up of sanitation activities in the state capitals and other major towns |           |         |         |         |         |         |         |         |         |         |         |
| SS-1 Community Sanitary System and Public Toilet Installation Project                |           |         |         |         |         |         |         |         |         |         |         |
| SS-2 Construction of Sludge Treatment Facilities Project                             |           |         |         |         |         |         |         |         |         |         |         |
| SS-3 Technical Project for Toilet Operation and Maintenance                          |           |         |         |         |         |         |         |         |         |         |         |
| SS-4 Project for Improving Sanitary Environment in Malakal Town                      |           |         |         |         |         |         |         |         |         |         |         |
| SS-5 Public Toilet Operation and Management Project                                  |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.5 Drainage Improvement Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| WD-1 Reconstruction of Main Drains in Central Malakal Project                        |           |         |         |         |         |         |         |         |         |         |         |
| WD-2 Reconstruction of Main Drains Project   |           |         |         |         |         |         |         |         |         |         |         |
| WD-3 Extension of Trunk Drain 1 Project  |           |         |         |         |         |         |         |         |         |         |         |
| WD-4 Construction of Trunk Drain 2 Project   |           |         |         |         |         |         |         |         |         |         |         |
| WD-5 Construction of Main Drains in New Urban Area Project                           |           |         |         |         |         |         |         |         |         |         |         |
| WD-6 Capacity Development Project for Operation and Management of Drains             |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.6 Solid Waste Management Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| SM-1 Solid Waste Collection Activities Improvement Project                           |           |         |         |         |         |         |         |         |         |         |         |
| SM-2 Landfill Management Improvement Project   |           |         |         |         |         |         |         |         |         |         |         |
| SM-3 Medical Waste Management Improvement Project                                    |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.7 Power Supply Programme</b>  |           |         |         |         |         |         |         |         |         |         |         |
| EN-0 Generator Installation Project  |           |         |         |         |         |         |         |         |         |         |         |
| EN-1 Power Plant Rehabilitation Project  |           |         |         |         |         |         |         |         |         |         |         |
| EN-2 Expansion of 11kV Distribution Network Project                                  |           |         |         |         |         |         |         |         |         |         |         |
| EN-3 Solar Power Pilot Project   |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.8 Emergency Service Reinforcement Programme</b>                                 |           |         |         |         |         |         |         |         |         |         |         |
| ES-1 Fire Fighting Service Improvement Project                                       |           |         |         |         |         |         |         |         |         |         |         |
| ES-2 Project for Improving Support System for Emergency Medical                      |           |         |         |         |         |         |         |         |         |         |         |
| <b>Region-wide Economic Development Strategy</b>                                     |           |         |         |         |         |         |         |         |         |         |         |
| <b>1.1 Region-wide Transportation and Logistics Development Program</b>              |           |         |         |         |         |         |         |         |         |         |         |
| EC-1 International Transport Corridor Establishment Project                          |           |         |         |         |         |         |         |         |         |         |         |
| EC-2 Malakal Airport Internationalization Project                                    |           |         |         |         |         |         |         |         |         |         |         |
| EC-3 Malakal Rural Road Network Improvement Project                                  |           |         |         |         |         |         |         |         |         |         |         |
| PT-0 Strengthening the Management Capacity of Inland Water Transport Project         |           |         |         |         |         |         |         |         |         |         |         |
| PT-1 Reconstruction of Jetty at Malakal Port Project                                 |           |         |         |         |         |         |         |         |         |         |         |
| PT-2 Procurement of Crane Project  |           |         |         |         |         |         |         |         |         |         |         |
| PT-5 Construction of Passenger Jetty Project   |           |         |         |         |         |         |         |         |         |         |         |

Source: JICA Project Team

Table 19.5-1 Continued.

| Programs/Projects   | Year |      |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|------|------|
|   | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| PT-7 Improvement of Malakal Port Project  |      |      |      |      |      |      |      |      |      |      |      |
| PT-9 Improvement of River Bank Protection Project                               |      |      |      |      |      |      |      |      |      |      |      |
| PT-3 Construction of New Port Project (Phase 1)                                 |      |      |      |      |      |      |      |      |      |      |      |
| PT-4 Construction of New Port Project (Phase 2)                                 |      |      |      |      |      |      |      |      |      |      |      |
| PT-6 Development of West Side (Left Bank) of River Nile Project                 |      |      |      |      |      |      |      |      |      |      |      |
| PT-8 Procurement of Ferry Project   |      |      |      |      |      |      |      |      |      |      |      |
| PT-10 Improvement of New Port Road Project                                      |      |      |      |      |      |      |      |      |      |      |      |
| PT-11 Port Management Capacity Development Project                              |      |      |      |      |      |      |      |      |      |      |      |
| <b>2.2 Primary Industrial Development Program</b>                               |      |      |      |      |      |      |      |      |      |      |      |
| EC-4 Upper Nile Fisheries Project   |      |      |      |      |      |      |      |      |      |      |      |
| EC-5 Malakal Dairy Farm Project   |      |      |      |      |      |      |      |      |      |      |      |
| EC-6 Malakal Poultry Breeding Farm Project                                      |      |      |      |      |      |      |      |      |      |      |      |
| EC-7 Malakal Slaughter House Construction Project                               |      |      |      |      |      |      |      |      |      |      |      |
| <b>2.3 Investment Climate Improvement Program</b>                               |      |      |      |      |      |      |      |      |      |      |      |
| EC-8 Malakal Light Industrial Park Development Project                          |      |      |      |      |      |      |      |      |      |      |      |
| EC-9 Logistics Hub Development Project  |      |      |      |      |      |      |      |      |      |      |      |
| <b>2.4 Research and Industrial Human Resources Development Program</b>          |      |      |      |      |      |      |      |      |      |      |      |
| EC-10 Research Function and Support Services Development Project                |      |      |      |      |      |      |      |      |      |      |      |
| EC-11 Malakal Vocational Training Centre Reinforcement Project                  |      |      |      |      |      |      |      |      |      |      |      |
| <b>3. Social Development Strategy</b>   |      |      |      |      |      |      |      |      |      |      |      |
| <b>3.1 Health and Medical Improvement Program</b>                               |      |      |      |      |      |      |      |      |      |      |      |
| HE-0 Health Management Information System (HMIS) Project                        |      |      |      |      |      |      |      |      |      |      |      |
| HE-1 Primary Health Care Centre Construction Project                            |      |      |      |      |      |      |      |      |      |      |      |
| HE-2 Malakal Teaching Hospital Health Infrastructure Improvement Project        |      |      |      |      |      |      |      |      |      |      |      |
| HE-3 Health Service Capacity of 4 Major Health Centres Upgrade Project          |      |      |      |      |      |      |      |      |      |      |      |
| HE-4 Revitalisation of Medical/Health Faculty in UNU Project                    |      |      |      |      |      |      |      |      |      |      |      |
| HE-5 Urban Malaria Control Program  |      |      |      |      |      |      |      |      |      |      |      |
| HE-6 EPI (DPT3, Measles) Vaccination Promotion Project                          |      |      |      |      |      |      |      |      |      |      |      |
| HE-7 Human Resource Development for Maternal and Child Health Project           |      |      |      |      |      |      |      |      |      |      |      |
| <b>3.2 Education Improvement Program</b>  |      |      |      |      |      |      |      |      |      |      |      |
| ED-0 Rehabilitation of 4 existing Primary Schools                               |      |      |      |      |      |      |      |      |      |      |      |
| ED-1 Primary School Establishment and Renovation Project                        |      |      |      |      |      |      |      |      |      |      |      |
| ED-2 Strengthening Mathematics and Science Education Project                    |      |      |      |      |      |      |      |      |      |      |      |
| ED-3 Capacity Building of MoE Project   |      |      |      |      |      |      |      |      |      |      |      |
| ED-4 Malakal Teachers's Training School Construction and Renovation Project     |      |      |      |      |      |      |      |      |      |      |      |
| ED-5 Malakal Teachers's Dormitory Reconstruction Project                        |      |      |      |      |      |      |      |      |      |      |      |
| ED-6 Malakal Primary School Construction Project                                |      |      |      |      |      |      |      |      |      |      |      |
| ED-7 Malakal Middle School Construction Project                                 |      |      |      |      |      |      |      |      |      |      |      |
| <b>3.3 Social Safety Net Program</b>  |      |      |      |      |      |      |      |      |      |      |      |
| SD-1 BHN for Returnees Project  |      |      |      |      |      |      |      |      |      |      |      |
| SD-2 Malakal Street Children Centre Renovation Project                          |      |      |      |      |      |      |      |      |      |      |      |
| SD-3 MoG&SW Speed Boat Project  |      |      |      |      |      |      |      |      |      |      |      |
| SD-4 Malakal Reformatory Centre Establishment Project                           |      |      |      |      |      |      |      |      |      |      |      |
| SD-6 Malakal Town Women's Group Community Empowerment Project                   |      |      |      |      |      |      |      |      |      |      |      |
| <b>3.4 Culture and Sports Promotion Program</b>                                 |      |      |      |      |      |      |      |      |      |      |      |
| SD-5 Upper Nile Culture Centre Project  |      |      |      |      |      |      |      |      |      |      |      |
| <b>3.5 Participatory Development Promotion Program</b>                          |      |      |      |      |      |      |      |      |      |      |      |
| PD-1 Participatory Development Planning System Establishment Project            |      |      |      |      |      |      |      |      |      |      |      |
| PD-2 Human Resource Development for Community Development Officer (CDO) Project |      |      |      |      |      |      |      |      |      |      |      |
| <b>4. Peace Building/Governance Strengthening Strategy</b>                      |      |      |      |      |      |      |      |      |      |      |      |
| <b>4.1 Conflict Mitigation Program</b>  |      |      |      |      |      |      |      |      |      |      |      |
| ID-1 Police Box and Community Police System Establishment Project               |      |      |      |      |      |      |      |      |      |      |      |
| <b>4.2 Individual Capacity Development Program</b>                              |      |      |      |      |      |      |      |      |      |      |      |
| CD-1 Local Government Administration Improvement Project                        |      |      |      |      |      |      |      |      |      |      |      |
| CD-2 Cost Recovery System Improvement Project                                   |      |      |      |      |      |      |      |      |      |      |      |
| <b>4.3 Organizational, Institutional, Social Capacity Development Program</b>   |      |      |      |      |      |      |      |      |      |      |      |
| ID-2 Malakal-Juba Urban Management System Project                               |      |      |      |      |      |      |      |      |      |      |      |
| ID-3 Land Registration System Improvement Project                               |      |      |      |      |      |      |      |      |      |      |      |

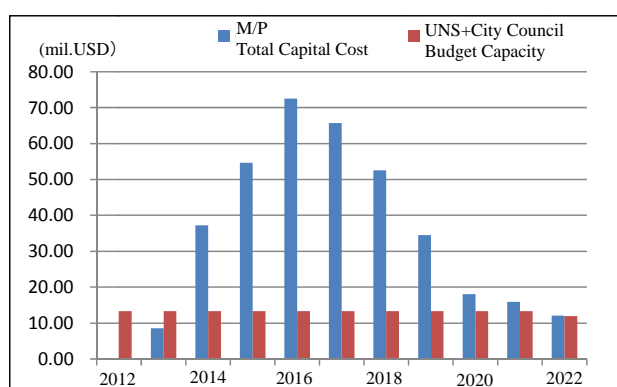
Source: JICA Project Team

## 19.6 INVESTMENT SCHEDULE

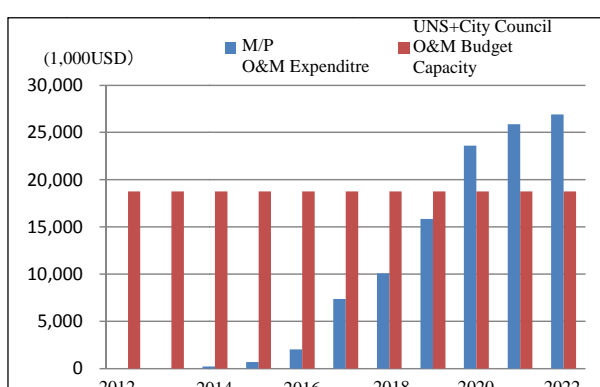
An investment schedule for the projects is prepared as shown in **Figure 19.6-1**. Investment requirements are shown for the physical facilities projects, but not for non-physical measures or technical assistance projects. **Figure 19.6-2** presents the costs for operating and maintaining the project facilities.

**Figure 19.6-1** also shows an estimate of the balance between the investment cost of the projects proposed in the master plan and the budget of the UNS Government plus that of Malakal Town Council. **Figure 19.6-2** presents the balance for operating and maintenance costs.

The budget approved for 2011 was used as the basis for funding availability. Projection of government revenue for the future would be difficult due to uncertainty in oil production and associated revenue. The budget of the UNS Government approved for 2011 was South Sudan Pounds (SSP) 313,133,090. The breakdowns into ministries and categories of “salaries”, “operating” and “capital” are shown in **Table 19.6-1**. The budget of Malakal Town Authority was SSP 3,158,653 for the 2011-2012 fiscal year comprising SSP 59,084 for salaries, SSP 2,000,400 for operating costs and SSP 1,099,169 for capital investment.



**Figure 19.6-1 Annual Investment Plan**



**Figure 19.6-2 Annual Operational and Management Cost**

**Table 19.6-1 Budget Requirement Summary**

| Budget Item                             | Urgent-term (2012-14) | Short-term (2015-18) | Med.-term (2019-22) | Comprehensive Plan (2012-22) |
|---|-----------------------|----------------------|---------------------|------------------------------|
| Currency                                | USD (Millions)        | USD (Millions)       | USD (Millions)      | USD (Millions)               |
| Number of Project                       | 6                     | 47                   | 28                  | 81                           |
| <b>Capital Cost</b>                     |                       |                      |                     |                              |
| Total Amount Required                   | 44.60                 | 241.79               | 80.62               | 367.01                       |
| Government Allocation                   | 40.00                 | 53.00                | 53.00               | 146.00                       |
| Gap (amount required)                   | (4.60)                | (188.79)             | (27.62)             | (221.01)                     |
| <b>Operation &amp; Maintenance Cost</b> |                       |                      |                     |                              |
| Total Amount Required                   | 0.23                  | 19.83                | 93.66               | 113.72                       |
| Government Allocation                   | 56.00                 | 75.00                | 75.00               | 206.00                       |
| Gap (amount required)                   | 55.77                 | 55.17                | (18.66)             | 92.28                        |

Note: Number of projects is completed project number within the term.

**Table 19.6-1** and **Table 19.6-2** indicate a shortage of funds locally available for public investment.

The UNS Government and Malakal Town Council need to consolidate their efforts in increasing tax revenue by promoting economic development of the state and improving the tax system as well as minimising inefficient and opaque expenditures. The gap needs to be filled by support from development partners.

The possibility of filling the gap between investment funds required and the available budget through foreign aid was reviewed. The following table presents the amount of assistance from international partners in terms of commitment and expenditure since 2006.

**Table 19.6-2 Commitment and Expenditure by Donors**

(unit: million US\$)

| Year | a. Commitment | b. Expenditure | b/a (%) |
|------|---------------|----------------|---------|
| 2006 | 242           | -              | -       |
| 2007 | 398           | 264            | 66.1%   |
| 2008 | 696           | 238            | 34.2%   |
| 2009 | 885           | 332            | 37.6%   |
| 2010 | 1,280         | 960            | 75.0%   |
| 2011 | 937           | 149            | 15.9%   |
| 2012 | 156           | -              | -       |
| 2013 | 68            | -              | -       |

Source: *South Sudan Donor Book 2011*, Ministry of Finance and Economic Planning

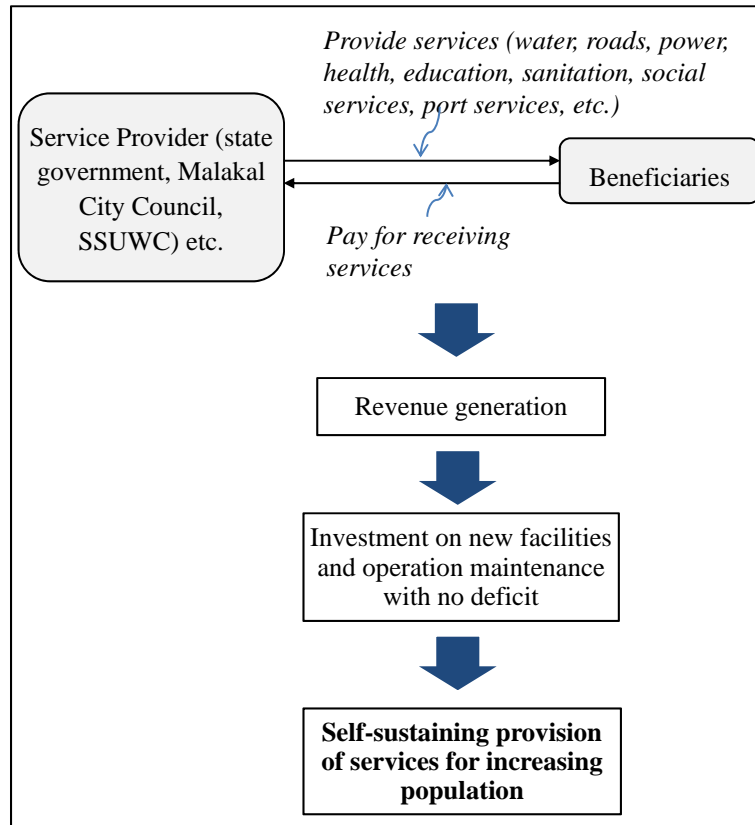
The average amount is US\$ 700 million for the period from 2006 to 2010 on a commitment basis and US\$ 450 million for the 2007-2010 period on an expenditure basis. Assuming that these average amounts are to be distributed equally among ten states, each state would receive US\$ 45-70 million per year. Theoretically, the development gap for Malakal may be filled by foreign aid, based on the assumptions that foreign aid is continued at this level, aid is distributed equally among the ten states, and part of the foreign aid is made available for the development of Malakal Town. Even in the event of the uneven distribution of foreign aid emphasising Juba continuing in the future, this scenario could still apply although the share allocated to Malakal within UNS will need to be determined more carefully.

**Table 19.6-1** and **Table 19.6-2** highlight a number of issues. The shortfall in the operations and maintenance budget in the water supply sector will need to be resolved by strengthening the “beneficiary-pay” principle so that water tariffs are set at such a level as to recover the operations and maintenance costs. The same applies to the port sector.

There is a need to look into cost recovery for such infrastructure facilities as roads, drains, sanitation systems and solid waste management facilities, which do not generate immediate revenue. The present land policy adopted by the state government emphasises welfare for returnees rather than cost recovery. The existing price of land at SSP 400 per 400 m<sup>2</sup> is just a fraction of the land price that theoretically should reflect costs for land and infrastructure development. This kind of approach may be inevitable at a time like the present when receiving the rapid influx of returnees is the highest priority.



In the future, however, land policy should shift more toward a cost recovery principle. Land prices should be set at a higher level, which would reflect costs for developing land and infrastructure facilities. A taxation system for property should also be established. Strengthening the private financial sector would also be a measure to be implemented in parallel in such a way that financial schemes such as housing loans are developed and disseminated. The financial capacity of the government needs to be strengthened by these measures.



Source: JICA Project Team

**Figure 19.6-3 Self-Sustaining Provision of Public Services**

Once the “beneficiary-pay” principle is established, it becomes possible for service providers such as the state government, Malakal City Council, South Sudan Urban Water Corporation (SSUWC), etc., to invest in new infrastructure, rehabilitate deteriorating infrastructure facilities, and operate and maintain the system using its own resources.

An incremental capital output ratio (ICOR) was derived in order to assess the broad magnitude of private investment required to achieve the economic growth target presented in **Chapter 4**. ICOR is derived by incremental capital investment divided by incremental Gross Regional Domestic Product (GRDP).

$$ICOR = \text{Incremental Investment} / \text{Incremental GRDP}$$

The following shows the process of calculation:

- a. Incremental investment proposed by Master Plan

between 2012 and 2022: US\$ 367 million

b. Additional GRDP generated between 2012 and 2022  
under Medium Growth Scenario: US\$ 1,100 million

c. ICOR and Investment Requirement:

c-1. ICOR for investment proposed by Master Plan

$$\text{US\$ 367 million} / \text{US\$ 1,100 million} = 0.33$$

c-2. Level of investment required to achieve ICOR of 1.0

$$\text{ICOR} * \text{Incremental GRDP} = \text{Incremental Investment}$$

$$1.0 * \text{US\$ 1,100 million} = \text{US\$ 1,100 million}$$

$$\text{Additional investment required to achieve target economic growth} =$$

$$\text{Investment required to attain ICOR of 1.0} - \text{investment proposed by master plan}$$

$$\text{US\$ 1,100 million} - \text{US\$ 367 million} = \text{US\$ 733 million}$$

c-3. Level of investment required to achieve ICOR of 2.0

$$2.0 * \text{US\$ 1,100 million} = \text{US\$ 2,200 million}$$

$$\text{US\$ 2,200 million} - \text{US\$ 367 million} = \text{US\$ 1,833 million}$$

It is regrettably difficult to estimate ICOR in South Sudan due to limited availability of statistical data. ICORs in countries with per capita GDP (Gross Domestic Product) of around US\$ 1,000 range somewhere between 1.0 and 5.0 based on a review of selected Asian countries. Assuming lower cases of ICOR such as 1.0 and 2.0, the calculation above indicates that investment (mainly private) required to achieve the target economic growth would amount to US\$ 733 million and US\$ 1,833 million respectively between 2012 and 2022 as a minimum.

It will be vital for the UNS government to take actions to improve the investment environment in Malakal Town, including early implementation of infrastructure projects and institutional measures.

The Comprehensive Plan was scheduled to achieve the future vision of Malakal to cope with reconstruction/rehabilitation and development needs, with the investment amount consequently concentrated in the middle of the planning horizon. Alteration of the investment schedule to level out the investment peak was studied for reference.

The rescheduling principles adopted were as follows:

a. Projects related to basic human needs (BHN) are not rescheduled.

b. The basic overview of the reschedule was as follows:

Water Transportation: Construction of new port projects (PT-3 and PT-4) is delayed.

Road and Road Transportation: Arterial and secondary arterial road improvement projects (RT-2 and RT-3) are delayed.

Storm Water Drainage: Trunk drain projects (WD-3 and WD-4) are delayed.

Solid Waste Management: Medical Waste Management Improvement Project (SM-3) is

delayed.

Energy: Power Plant Rehabilitation Project (EN-1) is delayed.

Economic Development: Light Industrial Park Establishment Project (EC-8) and Logistics Hub Development Project (EC-9) are delayed.

c. However, all proposed projects are completed in 2022.

In the study results, the peak investment year shifted from 2016 to 2020 and the maximum required investment was estimated at some US\$ 15 million lower than in the formulated Comprehensive Plan. However, the gap between the required investment and the budgetary capacity was still large, and the total benefits that would be acquired in the planning period were fewer than in the formulated Comprehensive Plan (refer to Appendix A-6).

**Table 19.6-3 Balance between Capital Cost and Locally Available Financial Resource**

(unit: mil.USD)

| Sector and Projects  | Cost (mil.USD) | 2012        | 2013         | 2014         | 2015         | 2016         | 2017         | 2018         | 2019         | 2020         | 2021         | 2022         |
|--|----------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Water Supply (SSUWC)</b>  |                |             |              |              |              |              |              |              |              |              |              |              |
| WS-1 Small-scale Water Supply Development Project                              | 2.20           | 0.00        | 1.10         | 1.10         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| WS-2 Rehabilitation Project of the Treatment Plant & Distribution Pipe Network | 48.00          | 0.00        | 3.54         | 7.09         | 7.09         | 7.09         | 7.73         | 7.73         | 7.73         | 0.00         | 0.00         | 0.00         |
| WS-3 Technical Cooperation Project on Improvement of Water Supply Service      | TA             | -           | -            | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| WS-4 Expansion of the Treatment Plant and Distribution Pipe Network Project    | 20.60          | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 6.87         | 6.87         | 6.87         |
| <i>Sub-Total</i>   | <i>70.80</i>   | <i>0.00</i> | <i>4.64</i>  | <i>8.19</i>  | <i>7.09</i>  | <i>7.09</i>  | <i>7.73</i>  | <i>7.73</i>  | <i>7.73</i>  | <i>6.87</i>  | <i>6.87</i>  | <i>6.87</i>  |
| <b>Budgetary capacity</b>  | <b>-</b>       | <b>0.03</b> | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  | <b>0.03</b>  |
| <b>Balance</b>   | <b>-</b>       | <b>0.03</b> | <b>-4.61</b> | <b>-8.15</b> | <b>-7.05</b> | <b>-7.05</b> | <b>-7.70</b> | <b>-7.70</b> | <b>-7.70</b> | <b>-6.83</b> | <b>-6.83</b> | <b>-6.83</b> |
| <b>Water Transport</b>   |                |             |              |              |              |              |              |              |              |              |              |              |
| PT-0 Strengthening the Management Capacity of Inland Water Transport Project   | TA             | -           | -            | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| PT-1 Reconstruction of Jetty at Malakal Port Project                           | 2.00           | 0.00        | 1.00         | 1.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-2 Procurement of Crane Project  | 0.75           | 0.00        | 0.00         | 0.75         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-3 Construction of New Port Project (Phase1)                                 | 3.00           | 0.00        | 0.00         | 1.50         | 1.50         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-4 Construction of New Port Project (Phase 2)                                | 21.00          | 0.00        | 0.00         | 0.00         | 0.00         | 7.00         | 7.00         | 7.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-5 Construction of Passenger Jetty Project                                   | 0.60           | 0.00        | 0.30         | 0.30         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-6 Development of West Side (Left Bank) of River Nile Project                | 0.50           | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.25         | 0.25         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-7 Improvement of Malakal Port Project                                       | 1.50           | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.75         | 0.75         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-8 Procurement of Ferry Project  | 6.00           | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 6.00         | 0.00         | 0.00         | 0.00         |
| PT-9 Improvement of River Bank Protection Project                              | 0.15           | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.08         | 0.08         | 0.00         |
| PT-10 Improvement of New Port Road Project                                     | 0.60           | 0.00        | 0.00         | 0.30         | 0.30         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         |
| PT-11 Port Management Capacity Development Project                             | TA             | -           | -            | -            | -            | -            | -            | -            | -            | -            | -            | -            |
| <i>Sub-Total</i>   | <i>36.10</i>   | <i>0.00</i> | <i>1.30</i>  | <i>3.85</i>  | <i>1.80</i>  | <i>7.00</i>  | <i>8.00</i>  | <i>8.00</i>  | <i>6.00</i>  | <i>0.08</i>  | <i>0.08</i>  | <i>0.00</i>  |
| <b>Budgetary capacity</b>  | <b>-</b>       | <b>0.00</b> | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  |
| <b>Balance</b>   | <b>-</b>       | <b>0.00</b> | <b>-1.30</b> | <b>-3.85</b> | <b>-1.80</b> | <b>-7.00</b> | <b>-8.00</b> | <b>-8.00</b> | <b>-6.00</b> | <b>-0.08</b> | <b>-0.08</b> | <b>0.00</b>  |

Source: JICA Project Team

Table 19.6-3 Continued.

(unit: mil.USD)

| Sector and Projects  | Cost (mil.USD) | 2012         | 2013        | 2014         | 2015          | 2016          | 2017          | 2018          | 2019         | 2020        | 2021        | 2022        |
|--|----------------|--------------|-------------|--------------|---------------|---------------|---------------|---------------|--------------|-------------|-------------|-------------|
| <b>Road Transport</b>  |                |              |             |              |               |               |               |               |              |             |             |             |
| RT-0 Malakal Town Internal Road Project (Kano)                                       |                | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| RT-0 Malakal Town Internal Road Project (Sinohydro)                                  | 51.80          | 17.27        | 17.27       | 0.00         | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| EC-1 International Transport Corridor Establishment Project                          | n.a.           |              |             |              |               |               |               |               |              |             |             |             |
| EC-2 Malakal Airport Internationalization Project                                    | n.a.           |              |             |              |               |               |               |               |              |             |             |             |
| EC-3 Malakal Rural Road Network Improvement Project                                  | n.a.           |              |             |              |               |               |               |               |              |             |             |             |
| RT-1 Community Road Construction Project (LBT)                                       | 2.00           | 0.00         | 1.00        | 1.00         | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| RT-2 Malakal Town Secondary Arterial Road Improvement Project                        | 13.50          | 0.00         | 0.00        | 4.50         | 4.50          | 4.50          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| RT-3 Malakal Town Arterial Road Improvement Project                                  | 60.00          | 0.00         | 0.00        | 0.00         | 6.67          | 13.33         | 20.00         | 13.33         | 6.67         | 0.00        | 0.00        | 0.00        |
| RT-4 Road Maintenance & Management Project   | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| RT-5 Public Transport Management Project   | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| RT-6 Malakal Town Bus Terminal & Bus Stop Facilities Construction Project            | 2.20           | 0.00         | 0.00        | 0.00         | 0.00          | 1.10          | 1.10          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| RT-7 Traffic Management Project  | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| RT-8 Intersection and Traffic Facility Improvement Project                           | 2.00           | 0.00         | 0.00        | 0.00         | 0.00          | 0.00          | 1.00          | 1.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| RT-9 Malakal Town Traffic Safety Management Project                                  | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| <i>Sub-Total</i>   | <i>79.70</i>   | <i>0.00</i>  | <i>1.00</i> | <i>5.50</i>  | <i>11.17</i>  | <i>18.93</i>  | <i>22.10</i>  | <i>14.33</i>  | <i>6.67</i>  | <i>0.00</i> | <i>0.00</i> | <i>0.00</i> |
| <b>Sewage and Sanitation</b>   |                |              |             |              |               |               |               |               |              |             |             |             |
| SS-0 Scaling up of sanitation activities in the state capitals and other major towns |                |              |             |              |               |               |               |               |              |             |             |             |
| SS-1 Community Sanitary System and Public Toilet Installation Project                | 11.40          | 0.00         | 1.14        | 1.14         | 1.14          | 1.14          | 1.14          | 1.14          | 1.14         | 1.14        | 1.14        | 1.14        |
| SS-2 Construction of Sludge Treatment Facilities Project                             | 3.40           | 0.00         | 0.00        | 0.43         | 0.43          | 0.43          | 0.43          | 0.43          | 0.43         | 0.43        | 0.43        | 0.00        |
| SS-3 Technical Project for Toilet Operation and Maintenance                          | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| SS-4 Project for Improving Sanitary Environment in Malakal Town                      | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| SS-5 Public Toilet Operation and Management Project                                  | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| <i>Sub-Total</i>   | <i>14.80</i>   | <i>0.00</i>  | <i>1.14</i> | <i>1.57</i>  | <i>1.57</i>   | <i>1.57</i>   | <i>1.57</i>   | <i>1.57</i>   | <i>1.57</i>  | <i>1.57</i> | <i>1.57</i> | <i>1.14</i> |
| <b>Storm Water Drainage</b>  |                |              |             |              |               |               |               |               |              |             |             |             |
| WD-1 Reconstruction of Main Drains in Central Malakal Project                        | 4.20           | 0.00         | 0.00        | 2.10         | 2.10          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| WD-2 Reconstruction of Main Drains Project   | 3.50           | 0.00         | 0.00        | 1.17         | 1.17          | 1.17          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| WD-3 Extension of Trunk Drain 1 Project  | 7.00           | 0.00         | 0.00        | 3.50         | 3.50          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| WD-4 Construction of Trunk Drain 2 Project   | 10.70          | 0.00         | 0.00        | 0.00         | 0.00          | 3.57          | 3.57          | 3.57          | 0.00         | 0.00        | 0.00        | 0.00        |
| WD-5 Construction of Main Drains in New Development Area Project                     | 3.50           | 0.00         | 0.00        | 0.00         | 0.00          | 0.00          | 0.00          | 0.70          | 0.70         | 0.70        | 0.70        | 0.70        |
| WD-6 Capacity Development Project for Operation and Maintenance of Drains            | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| <i>Sub-Total</i>   | <i>28.90</i>   | <i>0.00</i>  | <i>0.00</i> | <i>6.77</i>  | <i>6.77</i>   | <i>4.73</i>   | <i>3.57</i>   | <i>4.27</i>   | <i>0.70</i>  | <i>0.70</i> | <i>0.70</i> | <i>0.70</i> |
| <b>Solid Waste Management</b>  |                |              |             |              |               |               |               |               |              |             |             |             |
| SM-1 Solid Waste Collection Activities Improvement Project                           | TA             | -            | -           | -            | -             | -             | -             | -             | -            | -           | -           | -           |
| SM-2 Landfill Management Improvement Project   | 2.70           | 0.00         | 0.00        | 0.90         | 0.90          | 0.90          | 0.00          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| SM-3 Medical Waste Management Improvement Project                                    | 2.00           | 0.00         | 0.00        | 0.00         | 0.67          | 0.67          | 0.67          | 0.00          | 0.00         | 0.00        | 0.00        | 0.00        |
| <i>Sub-Total</i>   | <i>4.70</i>    | <i>0.00</i>  | <i>0.00</i> | <i>0.90</i>  | <i>1.57</i>   | <i>1.57</i>   | <i>0.67</i>   | <i>0.00</i>   | <i>0.00</i>  | <i>0.00</i> | <i>0.00</i> | <i>0.00</i> |
| <b>Total cost of road, drainage, sanitation, solid waste and urban development</b>   | <b>128.10</b>  | <b>0.00</b>  | <b>2.14</b> | <b>14.73</b> | <b>21.07</b>  | <b>26.80</b>  | <b>27.90</b>  | <b>20.17</b>  | <b>8.93</b>  | <b>2.27</b> | <b>2.27</b> | <b>1.84</b> |
| <b>Budgetary Capacity (road+drainage+sanitation)</b>                                 | <b>-</b>       | <b>7.64</b>  | <b>7.64</b> | <b>7.64</b>  | <b>7.64</b>   | <b>7.64</b>   | <b>7.64</b>   | <b>7.64</b>   | <b>7.64</b>  | <b>7.64</b> | <b>7.64</b> | <b>7.64</b> |
| <b>Balance</b>   | <b>-</b>       | <b>-7.64</b> | <b>5.50</b> | <b>-7.09</b> | <b>-13.43</b> | <b>-19.16</b> | <b>-20.26</b> | <b>-12.53</b> | <b>-1.29</b> | <b>5.37</b> | <b>5.37</b> | <b>5.80</b> |

Note: Sinohydro's cost is not included in investment cost sub-total.

Source: JICA Project Team

Table 19.6-3 Continued.

(unit: mil.USD)

| Sector and Projects   | Cost<br>(mil.USD) | 2012        | 2013        | 2014         | 2015          | 2016          | 2017         | 2018         | 2019         | 2020         | 2021        | 2022        |
|---|-------------------|-------------|-------------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|-------------|-------------|
| <b>Energy</b>   |                   |             |             |              |               |               |              |              |              |              |             |             |
| EN-0 Generator Installation Project   |                   |             |             |              |               |               |              |              |              |              |             |             |
| EN-1 Power Plant Rehabilitation Project                                     | 20.00             | 0.00        | 0.00        | 4.00         | 4.00          | 4.00          | 4.00         | 4.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| EN-2 Expansion of 11kV Distribution Network Project                         | 1.00              | 0.00        | 0.00        | 0.00         | 0.00          | 0.00          | 0.33         | 0.33         | 0.33         | 0.00         | 0.00        | 0.00        |
| EN-3 Solar Power Pilot Project  | 1.00              | 0.00        | 0.00        | 0.33         | 0.33          | 0.33          | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| <i>Sub-Total</i>  | <i>22.00</i>      | <i>0.00</i> | <i>0.00</i> | <i>4.33</i>  | <i>4.33</i>   | <i>4.33</i>   | <i>4.33</i>  | <i>4.33</i>  | <i>0.33</i>  | <i>0.00</i>  | <i>0.00</i> | <i>0.00</i> |
| <b>Budgetary capacity</b>   | <b>-</b>          | <b>0.00</b> | <b>0.00</b> | <b>0.00</b>  | <b>0.00</b>   | <b>0.00</b>   | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| <b>Balance</b>  | <b>-</b>          | <b>0.00</b> | <b>0.00</b> | <b>-4.33</b> | <b>-4.33</b>  | <b>-4.33</b>  | <b>-4.33</b> | <b>-4.33</b> | <b>-0.33</b> | <b>0.00</b>  | <b>0.00</b> | <b>0.00</b> |
| <b>Health</b>   |                   |             |             |              |               |               |              |              |              |              |             |             |
| HE-0 Health Management Information System (HMIS) Project                    |                   |             |             |              |               |               |              |              |              |              |             |             |
| HE-1 Primary Health Care Centre Construction Project                        | 8.10              | 0.00        | 0.00        | 0.00         | 0.00          | 0.00          | 2.70         | 2.70         | 2.70         | 0.00         | 0.00        | 0.00        |
| HE-2 Malakal Teaching Hospital Health Infrastructure Improvement Project    | 12.00             | 0.00        | 0.00        | 0.00         | 6.00          | 6.00          | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| HE-3 Health Service Capacity of 4 Major Health Centres Upgrade Project      | 8.40              | 0.00        | 0.00        | 0.00         | 0.00          | 4.20          | 4.20         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| HE-4 Revitalisation of Medical/Health Faculty in UNU Project                | 11.50             | 0.00        | 0.00        | 0.00         | 5.75          | 5.75          | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| HE-5 Urban Malaria Control Program *not included                            | Operational       | 0.00        | 0.00        | 1.00         | 1.00          | 1.00          | 1.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| HE-6 EPI (DPT3, Measles) Vaccination Promotion Project                      | TA                | -           | -           | -            | -             | -             | -            | -            | -            | -            | -           | -           |
| HE-7 Human Resource Development for Maternal and Child Health Project       | TA                | -           | -           | -            | -             | -             | -            | -            | -            | -            | -           | -           |
| <i>Sub-Total</i>  | <i>40.00</i>      | <i>0.00</i> | <i>0.00</i> | <i>0.00</i>  | <i>11.75</i>  | <i>15.95</i>  | <i>6.90</i>  | <i>2.70</i>  | <i>2.70</i>  | <i>0.00</i>  | <i>0.00</i> | <i>0.00</i> |
| <b>Budgetary capacity</b>   | <b>-</b>          | <b>0.68</b> | <b>0.68</b> | <b>0.68</b>  | <b>0.68</b>   | <b>0.68</b>   | <b>0.68</b>  | <b>0.68</b>  | <b>0.68</b>  | <b>0.68</b>  | <b>0.68</b> | <b>0.68</b> |
| <b>Balance</b>  | <b>-</b>          | <b>0.68</b> | <b>0.68</b> | <b>0.68</b>  | <b>-11.07</b> | <b>-15.27</b> | <b>-6.22</b> | <b>-2.02</b> | <b>-2.02</b> | <b>0.68</b>  | <b>0.68</b> | <b>0.68</b> |
| <b>Education</b>  |                   |             |             |              |               |               |              |              |              |              |             |             |
| ED-0 Rehabilitation of 4 Four Existing Primary Schools                      | 2.30              | 1.15        | 0.00        | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| ED-1 Primary School Establishment and Renovation Project                    | 2.05              | 0.00        | 0.51        | 0.51         | 0.51          | 0.51          | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        |
| ED-2 Strengthening Mathematics and Science Education Project                | TA                | -           | -           | -            | -             | -             | -            | -            | -            | -            | -           | -           |
| ED-3 Capacity Building of MoE Project                                       | TA                | -           | -           | -            | -             | -             | -            | -            | -            | -            | -           | -           |
| ED-4 Malakal Teachers's Training School Construction and Renovation Project | 11.00             | 0.00        | 0.00        | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 5.50         | 5.50         | 0.00        | 0.00        |
| ED-5 Malakal Teachers's Dormitory Reconstruction Project                    | 3.80              | 0.00        | 0.00        | 0.00         | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         | 0.00         | 1.90        | 1.90        |
| ED-6 Malakal Primary School Construction Project                            | 7.10              | 0.00        | 0.00        | 0.00         | 0.00          | 2.37          | 2.37         | 2.37         | 0.00         | 0.00         | 0.00        | 0.00        |
| ED-7 Malakal Middle School Construction Project                             | 10.80             | 0.00        | 0.00        | 0.00         | 0.00          | 3.60          | 3.60         | 3.60         | 0.00         | 0.00         | 0.00        | 0.00        |
| <i>Sub-Total</i>  | <i>34.75</i>      | <i>0.00</i> | <i>0.51</i> | <i>0.51</i>  | <i>0.51</i>   | <i>6.48</i>   | <i>5.97</i>  | <i>5.97</i>  | <i>5.50</i>  | <i>5.50</i>  | <i>1.90</i> | <i>1.90</i> |
| <b>Budgetary capacity</b>   | <b>-</b>          | <b>2.09</b> | <b>2.09</b> | <b>2.09</b>  | <b>2.09</b>   | <b>2.09</b>   | <b>2.09</b>  | <b>2.09</b>  | <b>2.09</b>  | <b>2.09</b>  | <b>2.09</b> | <b>2.09</b> |
| <b>Balance</b>  | <b>-</b>          | <b>1.58</b> | <b>1.58</b> | <b>1.58</b>  | <b>1.58</b>   | <b>-4.39</b>  | <b>-3.88</b> | <b>-3.88</b> | <b>-3.41</b> | <b>-3.41</b> | <b>0.19</b> | <b>0.19</b> |

Source: JICA Project Team

Table 19.6-3 Continued.

(unit.mil.USD)

| Sector and Projects   | Cost<br>(mil.USD) | 2012         | 2013         | 2014          | 2015          | 2016          | 2017          | 2018          | 2019          | 2020         | 2021         | 2022         |
|---|-------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|
| <b>Region-wide Economic Development</b>   |                   |              |              |               |               |               |               |               |               |              |              |              |
| EC-4 Upper Nile Fisheries Project   | 0.48              | 0.00         | 0.00         | 0.10          | 0.10          | 0.10          | 0.10          | 0.10          | 0.00          | 0.00         | 0.00         | 0.00         |
| EC-5 Malakal Dairy Farm Project   | 4.80              | 0.00         | 0.00         | 0.96          | 0.96          | 0.96          | 0.96          | 0.96          | 0.00          | 0.00         | 0.00         | 0.00         |
| EC-6 Malakal Poultry Breeding Farm Project                                      | 0.50              | 0.00         | 0.00         | 0.10          | 0.10          | 0.10          | 0.10          | 0.10          | 0.00          | 0.00         | 0.00         | 0.00         |
| EC-7 Malakal Slaughter House Construction Project                               | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| EC-8 Malakal Light Industrial Park Establishment Project                        | 10.00             | 0.00         | 0.00         | 0.00          | 2.50          | 2.50          | 2.50          | 2.50          | 0.00          | 0.00         | 0.00         | 0.00         |
| EC-9 Logistics Hub Development Project  | 10.00             | 0.00         | 0.00         | 0.00          | 0.00          | 0.00          | 0.00          | 0.00          | 3.33          | 3.33         | 3.33         | 0.00         |
| EC-10 Research Function and Support Services Development Project                | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| EC-11 Malakal Vocational Training Centre Reinforcement Project                  | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| <i>Sub-Total</i>  | <i>25.78</i>      | <i>0.00</i>  | <i>0.00</i>  | <i>1.16</i>   | <i>3.66</i>   | <i>3.66</i>   | <i>3.66</i>   | <i>3.66</i>   | <i>3.33</i>   | <i>3.33</i>  | <i>3.33</i>  | <i>0.00</i>  |
| <b>Budgetary capacity</b>   | -                 | <b>2.16</b>  | <b>2.16</b>  | <b>2.16</b>   | <b>2.16</b>   | <b>2.16</b>   | <b>2.16</b>   | <b>2.16</b>   | <b>2.16</b>   | <b>2.16</b>  | <b>2.16</b>  | <b>2.16</b>  |
| <b>Balance</b>  | -                 | <b>2.16</b>  | <b>2.16</b>  | <b>1.00</b>   | <b>-1.50</b>  | <b>-1.50</b>  | <b>-1.50</b>  | <b>-1.50</b>  | <b>-1.17</b>  | <b>-1.17</b> | <b>-1.17</b> | <b>2.16</b>  |
| <b>Social Development</b>   |                   |              |              |               |               |               |               |               |               |              |              |              |
| SW-1 BHN for Returnees Project  | 5.00              | 0.00         | 0.00         | 2.50          | 2.50          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         |
| SW-2 Malakal Street Children Centre Renovation Project                          | 0.40              | 0.00         | 0.00         | 0.20          | 0.20          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         |
| SW-3 MoG&SW Speed Boat Project  | 0.02              | 0.00         | 0.00         | 0.01          | 0.01          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         |
| SW-4 Malakal Reformatory Centre Establishment Project                           | 1.05              | 0.00         | 0.00         | 0.53          | 0.53          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 0.00         | 0.00         |
| SW-5 Upper Nile Culture Centre Project  | 3.00              | 0.00         | 0.00         | 0.00          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00          | 0.00         | 1.50         | 1.50         |
| SW-6 Malakal Town Women's Group Community Empowerment Project                   | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| PD-1 Participatory Development Planning System Establish Project                | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| PD-2 Human Resource Development for Community Development Officer (CDO) Project | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| <i>Sub-Total</i>  | <i>9.47</i>       | <i>0.00</i>  | <i>0.00</i>  | <i>3.24</i>   | <i>3.24</i>   | <i>0.00</i>   | <i>0.00</i>   | <i>0.00</i>   | <i>0.00</i>   | <i>0.00</i>  | <i>1.50</i>  | <i>1.50</i>  |
| <b>Budgetary capacity</b>   | -                 | <b>0.53</b>  | <b>0.53</b>  | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>  | <b>0.53</b>  | <b>0.53</b>  |
| <b>Balance</b>  | -                 | <b>0.53</b>  | <b>0.53</b>  | <b>-2.71</b>  | <b>-2.71</b>  | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>   | <b>0.53</b>  | <b>-0.97</b> | <b>-0.97</b> |
| <b>Emergency Service Reinforcement Programme</b>                                |                   |              |              |               |               |               |               |               |               |              |              |              |
| ES-1 Fire Fighting Service Improvement Project                                  | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| ES-2 Project for Improving Support System for Emergency Medical Service         | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| <b>Capacity Development</b>   |                   |              |              |               |               |               |               |               |               |              |              |              |
| CD-1 Local Government Administration Improvement Project                        | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| CD-2 Cost Recovery System Improvement Project                                   | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| ID-1 Police Box and Community Police System Establishment Project               | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| ID-2 Malakal-Juba Urban Management System Project                               | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| ID-3 Land Registration System Improvement Project                               | TA                | -            | -            | -             | -             | -             | -             | -             | -             | -            | -            | -            |
| <b>Budgetary capacity</b>   |                   |              |              |               |               |               |               |               |               |              |              |              |
| <b>Balance</b>  |                   |              |              |               |               |               |               |               |               |              |              |              |
| <b>Total</b>  |                   |              |              |               |               |               |               |               |               |              |              |              |
| <b>Total Capital Expenditure</b>  | <b>367.00</b>     | <b>0.00</b>  | <b>8.60</b>  | <b>36.01</b>  | <b>53.44</b>  | <b>71.30</b>  | <b>64.49</b>  | <b>52.55</b>  | <b>34.53</b>  | <b>18.04</b> | <b>15.94</b> | <b>12.11</b> |
| <b>Total budget capacity</b>  | -                 | <b>13.35</b> | <b>13.35</b> | <b>13.35</b>  | <b>13.35</b>  | <b>13.35</b>  | <b>13.35</b>  | <b>13.35</b>  | <b>13.35</b>  | <b>13.35</b> | <b>13.35</b> | <b>13.35</b> |
| <i>Upper Nile State Government</i>  | -                 | <i>13.13</i> | <i>13.13</i> | <i>13.13</i>  | <i>13.13</i>  | <i>13.13</i>  | <i>13.13</i>  | <i>13.13</i>  | <i>13.13</i>  | <i>13.13</i> | <i>13.13</i> | <i>13.13</i> |
| <i>Malakal Town Council</i>   | -                 | <i>0.22</i>  | <i>0.22</i>  | <i>0.22</i>   | <i>0.22</i>   | <i>0.22</i>   | <i>0.22</i>   | <i>0.22</i>   | <i>0.22</i>   | <i>0.22</i>  | <i>0.22</i>  | <i>0.22</i>  |
| <b>Total Balance</b>  | -                 | <b>13.35</b> | <b>4.75</b>  | <b>-22.66</b> | <b>-40.09</b> | <b>-57.95</b> | <b>-51.14</b> | <b>-39.20</b> | <b>-21.18</b> | <b>-4.69</b> | <b>-2.59</b> | <b>1.24</b>  |

Source: JICA Project Team

**Table 19.6-4 Balance between Operation & Management Cost and Locally Available Financial Resource**

(1,000USD)

| Sector and Projects   | Cost (mil.USD) | 2012       | 2013       | 2014       | 2015        | 2016        | 2017          | 2018          | 2019          | 2020          | 2021          | 2022          |
|---|----------------|------------|------------|------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Water Supply (SSUWC)</b>   |                |            |            |            |             |             |               |               |               |               |               |               |
| WS-1 Small-scale Water Supply Development Project                               | 2.20           | 0          | 0          | 154        | 154         | 154         | 154           | 154           | 154           | 154           | 154           | 154           |
| WS-2 Rehabilitation Project of the Treatment Plant & Distribution Pipe Network  | 48.00          | 0          | 0          | 0          | 0           | 0           | 1,736         | 1,736         | 1,736         | 3,360         | 3,360         | 3,360         |
| WS-3 Technical Cooperation Project on Improvement of Water Supply Service       | TA             | -          | -          | -          | -           | -           | -             | -             | -             | -             | -             | -             |
| WS-4 Expansion of the Treatment Plant and the Distribution Pipe Network Project | 20.60          | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 0             | 0             | 0             | 0             |
| <i>Sub-Total</i>  | <i>70.80</i>   | <i>0</i>   | <i>0</i>   | <i>154</i> | <i>154</i>  | <i>154</i>  | <i>1,890</i>  | <i>1,890</i>  | <i>1,890</i>  | <i>3,514</i>  | <i>3,514</i>  | <i>3,514</i>  |
| <b>Budgetary capacity</b>   | <b>-</b>       | <b>323</b> | <b>323</b> | <b>323</b> | <b>323</b>  | <b>323</b>  | <b>323</b>    | <b>323</b>    | <b>323</b>    | <b>323</b>    | <b>323</b>    | <b>323</b>    |
| <b>Balance</b>  | <b>-</b>       | <b>323</b> | <b>323</b> | <b>169</b> | <b>169</b>  | <b>169</b>  | <b>-1,567</b> | <b>-1,567</b> | <b>-1,567</b> | <b>-3,191</b> | <b>-3,191</b> | <b>-3,191</b> |
| <b>Water Transport</b>  |                |            |            |            |             |             |               |               |               |               |               |               |
| PT-0 Strengthening the Management Capacity of Inland Water Transport Project    | TA             | -          | -          | -          | -           | -           | -             | -             | -             | -             | -             | -             |
| PT-1 Reconstruction of Jetty at Malakal Port Project                            | 2.00           | 0          | 0          | 0          | 140         | 140         | 140           | 140           | 140           | 140           | 140           | 140           |
| PT-2 Procurement of Crane Project   | 0.75           | 0          | 0          | 0          | 53          | 53          | 53            | 53            | 53            | 53            | 53            | 53            |
| PT-3 Construction of New Jetty at New Site Project (Phase 1)                    | 3.00           | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 0             | 0             | 0             | 0             |
| PT-4 Extension of New Jetty at New Site Project (Phase 2)                       | 21.00          | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 1,470         | 1,470         | 1,470         | 1,470         |
| PT-5 Construction of Passenger Jetty Project                                    | 0.60           | 0          | 0          | 0          | 42          | 42          | 42            | 42            | 42            | 42            | 42            | 42            |
| PT-6 Development of West Side (Left Bank) of River Nile Project                 | 0.50           | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 35            | 35            | 35            | 35            |
| PT-7 Improvement of Malakal Port Project  | 1.50           | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 105           | 105           | 105           | 105           |
| PT-8 Procurement of Ferry Project   | 6.00           | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 0             | 420           | 420           | 420           |
| PT-9 Improvement of River Bank Protection Project                               | 0.15           | 0          | 0          | 0          | 0           | 0           | 0             | 0             | 0             | 0             | 0             | 11            |
| PT-10 Improvement of New Port Road Project                                      | 0.60           | 0          | 0          | 0          | 0           | 42          | 42            | 42            | 42            | 42            | 42            | 42            |
| PT-11 Port Management Capacity Development Project                              | TA             |            |            |            |             |             |               |               |               |               |               |               |
| <i>Sub-Total</i>  | <i>36.10</i>   | <i>0</i>   | <i>0</i>   | <i>0</i>   | <i>235</i>  | <i>277</i>  | <i>277</i>    | <i>277</i>    | <i>1,887</i>  | <i>2,307</i>  | <i>2,307</i>  | <i>2,317</i>  |
| <b>Budgetary capacity</b>   | <b>-</b>       | <b>0</b>   | <b>0</b>   | <b>0</b>   | <b>0</b>    | <b>0</b>    | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      | <b>0</b>      |
| <b>Balance</b>  | <b>-</b>       | <b>0</b>   | <b>0</b>   | <b>0</b>   | <b>-235</b> | <b>-277</b> | <b>-277</b>   | <b>-277</b>   | <b>-1,887</b> | <b>-2,307</b> | <b>-2,307</b> | <b>-2,317</b> |

Operation and maintenance cost is assumed to be 7.0% of investment cost for facilities other than school and speed boat.  
 Operation and maintenance cost is assumed to be 20.0% of investment cost for school and speed boat.

Source: JICA Project Team



Table 19.6-4 Continued.

(1,000USD)

| Sector and Projects   | Cost (mil.USD) | 2012         | 2013         | 2014         | 2015         | 2016         | 2017          | 2018          | 2019          | 2020          | 2021          | 2022          |
|---|----------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Road Transport</b>   |                |              |              |              |              |              |               |               |               |               |               |               |
| RT-0 Malakal Town Internal Road Project (Kano)  |                |              |              |              |              |              |               |               |               |               |               |               |
| RT-0 Malakal Town Internal Road Project (Sinohydro)                                   | 51.80          | 0            | 0            | 3,626        | 3,626        | 3,626        | 3,626         | 3,626         | 3,626         | 3,626         | 3,626         | 3,626         |
| EC-1 International Transport Corridor Establishment Project                           | n.a.           |              |              |              |              |              |               |               |               |               |               |               |
| EC-2 Malakal Airport Internationalization Project                                     | n.a.           |              |              |              |              |              |               |               |               |               |               |               |
| EC-3 Malakal Rural Road Network Improvement Project                                   | n.a.           |              |              |              |              |              |               |               |               |               |               |               |
| RT-1 Community Road Construction Project (LBT)  | 2.00           | 0            | 0            | 0            | 140          | 140          | 140           | 140           | 140           | 140           | 140           | 140           |
| RT-2 Malakal Town Secondary Arterial Road Improvement Project                         | 13.50          | 0            | 0            | 0            | 0            | 0            | 945           | 945           | 945           | 945           | 945           | 945           |
| RT-3 Malakal Town Arterial Road Improvement Project                                   | 60.00          | 0            | 0            | 0            | 0            | 0            | 0             | 1,400         | 2,800         | 4,200         | 4,200         | 4,200         |
| RT-4 Road Maintenance & Management Project  | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| RT-5 Public Transport Management Project  | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| RT-6 Malakal Town Bus Terminal & Bus Stop Facilities Construction Project             | 2.20           | 0            | 0            | 0            | 0            | 0            | 0             | 154           | 154           | 154           | 154           | 154           |
| RT-7 Traffic Management Project   | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| RT-8 Intersection and Traffic Facility Improvement Project                            | 2.00           | 0            | 0            | 0            | 0            | 0            | 0             | 0             | 140           | 140           | 140           | 140           |
| RT-9 Malakal Town Traffic Safety Management Project                                   | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| <i>Sub-Total</i>  | 79.70          | 0            | 0            | 0            | 140          | 140          | 1,085         | 2,639         | 4,179         | 5,579         | 5,579         | 5,579         |
| <b>Sewage and Sanitation</b>  |                |              |              |              |              |              |               |               |               |               |               |               |
| SS-0 Scaling up of sanitation activities in the state capitals and other major towns  | -              | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| SS-1 Community Sanitary System and Public Toilet Installation Project                 | 11.40          | 0            | 0            | 80           | 160          | 239          | 319           | 399           | 479           | 559           | 638           | 718           |
| SS-2 Construction of Sludge Treatment Facilities Project                              | 3.40           | 0            | 0            | 0            | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 238           |
| SS-3 Technical Project for Toilet Operation and Maintenance                           | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| SS-4 Project for Improving Sanitary Environment in Malakal Town                       | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| SS-5 Public Toilet Operation and Management Project                                   | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| <i>Sub-Total</i>  | 14.80          | 0            | 0            | 80           | 160          | 239          | 319           | 399           | 479           | 559           | 638           | 956           |
| <b>Storm Water Drainage</b>   |                |              |              |              |              |              |               |               |               |               |               |               |
| WD-1 Reconstruction of Main Drains in Central Malakal Project                         | 4.20           | 0            | 0            | 0            | 0            | 294          | 294           | 294           | 294           | 294           | 294           | 294           |
| WD-2 Reconstruction of Main Drains Project  | 3.50           | 0            | 0            | 0            | 0            | 0            | 245           | 245           | 245           | 245           | 245           | 245           |
| WD-3 Extension of Trunk Drain 1 Project   | 7.00           | 0            | 0            | 0            | 0            | 490          | 490           | 490           | 490           | 490           | 490           | 490           |
| WD-4 Construction of Trunk Drain 2 Project  | 10.70          | 0            | 0            | 0            | 0            | 0            | 0             | 0             | 749           | 749           | 749           | 749           |
| WD-5 Construction of Main Drains in New Development Area Project                      | 3.50           | 0            | 0            | 0            | 0            | 0            | 0             | 0             | 0             | 0             | 0             | 0             |
| WD-6 Capacity Development Project for Operation and Maintenance of Drains             | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| <i>Sub-Total</i>  | 28.90          | 0            | 0            | 0            | 0            | 784          | 1,029         | 1,029         | 1,778         | 1,778         | 1,778         | 1,778         |
| <b>Solid Waste Management</b>   |                |              |              |              |              |              |               |               |               |               |               |               |
| SM-1 Solid Waste Collection Activities Improvement Project                            | TA             | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             |
| SM-2 Landfill Management Improvement Project  | 2.70           | 0            | 0            | 0            | 0            | 0            | 189           | 189           | 189           | 189           | 189           | 189           |
| SM-3 Medical Waste Management Improvement Project                                     | 2.00           | 0            | 0            | 0            | 0            | 0            | 0             | 140           | 140           | 140           | 140           | 140           |
| <i>Sub-Total</i>  | 4.70           | 0            | 0            | 0            | 0            | 0            | 189           | 329           | 329           | 329           | 329           | 329           |
| <b>Total cost of road, drainage, sanitation, solid waste and urban development</b>    | <b>128.10</b>  | <b>0</b>     | <b>0</b>     | <b>80</b>    | <b>300</b>   | <b>1,163</b> | <b>2,622</b>  | <b>4,396</b>  | <b>6,765</b>  | <b>8,245</b>  | <b>8,324</b>  | <b>8,642</b>  |
| <b>Budgetary Capacity (Ministry of physical Infrastructure and Rural Development)</b> | <b>-</b>       | <b>1,511</b> | <b>1,511</b> | <b>1,511</b> | <b>1,511</b> | <b>1,511</b> | <b>1,511</b>  | <b>1,511</b>  | <b>1,511</b>  | <b>1,511</b>  | <b>1,511</b>  | <b>1,511</b>  |
| <b>Balance</b>  | <b>-</b>       | <b>1,511</b> | <b>1,511</b> | <b>1,431</b> | <b>1,211</b> | <b>347</b>   | <b>-1,111</b> | <b>-2,885</b> | <b>-5,254</b> | <b>-6,734</b> | <b>-6,814</b> | <b>-7,131</b> |

Operation and maintenance cost is assumed to be 7.0% of investment cost for facilities other than school and speed boat.  
 Operation and maintenance cost is assumed to be 20.0% of investment cost for school and speed boat.

Note: Sinohydro's cost is not included in investment cost sub-total.

Source: JICA Project Team

**Table 19.6-4 Continued.**

(1,000USD)

| Sector and Projects   | Cost (mil.USD) | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  | 2018  | 2019   | 2020   | 2021   | 2022   |
|---|----------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| <b>Energy</b>   |                |       |       |       |       |       |       |       |        |        |        |        |
| EN-0 Generator Installation Project   |                |       |       |       |       |       |       |       |        |        |        |        |
| EN-1 Power Plant Rehabilitation Project                                     | 20.00          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 1,400  | 1,400  | 1,400  | 1,400  |
| EN-2 Expansion of 11kV Distribution Network Project                         | 1.00           | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 70     | 70     | 70     |
| EN-3 Solar Power Pilot Project  | 1.00           | 0     | 0     | 0     | 0     | 0     | 70    | 70    | 70     | 70     | 70     | 70     |
| <i>Sub-Total</i>  | 22.00          | 0     | 0     | 0     | 0     | 0     | 70    | 70    | 1,470  | 1,540  | 1,540  | 1,540  |
| <b>Budgetary capacity</b>   | -              | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00   | 0.00   | 0.00   | 0.00   |
| <b>Balance</b>  | -              | 0.00  | 0.00  | 0.00  | 0.00  | 0     | -70   | -70   | -1,470 | -1,540 | -1,540 | -1,540 |
| <b>Health</b>   |                |       |       |       |       |       |       |       |        |        |        |        |
| HE-0 Health Management Information System (HMIS) Project                    | -              | -     | -     | -     | -     | -     | -     | -     | -      | -      | -      | -      |
| HE-1 Primary Health Care Centre Construction Project                        | 8.10           | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 567    | 567    | 567    |
| HE-2 Malakal Teaching Hospital Health Infrastructure Improvement Project    | 12.00          | 0     | 0     | 0     | 0     | 0     | 840   | 840   | 840    | 840    | 840    | 840    |
| HE-3 Health Service Capacity of 4 Major Health Centres Upgrade Project      | 8.40           | 0     | 0     | 0     | 0     | 0     | 0     | 588   | 588    | 588    | 588    | 588    |
| HE-4 Revitalisation of Medical/Health Faculty in UNU Project                | 11.50          | 0     | 0     | 0     | 0     | 0     | 805   | 805   | 805    | 805    | 805    | 805    |
| HE-5 Urban Malaria Control Program  | Operational    | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      |
| HE-6 EPI (DPT3, Measles) Vaccination Promotion Project                      | TA             | -     | -     | -     | -     | -     | -     | -     | -      | -      | -      | -      |
| HE-7 Human Resource Development for Maternal and Child Health Project       | TA             | -     | -     | -     | -     | -     | -     | -     | -      | -      | -      | -      |
| <i>Sub-Total</i>  | 40.00          | 0     | 0     | 0     | 0     | 0     | 1,645 | 2,233 | 2,233  | 2,800  | 2,800  | 2,800  |
| <b>Budgetary capacity</b>   | -              | 3,688 | 3,688 | 3,688 | 3,688 | 3,688 | 3,688 | 3,688 | 3,688  | 3,688  | 3,688  | 3,688  |
| <b>Balance</b>  | -              | 3,688 | 3,688 | 3,688 | 3,688 | 3,688 | 2,043 | 1,455 | 1,455  | 888    | 888    | 888    |
| <b>Education</b>  |                |       |       |       |       |       |       |       |        |        |        |        |
| ED-0 Rehabilitation of 4 Four Existing Primary Schools                      | 2.30           | 0     | 460   | 460   | 460   | 460   | 460   | 460   | 460    | 460    | 460    | 460    |
| ED-1 Primary School Establishment and Renovation Project                    | 2.05           | 0     | 0     | 0     | 0     | 0     | 411   | 411   | 411    | 411    | 411    | 411    |
| ED-2 Strengthening Mathematics and Science Education Project                | TA             | -     | -     | -     | -     | -     | -     | -     | -      | -      | -      | -      |
| ED-3 Capacity Building of MoE Project                                       | TA             | -     | -     | -     | -     | -     | -     | -     | -      | -      | -      | -      |
| ED-4 Malakal Teachers's Training School Construction and Renovation Project | 11.00          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 2,200  | 2,200  |
| ED-5 Malakal Teachers's Dormitory Reconstruction Project                    | 3.80           | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0      | 0      | 0      |
| ED-6 Malakal Primary School Construction Project                            | 7.10           | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 1,420  | 1,420  | 1,420  |
| ED-7 Malakal Middle School Construction Project                             | 10.80          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 2,160  | 2,160  | 2,160  |
| <i>Sub-Total</i>  | 34.75          | 0     | 0     | 0     | 0     | 0     | 411   | 411   | 411    | 3,991  | 6,191  | 6,191  |
| <b>Budgetary capacity</b>   | -              | 7,350 | 7,350 | 7,350 | 7,350 | 7,350 | 7,350 | 7,350 | 7,350  | 7,350  | 7,350  | 7,350  |
| <b>Balance</b>  | -              | 7,350 | 7,350 | 7,350 | 7,350 | 7,350 | 6,939 | 6,939 | 6,939  | 3,359  | 1,159  | 1,159  |

Operation and maintenance cost is assumed to be 7.0% of investment cost for facilities other than school and speed boat.  
 Operation and maintenance cost is assumed to be 20.0% of investment cost for school and speed boat.

Source: JICA Project Team

**Table 19.6-4 Continued.**

(1,000USD)

| Sector and Projects  | Cost (mil.USD) | 2012   | 2013   | 2014   | 2015   | 2016   | 2017   | 2018   | 2019   | 2020   | 2021   | 2022   |
|--|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Region-wide Economic Development</b>  |                |        |        |        |        |        |        |        |        |        |        |        |
| EC-4 Upper Nile Fisheries Project  | 0.48           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 34     | 34     | 34     | 34     |
| EC-5 Malakal Dairy Farm Project  | 4.80           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 336    | 336    | 336    | 336    |
| EC-6 Malakal Poultry Breeding Farm Project   | 0.50           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 35     | 35     | 35     | 35     |
| EC-7 Malakal Slaughter House Construction Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| EC-8 Malakal Light Industrial Park Establishment Project   | 10.00          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 700    | 700    | 700    | 700    |
| EC-9 Logistics Hub Development Project   | 10.00          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 700    |
| EC-10 Research Function and Support Services Development Project   | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| EC-11 Malakal Vocational Training Centre Reinforcement Project   | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| <i>Sub-Total</i>   | 25.78          | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1,105  | 1,105  | 1,105  | 1,805  |
| <i>Budgetary capacity (Min. of Animal Resources and Fisheries+Min. of Finance, Trade and Industry)</i>                 | -              | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  |
| <b>Balance</b>   | -              | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 4,536  | 3,431  | 3,431  | 3,431  | 2,731  |
| <b>Social Development</b>  |                |        |        |        |        |        |        |        |        |        |        |        |
| SW-1 BHN for Returnees Project   | 5.00           | 0      | 0      | 0      | 0      | 350    | 350    | 350    | 350    | 350    | 350    | 350    |
| SW-2 Malakal Street Children Centre Renovation Project   | 0.40           | 0      | 0      | 0      | 0      | 28     | 28     | 28     | 28     | 28     | 28     | 28     |
| SW-3 MoG&SW Speed Boat Project   | 0.02           | 0      | 0      | 0      | 0      | 2      | 2      | 2      | 2      | 2      | 2      | 2      |
| SW-4 Malakal Reformatory Centre Establishment Project  | 1.05           | 0      | 0      | 0      | 0      | 74     | 74     | 74     | 74     | 74     | 74     | 74     |
| SW-5 Upper Nile Culture Centre Project   | 3.00           | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| SW-6 Malakal Town Women's Group Community Empowerment Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| PD-1 Participatory Development Planning System Establish Project   | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| PD-2 Human Resource Development for Community Development Officer (CDO) Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| <i>Sub-Total</i>   | 9.47           | 0      | 0      | 0      | 0      | 453    | 453    | 453    | 453    | 453    | 453    | 453    |
| <i>Budgetary capacity (Min. of Gender, Social Welfare &amp; Religious Affairs + Min. of Culture, Youth and Sports)</i> | -              | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  | 1,350  |
| <b>Balance</b>   | -              | 1,350  | 1,350  | 1,350  | 1,350  | 897    | 897    | 897    | 897    | 897    | 897    | 897    |
| <b>Emergency Service Reinforcement Programme</b>   |                |        |        |        |        |        |        |        |        |        |        |        |
| ES-1 Fire Fighting Service Improvement Project   | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| ES-2 Project for Improving Support System for Emergency Medical Service  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| <b>Capacity Development</b>  |                |        |        |        |        |        |        |        |        |        |        |        |
| CD-1 Local Government Administration Improvement Project   | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| CD-2 Cost Recovery System Improvement Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| ID-1 Police Box and Community Police System Establishment Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| ID-2 Malakal-Juba Urban Management System Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| ID-3 Land Registration System Improvement Project  | TA             | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      | -      |
| <i>Sub-Total</i>   |                |        |        |        |        |        |        |        |        |        |        |        |
| <i>Budgetary capacity (Min. of Local Government &amp; Law Enforcement + Police Service + Fire Brigade)</i>             |                | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  | 6,382  |
| <b>Balance</b>   |                |        |        |        |        |        |        |        |        |        |        |        |
| <b>Total</b>   |                |        |        |        |        |        |        |        |        |        |        |        |
| <b>Total Operation and maintenance expenditure</b>   | 367.01         | 0      | 0      | 234    | 688    | 2,047  | 7,368  | 9,730  | 16,213 | 23,954 | 26,234 | 27,262 |
| <b>Total budget capacity</b>   | -              | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 |
| <i>Upper Nile State Government (Capacity development budgetary frame is excluded.)</i>                                 | -              | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 | 18,757 |
| <i>Malakal Town Council</i>  | -              | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| <b>Total Balance</b>   | -              | 18,757 | 18,757 | 18,524 | 18,069 | 16,710 | 11,390 | 9,028  | 2,544  | -5,196 | -7,476 | -8,504 |

Operation and maintenance cost is assumed to be 7.0% of investment cost for facilities other than school and speed boat.  
 Operation and maintenance cost is assumed to be 20.0% of investment cost for school and speed boat.

Source: JICA Project Team

**Table 19.6-5 2011 Budget for UNS**

(Unit: South Sudan Pound)

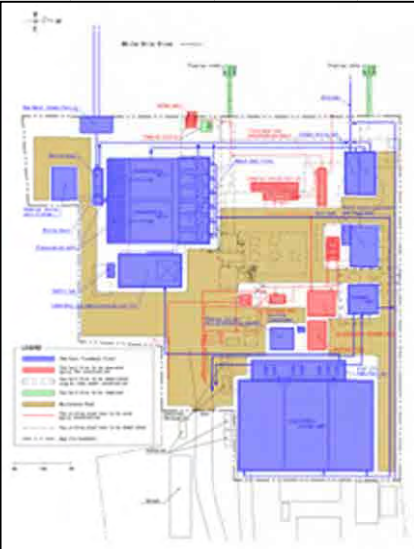
| Sector                                   | Spending Agency  | 2011 Approved Budget |                   |                   |                    |
|--|--|----------------------|-------------------|-------------------|--------------------|
|  |  | Salaries             | Operating         | Capital           | Total              |
| Accountability and Economic Functions    | Ministry of Finance, Trade and Industry                  | 9,028,834            | 8,614,764         | 6,956,771         | 24,600,369         |
|  | Ministry of Information and Communication                | 1,945,270            | 768,500           | 1,386,230         | 4,100,000          |
| Education                                | Ministry of Education                                    | 32,213,025           | 4,535,731         | 10,474,373        | 47,223,129         |
| Health                                   | Ministry of Health                                       | 16,590,279           | 1,849,794         | 3,389,316         | 21,829,389         |
| Infrastructure                           | Ministry of Infrastructure                               | 6,611,811            | 941,728           | 38,196,461        | 45,750,000         |
| Natural Resources and Social Development | Ministry of Agriculture                                  | 4,353,134            | 165,940           | 2,963,917         | 7,482,991          |
|  | Ministry of Animal Resources and Fisheries               | 4,760,428            | 276,161           | 3,859,531         | 8,896,120          |
|  | Ministry of Culture, Youth and Sports                    | 2,248,783            | 187,257           | 1,363,960         | 3,800,000          |
|  | Ministry of Gender, Social Welfare and Religious Affairs | 3,271,960            | 1,041,596         | 1,286,444         | 5,600,000          |
| Public Administration and Rule of Law    | Secretariate General Council of Ministers                | 10,003,526           | 2,844,011         | 1,249,447         | 14,096,984         |
|  | Ministry of Labour and Public Services                   | 4,805,120            | 76,000            | 118,880           | 5,000,000          |
|  | Ministry of Legal Affairs                                | 2,248,618            | 314,277           | 2,686,480         | 5,249,375          |
|  | Ministry of Local Government and Law Enforcement         | 2,824,619            | 930,791           | 2,244,590         | 6,000,000          |
|  | Ministry of Parliamentary Affairs                        | 908,095              | 326,445           | 2,865,460         | 4,100,000          |
|  | State Legislative Assembly                               | 6,127,826            | 4,019,723         | 1,852,451         | 12,000,000         |
|  | Police Service   | 23,259,000           | 2,858,000         | 142,166           | 26,259,166         |
|  | Prisons Service  | 13,290,600           | 1,120,000         | 0                 | 14,410,600         |
|  | Fire Brigade Service                                     | 1,615,800            | 423,184           | 271,000           | 2,309,984          |
|  | Wildlife Service   | 8,294,100            | 999,700           | 658,500           | 9,952,300          |
|  | Employees Justice Chamber                                | 91,688               | 60,000            | 12,000            | 163,688            |
|  | Land Commission  | 270,638              | 137,712           | 91,650            | 500,000            |
|  | Petroleum Commission                                     | 119,767              | 380,233           | 0                 | 500,000            |
|  | Public Grievance Chamber                                 | 317,325              | 252,754           | 382,568           | 952,647            |
| Transfer to Counties                     | General Transfer to Counties                             | 34,456,348           | 0                 | 7,900,000         | 42,356,348         |
| <b>GRAND TOTAL</b>                       |  | <b>189,656,594</b>   | <b>33,124,301</b> | <b>90,352,195</b> | <b>313,133,090</b> |

Source: Government of Upper Nile State Draft Budget 2011/12, State Ministry of Finance


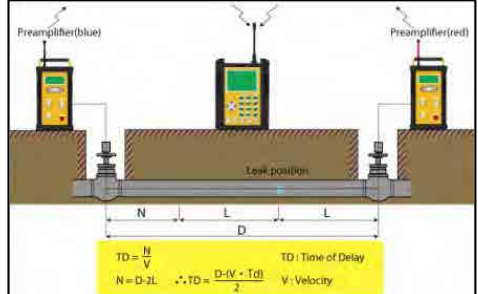
## 19.7 PROFILE OF SHORT- AND MEDIUM-TERM PROJECTS

### 19.7.1 Malakal Infrastructure Development Programme


#### (1) Water Supply Programme

| <b>WS-2: Treatment Plant and Distribution Pipe Network Rehabilitation Project</b>  |   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
|--|---|------|------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------|-----|--|--|---|--|--|--|--|--|--|--------------|--|--|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|
| <b>Background of the Project</b><br>Malakal Town currently has a water treatment plant and transmission and distribution pipelines. The water supply facilities are managed by SSUWC-Malakal.<br>Currently, SSUWC-Malakal is facing the following problems:<br>- Shortage of supplied water<br>- Low water pressure<br>- Poor quality of treated water<br>- High non-revenue water<br>- Other (shortage of fuel, lack of data, etc.)<br>The design capacity of the existing treatment plant is 14,800 m <sup>3</sup> /day but the actual performance of the plant is assumed to be approximately 4,800 m <sup>3</sup> /day, which was calculated based on the high lift pump capacity. The shortage of supplied water and low water pressure are caused by water leakage from the deteriorated pipelines, lack of pump capacity and generator. Since non-revenue water is currently high, only a small quantity of water is likely to be supplied.<br>Noticeable parameters were turbidity, colour and E-Coli, which do not comply with WHO guidelines. Inappropriate operations for chemical dosing, flocculation and filtration are resulting in poor quality of treated water. The project is expected to increase water production of the existing treatment plant as well as rehabilitation of the pipelines. | <b>Effects of the Project</b><br>a) Target Beneficiaries<br>• Approximately 190,000 inhabitants of Malakal Town<br>b) Effects of the Project<br>• Enable safe and stable water supply   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
|  | <b>Evaluation of the Project</b><br>a) Economic Viability<br>b) Financial Soundness<br>c) Environmental Impacts<br>- Positive Impacts<br>• Betterment of the urban environment<br>- Negative Impacts<br>• No specific negative impact is anticipated  |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Objectives of the Project</b><br>• To raise performance of the water treatment plant to its original capacity<br>• To supply safe water on a stable basis to Malakal Town<br>• To reduce water leakage  | <b>External Conditions</b><br>• Peace and order is maintained.<br>• SSUWC-Malakal has the fundamental capabilities for operating and maintaining the water supply system.   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Location of the Project</b><br>• Malakal Town (specifically, the compound of the existing treatment plant and the sites where deteriorated pipelines exist)   | <b>Preconditions</b><br>• O&M cost of the water supply system will be covered by beneficiaries after improvement of the water tariff collection system.<br>• Land is acquired for service reservoirs.<br>• Budgetary arrangements for O&M are allocated annually.<br>• Necessary funds are available. |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Scope of the Project</b><br>• Restoration of treatment plant (7,500 m <sup>3</sup> /day x 1 plant, chemical clarifier, flocculator, rapid sand filtration, rising pumps, generator)<br>• Replacement of pipes (approximately 100 km x φ100 mm-300 mm, polyethylene, PN10)<br>• Construction of elevated tank (1,000 m <sup>3</sup> x 10 tanks, RC made)<br>• Replacement of pipes (approximately 50 km x φ100 mm-150 mm, polyethylene, PN10)  | <b>Relationship with Other Projects</b><br>• Chemical dosing facilities were installed in the compound of the treatment plant by USAID funds in 2012. The existing treatment plant will be restored by the project as well as the chemical dosing facilities.   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Capacity Development</b><br>• Control of chemical dosing<br>• Control of water pressure and flow<br>• Undertaking water audits<br>• Supervision of water committees<br>• Collection of water tariffs  | <b>Remarks</b><br>  |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Agencies Responsible</b><br>• Project Implementation: SSUWC-Malakal and UNS<br>• Operation: SSUWC-Malakal<br>• Maintenance: SSUWC-Malakal   |   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Estimated Cost</b><br>• Implementation/Construction Cost (including construction supervision cost):<br>Construction Cost:<br>Consulting Fee:<br>Total Cost: <span style="float: right;">US\$ 48.00 million</span>   |   |      |      |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| <b>Implementation Schedule</b><br><table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td style="background-color: #cccccc;">█</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;">████████████████████</td> <td style="background-color: #cccccc;">████████████████████</td> <td style="background-color: #cccccc;">████████████████████</td> <td style="background-color: #cccccc;">████████████████████</td> <td style="background-color: #cccccc;">████████████████████</td> <td style="background-color: #cccccc;">████████████████████</td> </tr> </tbody> </table> D&B: Design and Bidding  |   | 2012 | 2013 | 2014                 | 2015                 | 2016                 | 2017                 | 2018                 | 2019                 | 2020 | D&B |  |  | █ |  |  |  |  |  |  | Construction |  |  |  | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |  |
|  | 2012  | 2013 | 2014 | 2015                 | 2016                 | 2017                 | 2018                 | 2019                 | 2020                 |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| D&B  |   |      | █    |                      |                      |                      |                      |                      |                      |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |
| Construction   |   |      |      | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |      |     |  |  |   |  |  |  |  |  |  |              |  |  |  |                      |                      |                      |                      |                      |                      |  |

Source: JICA Project Team


| <b>WS-3: Improvement of Water Supply Service Technical Cooperation Project</b>   |  |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
|--|--|------|------|------|------|------|------|------|------|------|------|--|--|--|--|--|--|--|--|--|---|
| <p><b>Background of the Project</b></p> <p>Malakal Town currently has a water treatment plant and transmission and distribution pipelines. The water supply facilities are managed by SSUWC-Malakal.</p> <p>In particular, distribution pipe networks have deteriorated. This causes huge amounts of water leakage.</p> <p>Currently, SSUWC-Malakal is facing a high rate of non-revenue water. Non-revenue water for SSUWC-Malakal is caused by the following factors:</p> <ul style="list-style-type: none"> <li>- Water leakage from deteriorated pipelines</li> <li>- Ineffective water tariff collection system</li> <li>- Use of flat rate system</li> <li>- Lack of water meters</li> </ul> <p>The total length of pipes (of at least 100 mm) is about 144 km. These pipes have deteriorated since construction in the 1930s and 1940s. Even though about 90km of pipes were replaced in 2009, the rest were not and some are unreliable due to damage from road construction.</p> <p>Issues with the water tariff collection system are one of the problems that cause an increase in non-revenue water. Current water tariff collection is inadequate for sustaining financial management.</p> <p>Consequently, in order to sustain sound management of SSUWC-Malakal, it is important that skills related to water leakage detection, asset management plant and inventory development are improved. Moreover, the water tariff collection system should be drastically improved through technical training composed of water meter reading, water auditing, billing systems, etc.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• SSUWC-Malakal</li> <li>• Approximately 80,000 inhabitants of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Enable safe and stable water supply</li> </ul>   |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>• To reduce water leakage</li> <li>• To develop a billing system</li> <li>• To improve revenue water</li> </ul>   | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <p>c) Environmental Impacts</p> <ul style="list-style-type: none"> <li>- Positive Impacts <ul style="list-style-type: none"> <li>• Betterment of the urban environment</li> <li>• Improvement of accessibility to utility for residents</li> </ul> </li> <li>- Negative Impacts <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul>      |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>   | <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• SSUWC-Malakal has the fundamental capabilities for operating and maintaining the water supply system.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>• Water audit</li> <li>• Select pilot project area</li> <li>• Digitise network pipelines in pilot plot project area using GIS software</li> <li>• Site reconnaissance for checking network pipelines</li> <li>• Install water meters and check the existing water meters in pilot project area</li> <li>• Check the minimum water flow at night in pilot project area</li> <li>• Conduct leakage detection in pilot project area</li> <li>• Repair leakage points in pilot project area</li> <li>• Improve water tariff collection system including meter reading, billing, etc.</li> </ul>  | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>• Staff of the technical, operational and finance division of SSUWC-Malakal are involved in the project.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>• Project Implementation: SSUWC-Malakal and UNS</li> <li>• Operation: SSUWC-Malakal</li> <li>• Maintenance: SSUWC-Malakal</li> </ul>   | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>• The project will be able to collaborate with the JICA technical cooperation project on water supply service that is being conducted in Juba.</li> <li>• Assistance on financial reform will be conducted by USAID for SSUWC headquarters directly. The trained person from headquarters will be sent to local SSUWC offices to train staff members. However, there is no defined time schedule.</li> </ul> |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>• Implementation/Construction Cost (including construction supervision cost) : Consulting Fee</li> <li>• Total Cost: US\$ 0.04 million</li> </ul>  | <p><b>Remarks</b></p> <div style="text-align: center;">  </div>  |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>T.A.</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>T.A.: Technical Assistance</p>   |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | T.A. |  |  |  |  |  |  |  |  |  | <div style="text-align: center;">  </div> |
|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |      |  |  |  |  |  |  |  |  |  |   |
| T.A.   |  |      |      |      |      |      |      |      |      |      |      |  |  |  |  |  |  |  |  |  |   |

Source: JICA Project Team

| <b>WS-4: Expansion of the Treatment Plant and Distribution Pipe Network Project</b>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
|---|------|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>Malakal Town currently has a water treatment plant and transmission and distribution pipelines. The water supply facilities are managed by SSUWC-Malakal.</p> <p>After rehabilitation of the existing treatment plant, the capacity will be restored to 14,800 m<sup>3</sup>/day.</p> <p>The population of Malakal Town is growing every year owing to the repatriation of immigrants/migrants. The future population is projected to be 220,000 based on the High Scenario for the year 2022. In this case, water demand will reach about 19,300 m<sup>3</sup>/day. Even if the original treatment plant is fully restored, capacity of the treatment plant is insufficient to meet future demand.</p> <p>Moreover, residence areas will have spread to the eastern and southern parts of Malakal Town due to repatriation.</p> <p>Accordingly, the treatment plant and distribution pipe networks must be expanded to meet future water demand and the expanding residential areas based on urban planning projections of the JICA study.</p> <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>To supply safe water on a stable basis to the original area and future expanding areas of Malakal Town</li> </ul> <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>Malakal Town and its future expanding areas</li> </ul> <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>Restoration of treatment plant (5,000 m<sup>3</sup>/day x 1 plant, chemical clarifier, flocculator, rapid sand filtration, rising pumps, generator)</li> <li>Replacement of pipes (approximately 50 km x φ100 mm-150 mm, polyethylene, PN10)</li> <li>Construction of elevated tank (1,000m<sup>3</sup> x 3 tank, made from reinforced concrete)</li> </ul> <p><b>Capacity Development</b></p> <ul style="list-style-type: none"> <li>Control of chemical dosing</li> <li>Control of water pressure and flow</li> </ul> <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>Project Implementation: SSUWC-Malakal and UNS</li> <li>Operation: SSUWC-Malakal</li> <li>Maintenance: SSUWC-Malakal</li> </ul> <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>Implementation/Construction Cost (including construction supervision cost): <ul style="list-style-type: none"> <li>Construction Cost</li> <li>Consulting Fee:.</li> <li>Total Cost: US\$ 20.60 million</li> </ul> </li> </ul> <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td></td> <td></td> </tr> <tr> <td>Const.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td></td> </tr> </tbody> </table> <p>D&amp;B: Design and Bidding</p> |      | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | D&B |  |  |  |  |  |  |  |  |  | Const. |  |  |  |  |  |  |  |  |  | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Approximately 205,000 inhabitants of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Enable safe and stable water supply</li> </ul> <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <p>c) Environmental Impacts</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>Betterment of the urban environment</li> <li>Improvement of accessibility to utility for residents</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>There is not enough space to expand the treatment plant in the current compound. The treatment plant must be expanded in another site.</li> <li>Peace and order is maintained.</li> <li>SSUWC-Malakal has the fundamental capabilities for operating and maintaining the water supply system.</li> </ul> <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>Staff of the technical, operation and finance division of SSUWC-Malakal are involved in the project.</li> <li>Land and service reservoirs are acquired for the treatment plant to be expanded.</li> <li>Budgetary arrangements for O&amp;M are allocated annually.</li> <li>Necessary funds are available.</li> </ul> <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>There are no related projects.</li> </ul> <p><b>Remarks</b></p> <div style="border: 1px solid black; padding: 5px;">  <p>The map shows the layout of Malakal Town with a grid of streets. A red circle marks the 'Existing Treatment Plant (15,000 m³/day)' on the western side. A blue circle marks the 'Treatment Plant to be expanded (5,000 m³/day)' on the eastern side. A network of red and blue lines represents the distribution pipes connecting these plants across the town.</p> </div> |
|   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| D&B   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Const.  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |

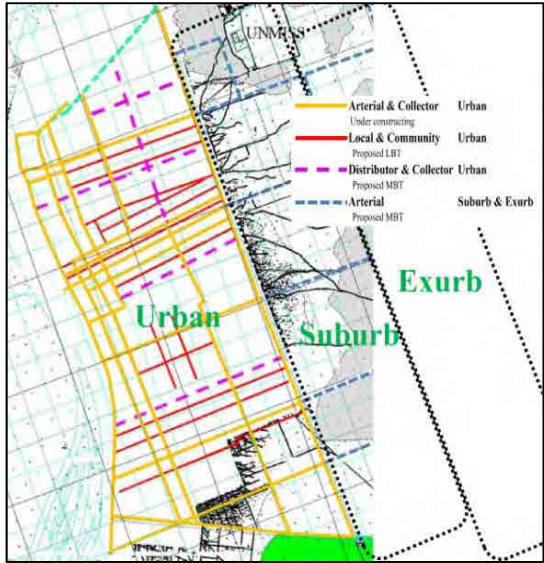
Source: JICA Project Team

## (2) Road Improvement Programme

| <b>RT-1: Community Road Construction Project (LBT)</b>  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p>Most road pavements in the town have been destroyed, and many roads become impassable during the rainy season. The major and sub-major roads and the Inner Ring Road surrounding Malakal Town are now being reconstructed by UNS so they can be used during the rainy season without difficulty.</p> <p>Local and community roads have not yet been developed. Some local and community areas become submerged during the rainy season. Although few cars use the roads in community areas, many pedestrians use the roads on a daily basis. Furthermore, there are limited job opportunities for people in Malakal.</p> <p>Public enterprises such as road construction projects using MBT do not employ many people given the scale and cost of the projects. The community road improvement project will utilise LBT, which improves the living environment of the community residential area and is expected to employ more residents than MBT projects. It should therefore be selected as an Urgent Support Project.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• The whole population of Malakal Town and returnees</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Reduction of difficulties for the community in the rainy season</li> <li>• Provision of jobs and income</li> </ul>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
|   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
|   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the income benefit for the community is about 40% of the cost of construction.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese Grant Aid has been requested</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>• Positive Impacts                             <ul style="list-style-type: none"> <li>- Improvement of the condition of community areas in the rainy season</li> <li>- Improvement of accessibility to community areas</li> </ul> </li> <li>• Negative Impacts                             <ul style="list-style-type: none"> <li>- Increase in the number of cars going through community areas</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To improve community roads</li> <li>• To improve the living environment of community areas</li> <li>• To provide jobs</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• One road in each of the north, central and south areas in Malakal Town<br/>J-3c (north), J-9c (central), J-13c (south)</li> </ul>  | <ul style="list-style-type: none"> <li>• Road right-of way is secured.</li> <li>• House walls within the right-of-way are removed.</li> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Construction of approximately 6 km of community roads utilising LBT</li> <li>• Supply of small equipment: mini excavator, mini compactor and some other small equipment items</li> </ul>   | <ul style="list-style-type: none"> <li>• Road Maintenance and Management Project</li> <li>• Malakal Internal Roads (Arterials and Collectors) Project</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   |    |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Counterpart: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> </ul>   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Detailed Design and Supervision Cost:    US\$ 0.20 million</li> <li>• Construction:           Road Construction:    US\$ 1.00 million</li> <li>  Equipment:            US\$ 0.80 million</li> <li>• Total Cost:                                    US\$ 2.00 million</li> </ul>  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td style="background-color: #cccccc;"> </td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Const.</td> <td></td> <td></td> <td style="background-color: #cccccc;"> </td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>   |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | D&B |  |  |  |  |  |  |  |  |  | Const. |  |  |  |  |  |  |  |  |  |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| D&B   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| Const.  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| D&B: Design and bidding   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team



| <b>RT-2: Malakal Town Secondary Arterial Road Improvement Project</b>   |   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>The road network in Malakal Town forms a grid with major roads and sub-major roads. The local and community road network, which forms blocks of residential plots in the residential area, also forms a grid inside the major road network. The major, sub-major roads and the Inner Ring Road are now being reconstructed by UNS.</p> <p>When Malakal Town is squared with each 1-mile (arterial), 1/2-mile inside (collector) and 1/4-mile inside (distributor) grid lines, most of major roads are located on the each 1-mile line. Local and community roads are inside the collector and distributor roads.</p> <p>Therefore as collector, distributor and local streets are developed, the internal road network in Malakal Town will provide better links between major roads and community roads, and the supply of practical equipment for improved maintenance will become more effective.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>The whole population of Malakal Town and returnees</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>Vehicle operation cost savings and travel time reduction</li> <li>Reduction of damages to vehicles</li> <li>Improvement of accessibility</li> <li>Increase of maintainable road sections</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>To rehabilitate damaged roads in Malakal Town</li> <li>To improve secondary and tertiary road networks</li> <li>To promote social and economic activities</li> <li>To secure access from/to the community</li> </ul>   | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>Although no economic analysis has been undertaken, it is expected that the project is economically viable because a sufficient benefit is expected to accrue from transport costs</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>No financial problems are anticipated</li> </ul> <p>c) Environmental Impact</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>Improvement of the living standard of people in the community and returnees in Malakal</li> <li>Improvement of accessibility to social/public facilities for residents</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>Collector and distributor roads in Malakal Town (Urban)</li> <li>Local and community roads in Malakal Town (Urban)</li> </ul>  | <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> <li>Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>Construction of approximately 12 km of distributor and collector roads and 4 km of local and community roads</li> <li>Supply of medium equipment: grader, concrete mixer and other items</li> </ul>   | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>Necessary funds are available.</li> </ul>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>Project Implementation: MoPI&amp;RD</li> <li>Counterpart: MoPI&amp;RD</li> <li>Operation: MoPI&amp;RD</li> </ul>  | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>Road Maintenance and Management Project</li> <li>Malakal Internal Roads (Arterials and Collectors) Project</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>Detailed Design and Supervision Cost: US\$ 1.00 million</li> <li>Construction: <ul style="list-style-type: none"> <li>Road Works: US\$ 11.00 million</li> <li>Road Facilities: US\$ 1.50 million</li> <li>Total Cost: US\$ 13.5 million</li> </ul> </li> </ul>  |   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Const.</td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> </tbody> </table> <p>D&amp;B: Design and Bidding</p>   |   | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | D&B |  |  |  |  |  |  |  |  |  | Const. |  |  |  |  |  |  |  |  |  |  |
|   | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| D&B   |   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Const.  |   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |

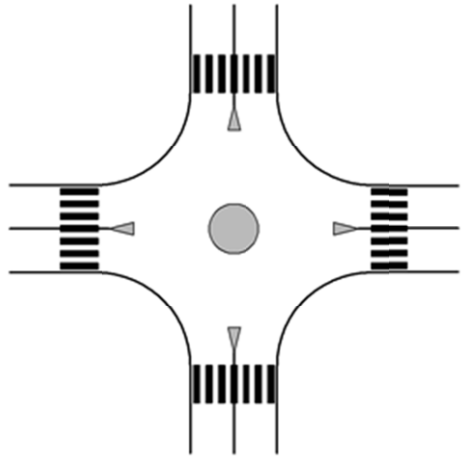
Source: JICA Project Team

| <b>RT-3: Malakal Town Arterial Road Improvement Project</b>   |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <p>The road network in Malakal Town forms a grid with major roads (arterial), sub-major roads (collector) and minor roads (distributor and local). Malakal Town is currently expanding eastwards as the population increases due to the growing number of returnees.</p> <p>The expansion areas consist of squared blocks of residential plots. Roads form a similar grid pattern to the present town. The right-of-way, which squares the resident zone with the gridline (each 1/2-mile), is 20 m or 40 m in width. The right-of-way, which are local and community roads in the squared zone with the gridline (each 1/2-mile) are 10 m, 15 m and 20 m in width. Local and community roads form residential blocks composed of about 10 residential plots.</p> <p>The road network expansion project is being undertaken in line with the expansion of the town. Phase I will be carried out 1 mile inside to east of the present town. It will also include the supply of equipment for road maintenance along with the extension of major roads.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>The whole population of Malakal Town and returnees</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>Construction of new road network in the area of expansion of Malakal Town</li> <li>Improvement of accessibility</li> <li>Vehicle operation cost savings and travel time reduction</li> <li>Increase of maintainable road sections</li> </ul>  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To provide a street network in good condition in the new area of the town</li> </ul>   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>Although no economic analysis has been undertaken, it is expected that the project is economically viable because a sufficient benefit is expected to accrue from transport costs</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>No financial problems are anticipated</li> </ul> <p>c) Environmental Impact</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>Improvement of the living standard of community members and returnees in Malakal</li> <li>Improvement of accessibility to social/public facilities for residents</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>No specific negative impact was found</li> </ul> |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Eastern area (suburb) of present Malakal Town</li> </ul> <p>Collector and Arterial    — — — —</p>  | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> <li>Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Construction of approximately 14 km of collector and arterial roads</li> <li>Supply of large equipment: excavator, compaction roller and other large equipment</li> </ul>  | <ul style="list-style-type: none"> <li>Town expansion remains on schedule.</li> <li>The land for right-of-way is secured.</li> <li>Necessary funds are available.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Project Implementation: MoPI&amp;RD</li> <li>Counterpart: MoPI&amp;RD</li> <li>Operation: MoPI&amp;RD</li> </ul>   | <ul style="list-style-type: none"> <li>All projects concerned with town expansion</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Detailed Design and Supervision Cost:    US\$ 6.00 million</li> <li>Construction: <ul style="list-style-type: none"> <li>Road Works:                                    US\$ 36.00 million</li> <li>Road Facilities:                                US\$ 18.00 million</li> </ul> </li> <li>Total Cost:                                    US\$ 60.00 million</li> </ul>   |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> <tr> <td>Const.</td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #cccccc;"></td> </tr> </tbody> </table> <p>D&amp;B: Design and Bidding</p>                                     |  |      | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | D&B |  |  |  |  |  |  |  |  |  | Const. |  |  |  |  |  |  |  |  |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| D&B   |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |
| Const.  |  |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>RT-4: Road Maintenance and Management Project</b>  |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|-------------|--|--|--|--|--|--|--|--|--|-------------|--|--|--|--|--|--|--|--|--|-----------|--|--|--|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <p>Most road pavements in the town have been destroyed, and many roads become impassable during the rainy season. The present level of road maintenance is very low, except for cleaning ditches and excavation of ditches for urgent discharge of storm water. The road section of the MoPI&amp;RD has little maintenance equipment.</p> <p>Even though it has some equipment for maintenance, the present system of road maintenance seems to be poor. It is necessary not only to keep sufficient equipment, but to also build appropriate capacity in terms of systems and human resources for the operation and maintenance of roads. This will be especially important after the completion of the present major roads project in Malakal Town.</p> <p>This matter was also taken up on 10 September 2011. The above issue is expected to be resolved by gradual supply of equipment as well as establishment of a highway maintenance management system and development of human resources to engage in operations and maintenance of the equipment.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Counterparts: MoPI&amp;RD</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Improvement of road maintenance systems and technology</li> <li>• Improvement of organisation and capacity</li> <li>• Improvement of the environment</li> </ul>  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Objectives of the Project   | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To reinforce maintenance skills</li> <li>• To supply appropriate equipment and reinforce skills for the operation and maintenance of equipment</li> <li>• To train staff on computerised operations</li> <li>• To construct a staff training system</li> </ul>   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the project is economically viable because it is expected that traffic conditions and the road environment will improve and the cost for road maintenance will be reduced</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Allocation of budget is necessary</li> </ul> <p>c) Environmental Impact:</p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Improvement of traffic conditions</li> <li>- Negative Impacts</li> <li>• No specific negative impact was found</li> </ul> |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• All roads in UNS</li> <li>• Especially roads under construction and planned roads in Malakal Town</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Scope of the Project  | Preconditions  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Technical transfer of skills related to inventory surveys, records and management analysis for roads maintenance</li> <li>• Technical transfer of skills related to operation and maintenance of equipment</li> <li>• Continuous on-the-job staff training</li> </ul>  | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Agencies Responsible  | O&M Organisation   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: Department of Roads and Bridges, Department of Survey, MoPI&amp;RD</li> <li>• Counterpart: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> </ul>  | <pre> graph TD     Manager[Manager] --&gt; DeputyManager[Deputy Manager]     DeputyManager --&gt; MechanicalEngineer[Mechanical Engineer]     DeputyManager --&gt; AccountingClerk[Accounting Clerk]     MechanicalEngineer --&gt; Operator[Operator]     MechanicalEngineer --&gt; Mechanic[Mechanic]     MechanicalEngineer --&gt; WarehouseKeeper[Warehouse Keeper]     </pre>  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Estimated Cost  |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation Cost: US\$ 2.00 million</li> <li>• Total Cost: US\$ 2.00 million</li> </ul>   |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
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| Implementation Schedule   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Engineering   |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Enforcement   |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Education   |  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |             |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| RT-8: Intersection and Traffic Facility Improvement Project  |      |      |      |      |   |      |      |      |      |  |
|--|------|------|------|------|---|------|------|------|------|--|
| Background of the Project  |      |      |      |      | Effects of the Project  |      |      |      |      |  |
| <p>Enforcement of road transport safety regulations is the responsibility of the Road Transport Safety Department of the MoPI&amp;RD, however, there has not been a specific staff member assigned to this area. The traffic police are in charge of road traffic control, but the necessary equipment is insufficient. Traffic safety facilities (traffic light signals, roundabouts, traffic signs, lane markings, guard rails, sidewalks, crosswalks, median strips, etc.) are few or absent in Malakal Town.</p> <p>As traffic volume increases, road traffic control will be a solution for reducing traffic accidents and congestion. Road traffic control and traffic safety facilities should be introduced in Malakal Town.</p> |      |      |      |      | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Counterpart: MoPI&amp;RD</li> <li>• Traffic police</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Enhancement of traffic safety</li> </ul>   |      |      |      |      |  |
| Objectives of the Project  |      |      |      |      | Evaluation of the Project   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• To install traffic facilities</li> <li>• To enhance traffic safety</li> </ul>   |      |      |      |      | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the project is economically viable because it is expected that traffic accidents will decrease</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact:</p> <ul style="list-style-type: none"> <li>- Positive impacts                             <ul style="list-style-type: none"> <li>• Decrease in traffic accidents</li> </ul> </li> <li>- Negative impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |  |
| Location of the Project  |      |      |      |      |   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• The whole of Malakal Town and UNS</li> </ul>  |      |      |      |      |   |      |      |      |      |  |
| Scope of the Project   |      |      |      |      | External Conditions   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Construction of roundabout/s</li> <li>• Construction of sidewalk/s</li> <li>• Construction of crosswalk/s</li> <li>• Installation of traffic sign/s</li> </ul>  |      |      |      |      | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>  |      |      |      |      |  |
| Agencies Responsible   |      |      |      |      | Preconditions   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Counterpart: MoPI&amp;RD and Traffic Police</li> <li>• Operation: MoPI&amp;RD and Traffic Police</li> </ul>  |      |      |      |      | <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |  |
| Relationship with Other Projects   |      |      |      |      |   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Road Maintenance Management Project</li> <li>• Malakal Town Secondary Arterial Road (Local Streets and Distributors) Improvement Project</li> <li>• Malakal Town Arterial Road (Collectors and Arterials) Improvement Project</li> </ul>  |      |      |      |      |   |      |      |      |      |  |
| Estimated Cost   |      |      |      |      |   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Construction:                             <ul style="list-style-type: none"> <li>Intersections: US\$ 1.00 million</li> <li>Others: US\$ 1.00 million</li> </ul> </li> <li>• Total Cost: US\$ 2.00 million</li> </ul>  |      |      |      |      |   |      |      |      |      |  |
| Implementation Schedule  |      |      |      |      |   |      |      |      |      |  |
|  | 2012 | 2013 | 2014 | 2015 | 2016  | 2017 | 2018 | 2019 | 2020 |  |
| D&B  |      |      |      |      |   | ■    |      |      |      |  |
| Intersection   |      |      |      |      |   | ■    | ■    |      |      |  |
| Others   |      |      |      |      |   | ■    | ■    |      |      |  |

Source: JICA Project Team

### (3) Public Transportation and Traffic Safety Programme

| RT-5: Public Transport Management Project   |      |      |      |      |  |      |      |      |      |  |
|---|------|------|------|------|--|------|------|------|------|--|
| Background of the Project   |      |      |      |      | Effects of the Project   |      |      |      |      |  |
| <p>Taxis and buses are the modes of public transport operated in Malakal Town. The traffic police manage the number plates of public transport vehicles. Conversely, other public transport management issues such as resolving bus fares and routes are managed by the Public Land and Air Transport Trade Union Cooperation.</p> <p>Bus routes do not cover a wide area in Malakal Town. According to interviews with citizens, some people are not able to use public transport due to the expense of fares.</p> <p>Administrative organs do not manage public transport in Malakal Town. Public transport operators collect fares from passengers, so profitability is important to the management of public transport. It is also necessary to provide public transport services that can be used fairly and easily. To this end, a department should be established that is in charge of public transport management.</p> |      |      |      |      | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Counterpart: MoPI&amp;RD</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul> <p>b) Effects:</p> <ul style="list-style-type: none"> <li>• Improvement of public transport services</li> </ul>  |      |      |      |      |  |
| Objectives of the Project   |      |      |      |      | Evaluation of the Project  |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• To improve public transport services</li> <li>• To improve public transport management (bus routes, public transport fares, governmental subsidisation)</li> </ul>   |      |      |      |      | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been done, it is expected that the project is economically viable because it is expected that more people will be able to use public transport. Time costs will be reduced.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• If public transport services are unsatisfactory, many people use private cars instead. Private car use leads to increases in traffic volume. This project therefore leads to improvement of traffic conditions.</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>• No specific negative impact was found</li> </ul> |      |      |      |      |  |
| Location of the Project   |      |      |      |      | External Conditions  |      |      |      |      |  |
| Scope of the Project  |      |      |      |      | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>   |      |      |      |      |  |
| Technical transfer for:   |      |      |      |      | Preconditions  |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Establishment of a public transport management department</li> <li>• Implementation of management techniques for public transport services</li> <li>• Planning of bus routes that meet passenger needs and reasonable bus fares</li> </ul>   |      |      |      |      | Relationship with Other Projects   |      |      |      |      |  |
| Agencies Responsible  |      |      |      |      | <ul style="list-style-type: none"> <li>• Bus Terminal and Taxi Bay Construction Project</li> </ul>   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Counterpart: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> </ul>   |      |      |      |      | Existing Organisation Structure  |      |      |      |      |  |
| Estimated Cost  |      |      |      |      | <pre> graph TD     D[Director of Roads and Transport] --&gt; DA[Department of Civil Aviation]     D --&gt; DR[Department of River Transport]     D --&gt; DRS[Department of Road Transport Safety]     D --&gt; DRB[Department of Road and Bridge]     DRS --&gt; ROS[Road Overseer Section]     DRS --&gt; BSS[Blacksmith Section]     DRS --&gt; P[Painting Section]     DRS --&gt; CS[Carpenter Section]     DRS --&gt; MS[Mechanical Section]     DRS --&gt; RES[Road Engineer Section]             </pre>   |      |      |      |      |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: US\$ 2.00 million</li> <li>• Total Cost: US\$ 2.00 million</li> </ul>  |      |      |      |      |  |      |      |      |      |  |
| Implementation Schedule   |      |      |      |      |  |      |      |      |      |  |
|   | 2012 | 2013 | 2014 | 2015 | 2016   | 2017 | 2018 | 2019 | 2020 |  |
| Establishment of department   |      |      |      |      |  |      |      |      |      |  |
| Engineer  |      |      |      |      |  |      |      |      |      |  |
| Education   |      |      |      |      |  |      |      |      |      |  |


Source: JICA Project Team

| <b>RT-6: Bus Terminal and Taxi Bay Construction Project</b>  |   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|-----|--|--|--|---|--|--|--|--|--|----------|--|--|--|---|---|---|--|--|--|--------------------|--|--|--|---|---|---|--|--|--|--|
| <b>Background of the Project</b><br>There are five transport terminals in Malakal Town. Public transportation services are frequently suspended in the rainy season due to bad road and transport terminal conditions. A transport terminal that provides a connection point for each traffic mode will enhance public transport services.<br><br>Buses use the transport terminal for both departures and arrivals. Buses use road shoulders as bus bays. Bus bays are an effective way for buses to collect passengers and to prevent traffic congestion. Furthermore, they lead to an increase in passenger numbers.  | <b>Effects of the Project</b><br>a) Target Beneficiaries <ul style="list-style-type: none"> <li>• Counterpart: MoPI&amp;RD</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul> b) Effects <ul style="list-style-type: none"> <li>• Improvement of public transport services</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Objectives of the Project</b> <ul style="list-style-type: none"> <li>• To improve public transport services</li> </ul>  | <b>Evaluation of the Project</b><br>a) Economic Viability <ul style="list-style-type: none"> <li>• Although no economic analysis has been done, it is expected that the project is economically viable because it is expected that more people will be able to use public transport. Time costs will be reduced.</li> </ul> b) Financial Soundness <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> c) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• If public transport services re unsatisfactory, many people use private cars instead. Private car use leads to increases traffic volume. This project therefore leads to improvement of traffic conditions.</li> <li>• If public transport services are unsatisfactory, many people use private cars instead. Private car use leads to increases in traffic volume. This project therefore leads to improvement of traffic conditions.</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact was found</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Location of the Project</b> <ul style="list-style-type: none"> <li>• The whole of Malakal Town and UNS</li> </ul>   | b) Financial Soundness <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> c) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• If public transport services re unsatisfactory, many people use private cars instead. Private car use leads to increases traffic volume. This project therefore leads to improvement of traffic conditions.</li> <li>• If public transport services are unsatisfactory, many people use private cars instead. Private car use leads to increases in traffic volume. This project therefore leads to improvement of traffic conditions.</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact was found</li> </ul> </li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Scope of the Project</b> <ul style="list-style-type: none"> <li>• Construction of a traffic terminal</li> <li>• Construction of bus and taxi bays</li> </ul>  | <b>External Conditions</b> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Agencies Responsible</b> <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Counterpart: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> </ul>  | <b>Preconditions</b> <ul style="list-style-type: none"> <li>• Sustainable bus services are expanded.</li> <li>• Necessary funds are available.</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Estimated Cost</b> <ul style="list-style-type: none"> <li>• Construction:                             <ul style="list-style-type: none"> <li>Bus Stops: US\$ 1.00 million</li> <li>Bus Terminal: US\$ 1.00 million</li> </ul> </li> <li>• Total Cost: US\$ 2.20 million</li> </ul>  | <b>Relationship with Other Projects</b> <ul style="list-style-type: none"> <li>• Road Maintenance Management Project</li> <li>• Malakal Town Secondary Arterial Road (Local Streets and Distributors) Improvement Project</li> <li>• Malakal Town Arterial Road (Collectors and Arterials) Network Improvement Project</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| <b>Implementation Schedule</b> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td></td> <td>■</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Terminal</td> <td></td> <td></td> <td></td> <td>■</td> <td>■</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Taxi bay/bus stops</td> <td></td> <td></td> <td></td> <td>■</td> <td>■</td> <td>■</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | D&B |  |  |  | ■ |  |  |  |  |  | Terminal |  |  |  | ■ | ■ | ■ |  |  |  | Taxi bay/bus stops |  |  |  | ■ | ■ | ■ |  |  |  |  |
|  | 2013  | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| D&B  |   |      |      | ■    |      |      |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| Terminal   |   |      |      | ■    | ■    | ■    |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |
| Taxi bay/bus stops   |   |      |      | ■    | ■    | ■    |      |      |      |      |     |  |  |  |   |  |  |  |  |  |          |  |  |  |   |   |   |  |  |  |                    |  |  |  |   |   |   |  |  |  |  |

Source: JICA Project Team

| <b>RT-7: Traffic Management Project</b>  |   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|-----------------------------|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|-----------|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Enforcement of road transport safety regulations is the responsibility of the Road Transport Safety Department of the MoPI&RD, but there has not been a specific staff member assigned to this area. The traffic police are in charge of road traffic control, but the necessary equipment is insufficient. Traffic safety facilities (traffic light signals, roundabouts, traffic signs, lane markings, guard rails, sidewalks, crosswalks, median strips, etc.) are few or absent in Malakal Town.   | a) Target Beneficiaries <ul style="list-style-type: none"> <li>• Counterpart: MoPI&amp;RD Traffic Police</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul>   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| As traffic volume increases, road traffic control will be a solution for reducing traffic accidents and congestion. Road traffic control should be introduced in Malakal Town.   | b) Effects <ul style="list-style-type: none"> <li>• Enhancement of traffic safety</li> </ul>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To improve traffic management</li> <li>• To enhance traffic safety</li> </ul>   | a) Economic Viability <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the project is economically viable because it is expected that traffic accidents will decrease.</li> </ul>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>   | b) Financial Soundness <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul>   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
|  | c) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impacts               <ul style="list-style-type: none"> <li>• Decrease in traffic accidents</li> </ul> </li> <li>- Negative Impacts               <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>  | <b>External Conditions</b>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Technical transfer for: <ul style="list-style-type: none"> <li>• Acquisition of road traffic safety measure techniques</li> <li>• Preparation of traffic facility construction and traffic control manuals</li> <li>• Implementation of traffic safety measures by responsible organisation for traffic safety</li> <li>• Implementation of proper traffic control and enforcement</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>  | <b>Preconditions</b>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD and Traffic Police</li> <li>• Counterpart: MoPI&amp;RD and Traffic Police</li> <li>• Operation: MoPI&amp;RD and Traffic Police</li> </ul>   |   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>  | <b>Relationship with Other Projects</b>   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: <span style="float: right;">US\$ 3.00 million</span></li> <li>• Total Cost: <span style="float: right;">US\$ 3.00 million</span></li> </ul>   | <ul style="list-style-type: none"> <li>• Road Maintenance Management Project</li> <li>• Malakal Town Secondary Arterial Road (Local Streets and Distributors) Improvement Project</li> <li>• Malakal Town Arterial Road (Collectors and Arterials) Improvement Project</li> </ul>   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>   | <b>Existing Organisation Structure</b>  |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
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|  | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Establishment of department  |   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Engineer   |   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |
| Education  |   |      |      |      |      |      |      |      |      |      |                             |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>RT-9: Malakal Town Traffic Safety Management Project</b>   |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
|---|------|------|------|------|---|--|--|--|--|--|------|------|------|------|------|
| <b>Background of the Project</b>  |      |      |      |      | <b>Effects of the Project</b>   |  |  |  |  |  |      |      |      |      |      |
| <p>Enforcement of road transport safety regulations is the responsibility of the Road Transport Safety Department of the MoPI&amp;RD, but there has not been a specific staff member assigned to this area. The traffic police are in charge of road traffic control, but the necessary equipment is insufficient. Traffic safety facilities (traffic light signals, roundabouts, traffic signs, lane markings, guard rails, sidewalks, crosswalks, median strips, etc.) are few or absent in Malakal Town.</p> <p>As traffic volume increases, road traffic control will be a solution for reducing traffic accidents and congestion. Traffic safety education is also an effective measure for traffic safety. It is necessary to implement a wide range of campaigns, for example, teaching in schools and campaigns for the general public and drivers.</p> |      |      |      |      | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Counterpart: MoPI&amp;RD Traffic Police</li> <li>• The whole population of Malakal Town as well as other towns in UNS</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Enhancement of traffic safety</li> </ul>  |  |  |  |  |  |      |      |      |      |      |
| <b>Objectives of the Project</b>  |      |      |      |      | <b>Evaluation of the Project</b>  |  |  |  |  |  |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• To improve traffic safety education</li> <li>• To enhance traffic safety</li> </ul>  |      |      |      |      | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the project is economically viable because it is expected that traffic accidents will decrease.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Decrease in traffic accidents</li> <li>- Negative Impacts</li> <li>• No specific negative impact is anticipated</li> </ul> |  |  |  |  |  |      |      |      |      |      |
| <b>Location of the Project</b>  |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
| <b>Scope of the Project</b>   |      |      |      |      | <b>External Conditions</b>  |  |  |  |  |  |      |      |      |      |      |
| <p>Technical transfer for:</p> <ul style="list-style-type: none"> <li>• Preparation of road traffic safety education manual</li> <li>• Delivery of traffic safety education for students, drivers, and traffic offenders</li> <li>• Implementation of traffic safety campaign</li> </ul>  |      |      |      |      | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>  |  |  |  |  |  |      |      |      |      |      |
| <b>Agencies Responsible</b>   |      |      |      |      | <b>Preconditions</b>  |  |  |  |  |  |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD and Traffic Police</li> <li>• Counterpart: MoPI&amp;RD and Traffic Police</li> <li>• Operation: MoPI&amp;RD and Traffic Police</li> </ul>  |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
| <b>Estimated Cost</b>   |      |      |      |      | <b>Relationship with Other Projects</b>   |  |  |  |  |  |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Project Implementation: <span style="float: right;">US\$ 2.00 million</span></li> <li>• Total Cost: <span style="float: right;">US\$ 2.00 million</span></li> </ul>  |      |      |      |      | <ul style="list-style-type: none"> <li>• Road Maintenance Management Project</li> <li>• Malakal Town Secondary Arterial Road (Local Streets and Distributors) Improvement Project</li> <li>• Malakal Town Arterial Road (Collectors and Arterials) Improvement Project</li> </ul>   |  |  |  |  |  |      |      |      |      |      |
| <b>Implementation Schedule</b>  |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
|   | 2014 | 2015 | 2016 | 2017 |   |  |  |  |  |  | 2018 | 2019 | 2020 | 2021 | 2022 |
| Engineering   |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
| Enforcement   |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |
| Education   |      |      |      |      |   |  |  |  |  |  |      |      |      |      |      |

Source: JICA Project Team



#### (4) Sanitation Improvement Programme

| SS-1: Community Sanitary System and Public Toilet Installation Project   |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|------|------|------|----------------|--|--|--|--|--|--|--|--|--|--|--|
| Background of the Project  | Effects of the Project  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| 70-90% of people in Malakal Town defecate openly. As a result, cholera, typhoid, shigella, infectious hepatitis, etc., are widespread because excrements containing pathogens are not treated appropriately. | a) Target Beneficiaries<br>• About 224,475 inhabitants of Malakal Town  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| In addition, there are no appropriate sludge treatment facilities, so sludge and excrements are not treated appropriately.   | b) Effects<br>• Reduction of water-borne diseases<br>• Improvement of the quality of life<br>• Promotion of work activities   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Although some public and school toilets are funded by NGOs, the number of toilets is insufficient and most toilets are not appropriately operated and managed.   | Evaluation of the Project   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | a) Economic Viability<br>• Although no economic analysis has been undertaken, it is expected that sanitary conditions for citizens and public health will be improved.  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | b) Financial Soundness<br>• Budget allocation is necessary  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | c) Environmental Impact: <b>Category C</b><br>- Positive Impacts<br>• Improvement of hygiene services and living standards<br>- Negative Impacts<br>• No specific negative impact is anticipated  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | External Conditions   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | • Responsible agency in Malakal Town is not yet established.  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Objectives of the Project  | Preconditions   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| • To raise the living standards of residents<br>• To improve the environmental hygiene of residents  | • O&M costs and water charges for public toilets are subsidised by Malakal Town. User charges are set in line with user capacity to pay.  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Location of the Project  | Relationship with Other Projects  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| • Malakal Town   | • A project for installation of public toilets in main market in Malakal Town was conducted in 2009.  |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Scope of the Project   | Remarks   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| • Construction of 231 public toilets with septic tanks<br>• Provision of 18 vacuum trucks  | Public toilet (pour flush type) + septic tank   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Agencies Responsible   |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| • Project Implementation:<br>• Operation:<br>• Maintenance:<br>Responsible agency in Malakal Town is to be established at a later date.  |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Estimated Cost   |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| • Implementation/Construction Cost (including design, construction supervision cost): US\$ 9.60 million<br>• Contingency: US\$ 1.70 million<br>• Total Cost: US\$ 11.40 million                              |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Implementation Schedule  |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
|  | <table border="1"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Implementation</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |      | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Implementation |  |  |  |  |  |  |  |  |  |  |  |
|  | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |      |                |  |  |  |  |  |  |  |  |  |  |  |
| Implementation   |   |      |      |      |      |      |      |      |      |      |      |      |      |                |  |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>SS-2: Construction of Sludge Treatment Facilities Project</b>  |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|------|------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>70-90% of people in Malakal Town defecate openly. As a result, cholera, typhoid, shigella, infectious hepatitis, etc., are widespread because excrements containing pathogens are not treated appropriately.</p> <p>In addition, there are no appropriate sludge treatment facilities, so sludge and excrements are not treated appropriately.</p> <p>Although some public and school toilets are funded by NGOs, the number of toilets is insufficient and most toilets are not appropriately operated and managed.</p>   | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>About 224,475 inhabitants of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Reduction of water-borne diseases</li> <li>Improvement of the quality of life</li> <li>Promotion of work activities</li> </ul> <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>Although no economic analysis has been undertaken, it is expected that the sanitary conditions for citizens and public health will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>Budget allocation is necessary</li> </ul> <p>c) Environmental Impact: <b>Category A</b><br/>(Exact location is not decided)</p> <ul style="list-style-type: none"> <li>- Positive Impacts <ul style="list-style-type: none"> <li>Improvement of hygiene services and living standards</li> </ul> </li> <li>- Negative Impacts <ul style="list-style-type: none"> <li>Possible resettlement of commune located within project area</li> </ul> </li> </ul> <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>Responsible agency in Malakal Town is not yet established.</li> </ul> |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>To raise the living standard of residents</li> <li>To improve the environmental hygiene of residents</li> </ul>  | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>O&amp;M costs of the treatment plants are covered by beneficiaries.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>Malakal Town</li> </ul>  | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>A feasibility study (F/S) for construction of sludge treatment facilities near Malakal Town is currently being conducted by the Ministry of Water Resources and Irrigation.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>Construction of sludge treatment facilities with capacity of 150 m<sup>3</sup>/day.</li> </ul>  | <p><b>Remarks</b></p> <p><b>General Layout and Flow for Sludge Treatment Facilities</b></p> <p>BOD 20,000mg/L      Capacity: 150m<sup>3</sup>/day</p> <p>Night Soil<br/>Sludge from septic tank</p> <p style="text-align: center;">Schematic Diagram of Sludge Treatment Process (Oxidation Pond)</p>  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>Project Implementation:</li> <li>Operation:</li> <li>Maintenance:</li> </ul> <p>Responsible agency in Malakal Town to be established at a later date.</p>   |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>Implementation/Construction Cost (including design, construction supervision cost): US\$ 3.40 million</li> <li>Temporary Works and Contingency:</li> <li>Total Cost: US\$ 3.40 million</li> </ul>   |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table> |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Construction |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction  |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

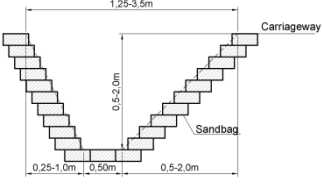
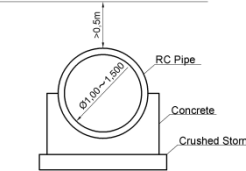
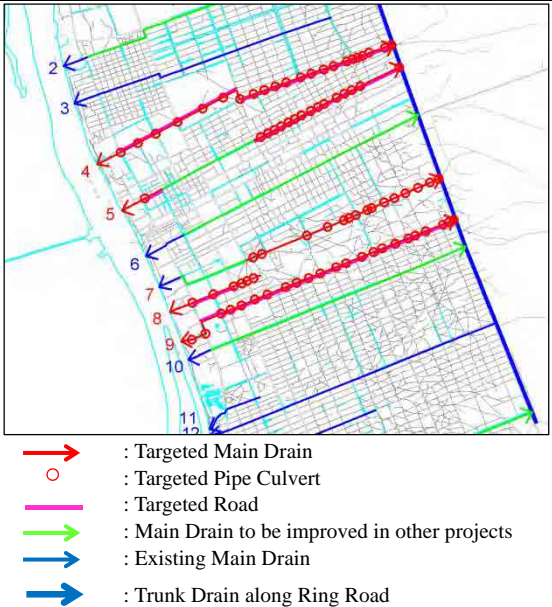
| <b>SS-4: Project for Improving the Sanitary Environment in Malakal Town</b>   |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <p>The population of Malakal Town has been increasing since the CPA. People are not accustomed with using toilets properly and hygiene conditions are worsening along with increasing population density. As a result, high rates of water-borne diseases are being reported.</p> <p>WASH Programme has been conducting activities nationwide, and water and sanitation facilities have been gradually built. Toilet behaviour among people has not changed enough, however. In order to change behaviour, awareness raising activities should be delivered continuously to the people.</p> <p>This project will train local people as “change agents” (CA) and establish a system for the trained people to disseminate sanitation and health knowledge to others.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• UNS MoH, PHCU, PHCC, community members</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Change to people’s toilet behaviour</li> <li>• Increase in people’s knowledge about hygiene and health</li> <li>• Improvement of people’s living standards</li> </ul> |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To change people’s toilet behaviour</li> <li>• To establish a system of sanitation and health knowledge dissemination via trained change agents</li> </ul>   | <p>a) Economic Viability: N/A</p> <p>b) Financial Soundness: N/A (Technical Cooperation)</p> <p>c) Environmental Impacts</p> <ul style="list-style-type: none"> <li>- Positive Impacts: None</li> <li>- Negative Impacts: None</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  | <b>External Conditions</b>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town and one other location in UNS</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>Preconditions</b>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Strengthening of the capacity of public health workers (PHW) in health centres</li> <li>• Training of candidates as “change agents” (by the PHW)</li> <li>• Conducting community health meetings (by CA)</li> <li>• Provision of provisional health care in health centres: vaccination, dosing, consultation, etc.</li> </ul>   | <ul style="list-style-type: none"> <li>• Staff are allocated in the PHCC, PHCU</li> <li>• Toilet construction activities in accordance with the Master Plan are conducted</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Capacity Development</b>   | <b>Relationship with Other Projects</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| Please refer to Scope of the Project  | <ul style="list-style-type: none"> <li>• WASH, any toilet construction projects</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Rema</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| Project Implementation: MoH, UNS  | <pre> graph TD     A[Project Implementation Unit] --- B[MOH]     A --&gt; C[Trainers' Training]     B --&gt; C     C --&gt; D[Selected PHW in PHCC and PHCU]     D --&gt; E[Trained PHWs (trainers) provide trainings for their colleagues]     E --&gt; F[Change Agents in Communities]             </pre>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Expertise: Input of 60 man-months assumed (public health, training plans, community development, data analysis)</li> <li>• Training: OECD countries, neighbouring countries, Juba</li> </ul>   |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
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|   | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| Project   |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |
| Training  |   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

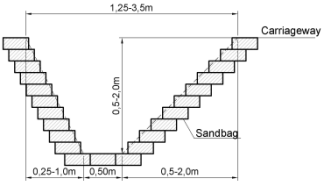
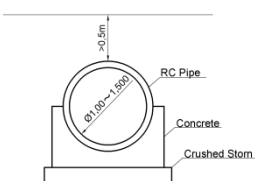

| <b>SS-5: Public Toilet Operation and Management Project</b>  |  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <p>While public toilets can improve sanitary conditions for the beneficiaries, there are often problems with maintenance and operations.</p> <p>The Comprehensive Plan includes the construction of public toilets not only in market areas but also residential areas. Malakal City Council is not responsible for cleaning private (residential) areas, so the daily maintenance of public toilets should be done by beneficiaries/communities.</p> <p>This project is expected to raise people’s awareness about the importance of hygiene, and establish a participatory operational and maintenance system for the toilets.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Toilet Users</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Increase in hygiene conditions for the beneficiaries</li> <li>Decrease in the incidence of water-borne diseases</li> <li>Improvement of people’s living standards</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To raise people’s awareness about the importance of hygiene</li> <li>To establish a self-operational and maintenance system in each community</li> </ul>  | <p>a) Economic Viability: N/A</p> <p>b) Financial Soundness: N/A (outsourcing to NGO)</p> <p>c) Environmental Impacts: None</p>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Malakal Town</li> </ul>   | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>  | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Education of people about the importance of hygiene</li> <li>Establishment of a maintenance committee (group) in each community</li> <li>Establishment of use and maintenance rules (including tariffs) in the committee</li> <li>Management of committee accounts (income and expenses)</li> </ul>   | <ul style="list-style-type: none"> <li>Toilet construction project in accordance with the Master Plan is conducted.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Capacity Development</b>  | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| Please refer to the scope of the project   | <ul style="list-style-type: none"> <li>Toilet construction projects, WASH</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>  | <b>Remarks</b>   |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| Project Implementation: NGO  | <pre> graph TD     subgraph Management_Committee [Management Committee]         Accountant         M_E[M&amp;E]         Secretary     end     subgraph Toilet_Users [Toilet Users<br/>Residents of the Community]         TU[Toilet Users<br/>Residents of the Community]     end     subgraph Maintenance_Activities [Maintenance Activities]         MA[Maintenance Activities]     end     TU -- Selection --&gt; M_E     M_E -- Report --&gt; TU     Management_Committee -- Planning and M&amp;E --&gt; MA     TU -- Participation --&gt; MA     </pre> |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>  |  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Expertise: Input of 60 man-months assumed (site managers, hygiene education officers, social workers)</li> <li>Total Cost: SSP 4 million (out-sourcing to NGO)</li> </ul>   |  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>   |  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table>  |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Project |  |  |  |  |  |  |  |  |  |  |  |
|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |         |  |  |  |  |  |  |  |  |  |  |  |
| Project  |  |      |      |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

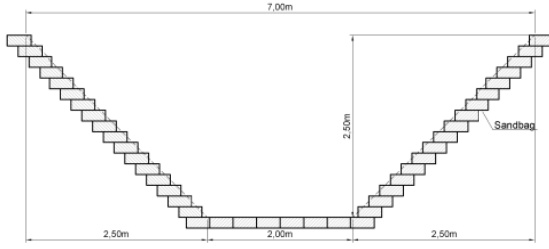
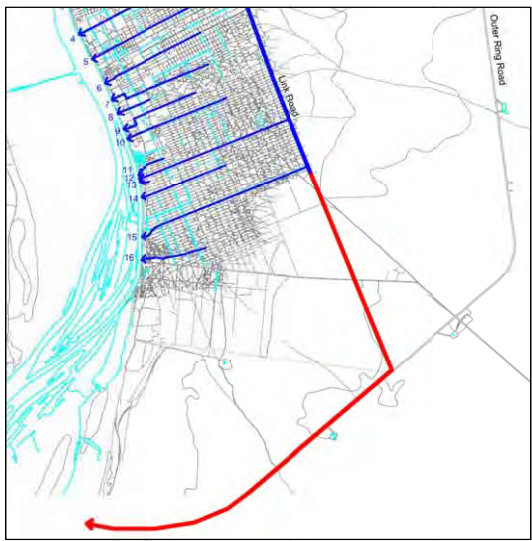
### (5) Drainage Improvement Programme

| <b>WD-1: Reconstruction of Main Drains in Central Malakal Project</b>  |   |      |      |      |      |                               |  |  |  |  |  |
|--|---|------|------|------|------|-------------------------------|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>The storm water drainage facilities in Malakal Town are sorted into the categories of main drains and minor drains. Storm water is first collected in minor drains laid on a grid, then consolidated into main drains. There are 16 main drains in the town located east to west leading to the Nile River. However, all of them were simply dug by hand tools without any lining. Therefore, collected water in main drains is stagnant, such as in sag sections and intersections where crossing culverts are missing. The main drains in Central Malakal are especially poor because they were constructed early on.</p> <p>In order to improve the storm water drainage situation in Central Malakal and develop economic activity, it is necessary to reconstruct the main drains, which constitute the basis of the drainage network.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>About 200,000 inhabitants of the existing Malakal Town located on the west side of the Link Road</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Promotion of economic activity</li> <li>Improvement of the quality of life</li> <li>Improvement of maintenance of facilities</li> </ul>  |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>To enhance drainage capacity and mitigate flood damage</li> <li>To eliminate stagnant areas</li> </ul>  | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>Budget allocation is necessary</li> </ul> <p>c) Environmental Impact: <b>Category C</b></p> <ul style="list-style-type: none"> <li>Positive Impacts                             <ul style="list-style-type: none"> <li>Improvement of hygiene services and living standards</li> </ul> </li> <li>Negative Impacts                             <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>Central Malakal</li> </ul>  |   |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>Reconstruction of 11.6 km of existing main drains with proper vertical slope toward the Nile River for the west end and toward the Trunk Drain for the east end</li> <li>Lining of open channels with sandbags</li> <li>Installation of RC pipe culverts in the intersections with crossing roads</li> </ul>   | <p><b>External Conditions</b></p> <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>Necessary funds are available.</li> </ul>  |      |      |      |      |                               |  |  |  |  |  |
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Open Channel</p> </div> <div style="text-align: center;">  <p>Pipe Culvert</p> </div> </div>   | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>Road projects implemented by Sinohydro and Kano under MPI&amp;RD are ongoing including improvement of side ditches. Coordination will be required as some main drains proposed in this project will be connected with them.</li> </ul>  |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>Project Implementation: MoPI&amp;RD</li> <li>Operation: MoPI&amp;RD</li> <li>Maintenance: MoPI&amp;RD</li> </ul>   | <p><b>Location Map</b></p>    |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>Total Cost: US\$ 4.20 million</li> </ul>   |   |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> </tr> </thead> <tbody> <tr> <td>Reconstruction of Main Drains</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table>   |   | 2012 | 2013 | 2014 | 2015 | Reconstruction of Main Drains |  |  |  |  |  |
|  | 2012  | 2013 | 2014 | 2015 |      |                               |  |  |  |  |  |
| Reconstruction of Main Drains  |   |      |      |      |      |                               |  |  |  |  |  |

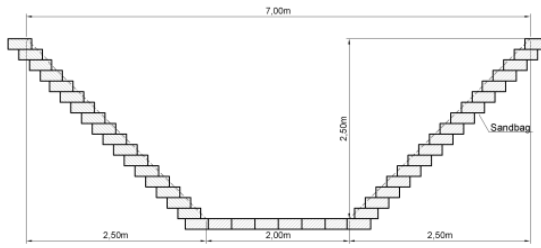
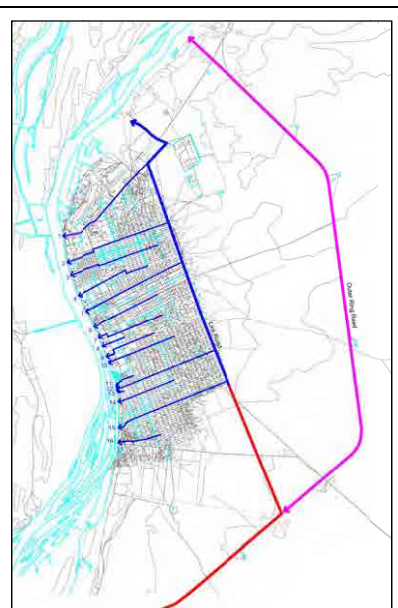
Source: JICA Project Team

| <b>WD-2: Reconstruction of Main Drains Project</b>  |  |      |      |      |      |                               |  |  |  |  |  |
|---|--|------|------|------|------|-------------------------------|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>The storm water drainage facilities in Malakal Town are sorted into the categories of main drains and minor drains. Storm water is first collected in minor drains laid on a grid, then consolidated into main drains. There are 16 main drains in the town located east to west leading to the Nile River.</p> <p>However, all of them were simply dug by hand tools without any lining. Therefore, collected water in main drains is stagnant, such as in sag sections and intersections where crossing culverts are missing. The main drains in Central Malakal are especially poor because they were constructed early on.</p> <p>In order to improve the storm water drainage situation in Central Malakal and develop economic activity, it is necessary to reconstruct the main drains, which constitute the basis of the drainage network.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• About 200,000 inhabitants of existing Malakal Town located on the west side of the Link Road</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Promotion of economic activity</li> <li>• Improvement of the quality of life</li> <li>• Improvement of maintenance of facilities</li> </ul>   |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>• To enhance drainage capacity and mitigate flood damage</li> <li>• To eliminate stagnant areas</li> </ul>   | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact: <b>Category C</b></p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• Improvement of hygiene services and living standards</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>  | <p><b>External Conditions</b></p>  |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>• Reconstruction of the existing main drains (11.8 km) with proper vertical slope toward the Nile River for the west end and toward the Trunk Drain for the east end</li> <li>• Lining of open channels with sandbags</li> <li>• Installation of RC pipe culverts in the intersections with crossing roads</li> </ul>   | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>   |      |      |      |      |                               |  |  |  |  |  |
| <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Open Channel</p> </div> <div style="text-align: center;">  <p>Pipe Culvert</p> </div> </div>   | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>• Road projects implemented by Sinohydro and Kano under the MoPI&amp;RD are ongoing including improvement of side ditches. Coordination will be required as some main drains proposed in this project will be connected with them.</li> </ul>  |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> <li>• Maintenance: MoPI&amp;RD</li> </ul>  | <p><b>Location Map</b></p>   |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>• Total Cost: US\$ 3.50 million</li> </ul>  |  |      |      |      |      |                               |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Reconstruction of Main Drains</td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table>  |  | 2014 | 2015 | 2016 | 2017 | Reconstruction of Main Drains |  |  |  |  |  |
|   | 2014   | 2015 | 2016 | 2017 |      |                               |  |  |  |  |  |
| Reconstruction of Main Drains   |  |      |      |      |      |                               |  |  |  |  |  |

Source: JICA Project Team

| <b>WD-3: Construction of Trunk Drain 1 Project</b>  |  |      |      |      |      |              |  |  |  |  |  |
|---|--|------|------|------|------|--------------|--|--|--|--|--|
| <b>Background of the Project</b><br>In order to improve the drainage situation in town, a trunk drain was constructed a few years ago along the Ring Road as an outlet for the main drains. However, the construction work was terminated without fully continuing southwards to the Nile River. This trunk drain is sloped toward both north and south. Therefore, water between the crest of the invert and the existing south end is stagnant. | <b>Effects of the Project</b><br>a) Target Beneficiaries <ul style="list-style-type: none"> <li>• About 242,000 inhabitants of Malakal Town including the new development area</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Promotion of economic activity</li> <li>• Improvement of the quality of life</li> </ul>   |      |      |      |      |              |  |  |  |  |  |
| <b>Objectives of the Project</b> <ul style="list-style-type: none"> <li>• To enhance drainage capacity and mitigate flood damage</li> <li>• To eliminate stagnant water</li> </ul>  | <b>Evaluation of the Project</b><br>a) Economic Viability <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> b) Financial Soundness <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> c) Environmental Impact: <b>Category C</b> <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• Improvement of hygiene services and living standards</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |              |  |  |  |  |  |
| <b>Location of the Project</b> <ul style="list-style-type: none"> <li>• Along the Link Road located on the east edge of existing Malakal Town</li> </ul>  | <b>External Conditions</b>   |      |      |      |      |              |  |  |  |  |  |
| <b>Scope of the Project</b> <ul style="list-style-type: none"> <li>• Construction of trunk drains (10.9 km) with sandbag linings</li> <li>• Installation of box culverts</li> </ul>   | <b>Preconditions</b> <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |              |  |  |  |  |  |
|  <p style="text-align: center;">Typical Cross Section</p>   | <b>Relationship with Other Projects</b> <ul style="list-style-type: none"> <li>• Road projects implemented by Sinohydro and Kano under the MoPI&amp;RD are ongoing including improvement of side ditches. The ditches are designed to be sloped toward both west and east. The eastward ditch should discharge into the trunk drain along the Ring Road.</li> </ul>  |      |      |      |      |              |  |  |  |  |  |
| <b>Agencies Responsible</b> <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> <li>• Maintenance: MoPI&amp;RD</li> </ul>   | <b>Location Map</b><br> <p style="text-align: center;">← : Proposed Trunk Drain</p>  |      |      |      |      |              |  |  |  |  |  |
| <b>Estimated Cost</b> <ul style="list-style-type: none"> <li>• Total Cost: US\$ 7.00 million</li> </ul>   |  |      |      |      |      |              |  |  |  |  |  |
| <b>Implementation Schedule</b> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> </tr> </tbody> </table>   |  | 2013 | 2014 | 2015 | 2016 | Construction |  |  |  |  |  |
|   | 2013   | 2014 | 2015 | 2016 |      |              |  |  |  |  |  |
| Construction  |  |      |      |      |      |              |  |  |  |  |  |

Source: JICA Project Team

| <b>WD-4: Construction of Trunk Drain 2 Project</b>   |  |      |      |      |      |              |  |  |  |  |  |
|--|--|------|------|------|------|--------------|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>Malakal Town is set to expand into the area surrounded by the Ring Road and Outer Ring Road. The topography of the new development area is flat like the existing town area, and further from the river. Therefore, the drainage system will be much more important than for the existing town.</p> <p>The trunk drain will need to run along the Outer Ring Road, which is the eastern boundary of the new area, to secure the outlet of the drainage network in the new area.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• About 50,000 inhabitants of the new development area</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Creation of a new town area free/safe from floods</li> </ul>  |      |      |      |      |              |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>• To secure the drainage system in the new development area</li> </ul>  | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact: Category C</p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Improvement of hygiene services and living standards</li> <li>- Negative Impacts</li> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |              |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>• Along the Outer Ring Road located on the eastern edge of the new development area</li> </ul>  | <p><b>External Conditions</b></p> <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul> <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>• The drains to be constructed in the new development area will be connected with the proposed trunk drain.</li> </ul>  |      |      |      |      |              |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>• Construction of trunk drain with sandbag lining</li> <li>• Installation of box culverts</li> </ul> <div style="text-align: center;">  <p>Typical Cross Section</p> </div>   | <p><b>Location Map</b></p> <div style="text-align: center;">  <p>↔ : Proposed Trunk Drain<br/>← : Trunk Drain proposed in SW-2</p> </div>  |      |      |      |      |              |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> <li>• Maintenance: MoPI&amp;RD</li> </ul>   |  |      |      |      |      |              |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>• Total Cost: US\$ 10.70 million</li> </ul>  |  |      |      |      |      |              |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table>   |  | 2015 | 2016 | 2017 | 2018 | Construction |  |  |  |  |  |
|  | 2015   | 2016 | 2017 | 2018 |      |              |  |  |  |  |  |
| Construction   |  |      |      |      |      |              |  |  |  |  |  |

Source: JICA Project Team





| <b>WD-5: Construction of Main Drains in New Urban Area Project</b>   |  |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
|--|--|------|------|------|------|------|-----------------------------|--|--|--|--|--|---|--|------|------|------|------|------|-----------------------------|--|--|--|--|--|
| <b>Background of the Project</b><br>Malakal Town is set to expand into the area surrounded by the Link Road and Outer Ring Road. The topography of the new development area is flat like the existing town area. Therefore, systematic drainage system is required in this area, and all of the main drains must be connected to both Trunk Drain 1 and 2.   | <b>Effects of the Project</b><br>a) Target Beneficiaries <ul style="list-style-type: none"> <li>• About 50,000 inhabitants in the new development area</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Creation of a new town free/safe from floods</li> </ul>   |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Objectives of the Project</b> <ul style="list-style-type: none"> <li>• To secure the drainage system in the new development area</li> </ul>   | <b>Evaluation of the Project</b><br>a) Economic Viability <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> b) Financial Soundness <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> c) Environmental Impact: <b>Category C</b> <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• Improvement of hygiene services and living standards</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Location of the Project</b> <ul style="list-style-type: none"> <li>• The new development area to be located to the west of the Ring Road</li> </ul>   | <b>External Conditions</b>   |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Scope of the Project</b> <ul style="list-style-type: none"> <li>• Construction of main drains (31 km) with proper vertical slope toward Trunk Drain 1 for the west end and toward Trunk Drain 2 for the east end</li> <li>• Installation of RC pipe culverts in the intersections with crossing roads</li> </ul>  | <b>Preconditions</b> <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Agencies Responsible</b> <ul style="list-style-type: none"> <li>• Project Implementation: MoPI&amp;RD</li> <li>• Operation: MoPI&amp;RD</li> <li>• Maintenance: MoPI&amp;RD</li> </ul>  | <b>Relationship with Other Projects</b> <ul style="list-style-type: none"> <li>• This project should be implemented with related road construction projects.</li> </ul>  |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Estimated Cost</b> <ul style="list-style-type: none"> <li>• Total Cost: US\$ 3.50 million</li> </ul>  | <b>Conceptual Plan</b>   |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| <b>Implementation Schedule</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Construction of Main Drains</td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table> |  | 2018 | 2019 | 2020 | 2021 | 2022 | Construction of Main Drains |  |  |  |  |  | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Construction of Main Drains</td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table> |  | 2018 | 2019 | 2020 | 2021 | 2022 | Construction of Main Drains |  |  |  |  |  |
|  | 2018   | 2019 | 2020 | 2021 | 2022 |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| Construction of Main Drains  |  |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
|  | 2018   | 2019 | 2020 | 2021 | 2022 |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |
| Construction of Main Drains  |  |      |      |      |      |      |                             |  |  |  |  |  |   |  |      |      |      |      |      |                             |  |  |  |  |  |

Source: JICA Project Team

| WD-6: Capacity Development Project for Operation and Maintenance of Drains  |  |      |      |      |      |         |  |  |  |  |  |
|---|--|------|------|------|------|---------|--|--|--|--|--|
| Background of the Project   | Effects of the Project   |      |      |      |      |         |  |  |  |  |  |
| Operational and maintenance work for drains is generally undertaken on a routine basis to maximise drainage facility functions. However, because of the absence of experts within the MoPI&RD, as well as a lack of manuals and funds, no operational and maintenance work (other than minor cleaning activities) is carried out.   | a) Target Beneficiaries  |      |      |      |      |         |  |  |  |  |  |
|   | <ul style="list-style-type: none"> <li>About 242,000 inhabitants of Malakal Town including the new development area</li> </ul>   |      |      |      |      |         |  |  |  |  |  |
| Objectives of the Project   | b) Effects of the Project  |      |      |      |      |         |  |  |  |  |  |
|   | <ul style="list-style-type: none"> <li>Promotion of economic activity</li> <li>Improvement of the quality of life</li> </ul>   |      |      |      |      |         |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To strengthen operations and maintenance so that drainage facilities function effectively</li> </ul>   | Evaluation of the Project  |      |      |      |      |         |  |  |  |  |  |
|   | a) Economic Viability  |      |      |      |      |         |  |  |  |  |  |
| Location of the Project   | <ul style="list-style-type: none"> <li>Although no economic analysis has been undertaken, it is expected that the drainage system and environmental hygiene will be improved.</li> </ul> |      |      |      |      |         |  |  |  |  |  |
|   | b) Financial Soundness   |      |      |      |      |         |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>MoPI&amp;RD</li> </ul>   | c) Environmental Impact: <b>Category C</b>   |      |      |      |      |         |  |  |  |  |  |
|   | - Positive Impacts   |      |      |      |      |         |  |  |  |  |  |
| Scope of the Project  | <ul style="list-style-type: none"> <li>Improvement of hygiene services and living standards</li> </ul>   |      |      |      |      |         |  |  |  |  |  |
|   | - Negative Impacts   |      |      |      |      |         |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Hiring technical staff specialised in storm water drainage systems</li> <li>Establishment of operations and maintenance management system including preparation of manuals and guidelines</li> <li>Delivery of technical training for construction supervision and hydraulic design</li> <li>Supply of equipment (engine pump with pickup, vehicles for staff transportation, backhoes)</li> </ul> | <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul>   |      |      |      |      |         |  |  |  |  |  |
|   | External Conditions  |      |      |      |      |         |  |  |  |  |  |
| Agencies Responsible  |  |      |      |      |      |         |  |  |  |  |  |
|   | Preconditions  |      |      |      |      |         |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Project Implementation: MoPI&amp;RD</li> <li>Operation: MoPI&amp;RD</li> <li>Maintenance: MoPI&amp;RD</li> </ul>   | <ul style="list-style-type: none"> <li>Necessary funds are available.</li> </ul>   |      |      |      |      |         |  |  |  |  |  |
| Estimated Cost  | Relationship with Other Projects   |      |      |      |      |         |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Total Cost: US\$ 1.30 million</li> </ul>   | <ul style="list-style-type: none"> <li>Technical training for construction supervision is to be conducted in collaboration with the road sector.</li> </ul>                              |      |      |      |      |         |  |  |  |  |  |
| Implementation Schedule   |  |      |      |      |      |         |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th></th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> </tr> </tbody> </table>   |  | 2014 | 2015 | 2016 | 2017 | Project |  |  |  |  |  |
|   | 2014   | 2015 | 2016 | 2017 |      |         |  |  |  |  |  |
| Project   |  |      |      |      |      |         |  |  |  |  |  |

Source: JICA Project Team

**(6) Solid Waste Management Programme**

| <b>SM-1: Solid Waste Collection Activities Improvement Project</b>   |  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|------|-------------|--|--|---|---|--|--|--|--|--|--|--------------|--|--|---|---|--|--|--|--|--|--|----------|--|---|--|--|--|--|--|--|--|--|---------------|--|--|---|---|---|--|--|--|--|--|----------------------|--|--|---|---|---|--|--|--|--|--|--|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <p>Currently, most residents treat and dispose of their garbage by themselves. Combustible garbage is frequently burned in backyards. Non-combustible garbage such as aluminium cans, PET bottles and ceramics are sometimes collected by collection vehicles, or are thrown away somewhere.</p> <p>Existing collection points with facilities are being set up near the market. Waste generated from the market can be gathered and collected at the collection point. Waste collection/disposal workers go around the town to collect waste and take it to the landfill site.</p> <p>However, solid waste is not collected due to lack of capacity for collection and transportation of daily waste generation. Therefore, improvement of collection capacity and establishment of a proper collection system are expected.</p>  | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• General sanitation for environmental corporation department</li> <li>• The whole population of Malakal Town</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Improvement of collection capacity of solid waste</li> <li>• Improvement of capacity of collection/disposal workers and department staff for solid waste management</li> <li>• Improvement of awareness among residents about sanitation</li> </ul>  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Enhancement of capacity for collection of solid waste generated from Malakal Town</li> </ul>  | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that the solid waste collection system will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts <ul style="list-style-type: none"> <li>• Improvement of sanitary conditions in Malakal Town</li> </ul> </li> <li>- Negative Impacts <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Location of the Project</b>   |  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Four quarters of Malakal Town (Northern Quarter, Central Quarter, Eastern Quarter, Southern Quarter)</li> </ul>   |  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Scope of the Project</b>  | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Establishment of new, effective collection system for solid waste</li> <li>• Preparation and establishment of proper plan for collection points</li> <li>• Preparation and implementation of plan for efficient sanitation activities</li> <li>• Implementation of dissemination activities for residents to improve collection ratio</li> <li>• Development of facilities and equipment to enhance collection capacity</li> </ul> <p>&lt;Proposed facilities/equipment&gt;</p> <p>1) Construction of collection points (50 sites) and workshop</p> <p>2) Procurement of collection vehicles (six vehicles)</p>   | <ul style="list-style-type: none"> <li>• Counterpart agencies for the project have sufficient capacity and number of workers to undertake training.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
|  | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
|  | <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Agencies Responsible</b>  | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: General sanitation for environmental corporation department</li> <li>• Counterpart: Malakal City Council</li> </ul>   | <ul style="list-style-type: none"> <li>• Other projects are not planned in this sector.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Estimated Cost</b>  |    |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Procurement: <ul style="list-style-type: none"> <li>Collection vehicles: US\$ 1.80 million</li> </ul> </li> <li>• Construction: <ul style="list-style-type: none"> <li>Workshop: US\$ 0.30 million</li> <li>Collection points: US\$ 0.10 million</li> </ul> </li> <li>• Project Implementation: <ul style="list-style-type: none"> <li>US\$ 2.70 million</li> </ul> </li> <li>• Total Cost: US\$ 4.90 million</li> </ul>  |  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| <b>Implementation Schedule: 4 years</b>  |  |      |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
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|  | 2013   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| Procurement  |  |      | ■    | ■    |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| Construction   |  |      | ■    | ■    |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| Planning   |  | ■    |      |      |      |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| Dissemination  |  |      | ■    | ■    | ■    |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |
| Capacity development   |  |      | ■    | ■    | ■    |      |      |      |      |      |      |             |  |  |   |   |  |  |  |  |  |  |              |  |  |   |   |  |  |  |  |  |  |          |  |   |  |  |  |  |  |  |  |  |               |  |  |   |   |   |  |  |  |  |  |                      |  |  |   |   |   |  |  |  |  |  |  |

Source: JICA Project Team




| <b>SM-3: Medical Waste Management Improvement Project</b>  |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|------|------|----------|--|--|--|--|--|--|--|--|--|--|----------------------|--|--|--|--|--|--|--|--|--|
| Background of the Project  | Effects of the Project  |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <p>Medical waste such as syringes, needles and waste cloths with blood is classified as infectious medical waste and is very dangerous to patients and workers. Source separation is generally carried out and infectious medical waste is collected separately. It is then treated by using proper methods like incineration before disposing at landfill.</p> <p>Source separation is currently not implemented at the Educational Hospital and workers do not pay much attention to infectious medical waste. Medical waste generated from the Educational Hospital is treated and disposed at a temporary place. It seems that some infectious medical waste is incinerated. The temporary place is not managed properly. Improvement of medical solid waste management is therefore expected.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Educational Hospital</li> <li>• State Ministry of Health (MoH)</li> <li>• The whole population of Malakal Town</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Improvement of medical solid waste management at the Educational Hospital</li> <li>• Improvement of treatment of infectious medical waste</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Objectives of the Project  | Evaluation of the Project   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Development of management capacity for medical waste at the Educational Hospital</li> </ul>   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that medical solid waste management will be improved.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Budget allocation is necessary</li> </ul> <p>c) Environmental Impact</p> <p>- Positive Impact</p> <ul style="list-style-type: none"> <li>• Improvement of sanitary conditions at the Educational Hospital</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Location of the Project  | External Conditions   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>   | <ul style="list-style-type: none"> <li>• Counterpart agencies for the project have sufficient capacity and number of workers to undertake training.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Scope of the Project   | Preconditions   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Proper management of medical waste by medical staff</li> <li>• Enhancement of source separation of medical waste at the hospital</li> <li>• Proper incineration of infectious medical waste</li> </ul>  | <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Agencies Responsible   | Relationship with Other Projects  |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: Educational Hospital</li> <li>• Counterpart: State Ministry of Health (MoH)</li> </ul>  | <ul style="list-style-type: none"> <li>• Other capacity development projects for medical solid waste management at the Educational Hospital have not been reported.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Estimated Cost   |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: <span style="float: right;">US\$ 2.00 million</span></li> <li>• Total Cost: <span style="float: right;">US\$ 2.00 million</span></li> </ul>   |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Implementation Schedule: 3 years   |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Planning</td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: left;">Capacity development</td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  |   |      | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Planning |  |  |  |  |  |  |  |  |  |  | Capacity development |  |  |  |  |  |  |  |  |  |
|  | 2013  | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Planning   |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |
| Capacity development   |   |      |      |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |  |  |                      |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

## (7) Power Supply Programme

| <b>EN-1: Power Plant Rehabilitation Project</b>  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|
| Background of the Project  | Effects of the Project   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Stable and reliable power supply is a fundamental condition for accelerating economic development and achieving human security. However, the power supply situation in Malakal Town is far from acceptable. The estimated peak demand in Malakal Town is 5,900 kW but the available generation capacity is currently only 2,400 kW. Given this situation, many commercial customers use captive generators, which impose a heavy financial burden on commercial activities. Many domestic customers cannot use electricity most of the day. This has a severe negative impact on the social welfare of residents of Malakal Town. There is an urgent need to fill the gap between power demand and supply.   | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Approximately 126,000 inhabitants of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Achievement of sufficient and stable power supply through enhancement of power supply capacity</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Objectives of the Project  | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Stable and sufficient supply of electricity to Malakal Town</li> </ul>  | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• National Electrical Company (NEC) is a state-owned electric utility company in Malakal. NEC operates an electricity supply business and operation and maintenance costs for the generators will be covered by electricity tariffs as a normal electric utility business activity.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Since small-scale power generation using diesel fuel is rather expensive, cost recovery from electricity tariff collection only would be difficult considering the economic level of electricity customers in Malakal. Therefore, government subsidies will be necessary to some extent.</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts <ul style="list-style-type: none"> <li>• Improvement of social welfare of people living in the town</li> <li>• Revitalisation of economic activities in the town</li> <li>• Improvement of security in the town</li> </ul> </li> <li>- Negative Impacts <ul style="list-style-type: none"> <li>• Emission of NOx and SOx, which are contained in exhaust gases from diesel generators, will increase but the impact will be minimal.</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Location of the Project  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Existing power station in the north western area of Malakal Town</li> </ul>   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Scope of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Diesel generators (2.5 MW x 4 sets, medium speed, continuous operation mode)</li> <li>• Power house for the above generators</li> <li>• Fuel storage tanks (600 m<sup>3</sup> x 2 sets) and fuel unloading system</li> <li>• Mechanical and electrical auxiliary system</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• NEC-Malakal has the fundamental capabilities for operating and maintaining the electricity supply system.</li> </ul>  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Capacity Development   | Preconditions  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Operation of diesel generators</li> <li>• Maintenance and repair of diesel generators</li> </ul>  | <ul style="list-style-type: none"> <li>• O&amp;M cost of the generators is covered by beneficiaries.</li> <li>• Fuel to run the generator is supplied continuously.</li> <li>• Necessary funds for O&amp;M are available.</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Agencies Responsible   | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project Implementation: SSEC-Malakal and UNS</li> <li>• Operation: SSEC-Malakal</li> <li>• Maintenance: SSEC-Malakal</li> </ul>   | <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Estimated Cost   | Remarks  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Implementation/Construction Cost</li> <li>Construction Cost: US\$ 20.00 million</li> <li>Total Cost: US\$ 20.00 million</li> </ul>  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Implementation Schedule  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
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|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| D&B  |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Manuf.   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| Const.   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |
| D&B: Design and Bidding, Manuf.: Manufacturing, Const.: Construction   |  |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

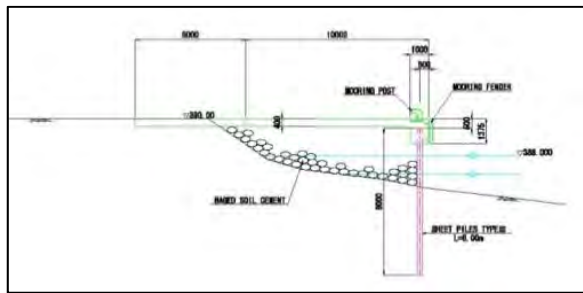
| <b>EN-2: Expansion of 11 kV Distribution Network Project</b>  |   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>Stable and reliable power supply is a fundamental condition for accelerating economic development and achieving human security. However, the power supply situation in Malakal Town is far from acceptable. The estimated peak demand in Malakal Town is 5,900 kW but the available generation capacity is currently only 2,400 kW.</p> <p>The existing 11 kV distribution network covers the central area of Malakal but does not reach the outskirts of the town area. People living on the fringe of Malakal cannot receive electricity or can only receive electricity with a huge voltage drop and losses through a low voltage distribution line.</p> <p>This has a severe negative impact on the social welfare of residents of Malakal Town. There is a need to expand the high voltage distribution network.</p>          | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Approximately 126,000 inhabitants of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Achievement of sufficient and stable power supply through the enhancement of power supply capacity</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>To supply stable and sufficient electricity to Malakal Town</li> </ul>   | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>National Electrical Company (NEC) is a state-owned electric utility company in Malakal. NEC operates an electricity supply business and operation and maintenance costs for the generators will be covered by electricity tariffs as a normal electric utility business activity.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>Since small-scale power generation is rather expensive, cost recovery from electricity tariff collection only would be difficult considering the economic level of electricity customers in Malakal. Therefore, government subsidies will be necessary to some extent.</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>Improvement of social welfare of people living in the town</li> <li>Revitalisation of economic activities in the town</li> <li>Improvement of security in the town</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>Northern and southern areas of Malakal</li> </ul>  | <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> <li>NEC-Malakal has the fundamental capabilities for operating and maintaining the electricity supply system.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>11 kV distribution lines (approximately 5.2 km)</li> <li>Distribution poles</li> <li>Pole fitting materials</li> <li>Aluminium conductors</li> <li>Distribution transformers</li> </ul>   | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>O&amp;M costs of the distribution network are covered by beneficiaries.</li> <li>Necessary permits to erect distribution poles are granted.</li> <li>Necessary funds for O&amp;M are available.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Capacity Development</b></p> <ul style="list-style-type: none"> <li>Operation of the distribution network</li> <li>Maintenance and repair of the distribution network</li> </ul>  | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>None</li> </ul>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>Project Implementation: SSEC-Malakal and UNS</li> <li>Operation: SSEC-Malakal</li> <li>Maintenance: SSEC-Malakal</li> </ul>   | <p><b>Remarks</b></p>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>Implementation/Construction Cost</li> </ul> <p>Construction Cost:                      US\$ 1.00 million<br/>                     Total Cost:                                US\$ 1.00 million</p>  |  <p style="text-align: center;">Present Electricity Network</p>   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>D&amp;B</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Manuf.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> </tr> <tr> <td>Const.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> </tr> </tbody> </table> <p>D&amp;B: Design and Bidding, Manuf.: Manufacturing, Const.: Construction</p> |   |      | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | D&B |  |  |  |  |  |  |  |  |  | Manuf. |  |  |  |  |  |  |  |  |  | Const. |  |  |  |  |  |  |  |  |  |
|   |   | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| D&B   |   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| Manuf.  |   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |
| Const.  |   |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

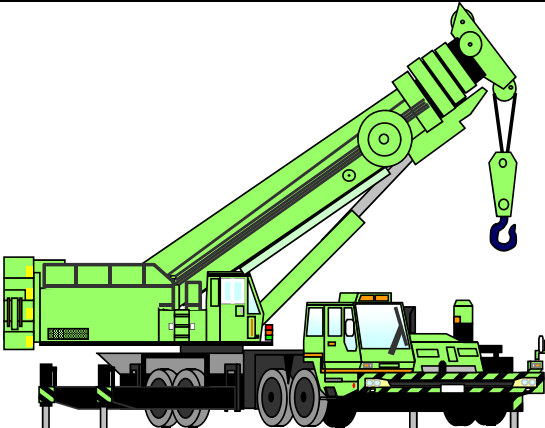




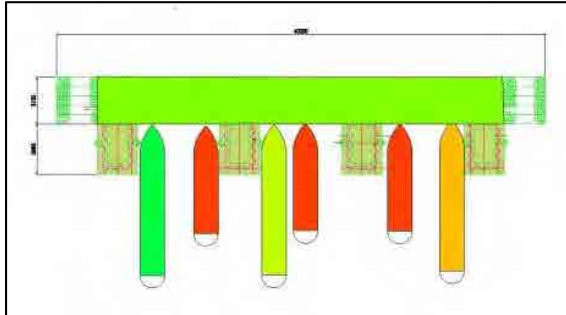


| <b>PT-1 Reconstruction of Jetty at Malakal Port Project</b>  |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|------|------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>Malakal Port contains a steel 18 m x 10 m jetty that was constructed in 2003 by the Sudanese Government. The jetty is too dangerous to use because of the lack of discipline on the part of tugboat operators, who stop barges by hitting the jetty. Moreover, the jetty has not been maintained.</p> <p>It is necessary to remove and reconstruct the jetty to meet the requirement of increasing cargo handling in Malakal Town.</p>                                    | <p>a) Target beneficiaries:</p> <ul style="list-style-type: none"> <li>• The whole population of Malakal Town</li> <li>• The whole population of South Sudan</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Improvement of safe cargo handling</li> <li>• Reduction of cargo handling time</li> <li>• Savings on transportation costs</li> <li>• Reduction of travel costs</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To meet the river transport demand of goods and people and support social and economic activities</li> </ul>  | <p>a) Economic viability</p> <ul style="list-style-type: none"> <li>• It is expected that the project is economically viable because a large benefit is expected to accrue from reductions in transport costs and time.</li> </ul> <p>b) Financial soundness</p> <ul style="list-style-type: none"> <li>• No financial problems are anticipated</li> </ul> <p>c) Environmental impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts <ul style="list-style-type: none"> <li>• Improvement of social and economic activities in Malakal Town and nearby areas</li> </ul> </li> <li>- Negative Impacts <ul style="list-style-type: none"> <li>• River flow blockage is negligible/same as present (ratio that gross length of pier width of water flow width=3.0%)</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Present Malakal Port</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>  | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Remove old jetty and construct new jetty</li> </ul>   | <ul style="list-style-type: none"> <li>• Required area for setting is secured.</li> <li>• Rules for usage among ship owners/boatmen are drawn up.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>  | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Project implementation: ROSS/UNS</li> <li>• Operation: do.</li> <li>• Maintenance: do.</li> </ul>   | <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>  |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Detailed Design Cost US\$</li> <li>• Demolition Cost: US\$</li> <li>• Construction Cost: US\$</li> <li>• Total Cost: US\$ 2.00 million</li> </ul>   |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation schedule</b>   | <b>Remarks</b>   |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Construction |  |  |  |  |  |  |  |  |  |  |  |  <p>The diagram illustrates the layout of the reconstructed jetty. It shows a rectangular structure with a length of 1000 units and a width of 1000 units. Key components labeled include a 'MOORING POST' and 'MOORING FENDER' at the end of the structure. The foundation consists of 'SHIELD SOIL CEMENT' and 'SHIELD PILE TYNE (1.4m)'. The drawing also indicates '300.00' and '300.00' dimensions for the structure's width and depth.</p> |
|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |              |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction   |  |      |      |      |      |      |      |      |      |      |      |      |              |  |  |  |  |  |  |  |  |  |  |  |  |


Source: JICA Project Team

| PT-2: Procurement of Crane Project  |   |      |      |      |      |      |                      |  |  |  |  |  |  |
|---|---|------|------|------|------|------|----------------------|--|--|--|--|--|--|
| <b>Background of the Project</b><br>There is no unloading equipment in Malakal Town. When a container comes to Malakal Port, stevedores open the container on the barge and unload the goods by hand. If general cargo is loaded on a palette, it can be loaded by crane.<br>It is expected that the number of container cargos will increase and efficient cargo handling will be required. Therefore, unloading equipment is required.  | <b>Effect of the Project</b><br>a) Target Beneficiaries <ul style="list-style-type: none"> <li>• The whole population of Malakal Town</li> </ul> b) Effect of the Project <ul style="list-style-type: none"> <li>• Reduction of cargo handling time</li> <li>• Savings on transportation costs</li> <li>• Reduction of travel costs</li> </ul>  |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Objectives of the Project</b><br><ul style="list-style-type: none"> <li>• To meet the river transport demand of people and goods and support social and economic activities</li> </ul>   | <b>Evaluation of the Project</b><br>a) Economic Viability <ul style="list-style-type: none"> <li>• It is expected that the project is economically viable because a large benefit is expected to accrue from reductions in transport costs and time.</li> </ul> b) Financial Soundness <ul style="list-style-type: none"> <li>• Revenue from leasing the crane can be expected. However subsidies should be provided by the government.</li> </ul> c) Environmental Impacts <ul style="list-style-type: none"> <li>- Positive Impact                             <ul style="list-style-type: none"> <li>• Improvement of social and economic activities in Malakal Town and nearby areas</li> </ul> </li> <li>- Negative Impact                             <ul style="list-style-type: none"> <li>• It could cost a lot of stevedores' jobs. It is therefore necessary to obtain their consent.</li> </ul> </li> </ul> |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Location of the Project</b><br><ul style="list-style-type: none"> <li>• Present Malakal Port</li> </ul>  | <b>External Conditions</b><br><ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>  |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Scope of the Project</b><br><ul style="list-style-type: none"> <li>• Procurement of mobile crane (40 t)</li> </ul>   | <b>Preconditions</b><br><ul style="list-style-type: none"> <li>• Consensus is built among stevedores (union), cargo owners and the government.</li> <li>• Workshops are ready to use.</li> <li>• Necessary manpower/organisation is provided.</li> <li>• Necessary funds are provided.</li> </ul>   |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Agencies Responsible</b><br><ul style="list-style-type: none"> <li>• Project Implementation: GOSS/UNS</li> <li>• Operation: do.</li> <li>• Maintenance: do.</li> </ul>   | <b>Relationship with Other Projects</b><br><ul style="list-style-type: none"> <li>• N/A</li> </ul>  |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Estimated Cost</b><br><ul style="list-style-type: none"> <li>• Total Cost: US\$ 0.75 million</li> </ul>  |   |      |      |      |      |      |                      |  |  |  |  |  |  |
| <b>Implementation Schedule</b><br><br><table border="1"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>Procurement of crane</td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> </tr> </tbody> </table> <p> <span style="background-color: black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> Procurement of crane                 </p> |   | 2012 | 2013 | 2014 | 2015 | 2016 | Procurement of crane |  |  |  |  |  | <b>Remarks</b><br> |
|   | 2012  | 2013 | 2014 | 2015 | 2016 |      |                      |  |  |  |  |  |  |
| Procurement of crane  |   |      |      |      |      |      |                      |  |  |  |  |  |  |

Source: JICA Project Team

| <b>PT-5: Construction of Passenger Jetty Project</b>  |  |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|------|------|--------------|--|---|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b><br>Transportation by water is very important around Malakal Town due to poor road conditions. There is no bridge over the White Nile and the only way to cross the river is by ferry. Around 1,000 passengers per day use the ferry at Malakal Port. The nearest destination is the opposite side. The farthest destination is Atar, which is about 40 km from Malakal Port.<br>Although many passengers use the ferry, there is no particular facility for boarding. Passengers sometimes have to walk into the river to board in the dry season, and they have to board from unsteady places during the rainy season.<br>Passengers can board safely regardless of weather or seasons by constructing a passenger jetty. | <b>Effects of the Project</b><br>a) Target beneficiaries <ul style="list-style-type: none"> <li>• Approximately 1,000 passengers per day</li> <li>• The whole population of UNS (964,000) and those in Jonglei (1,358,000) (2008)</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Ensure safety of passengers</li> <li>• Ensure convenience of passengers</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b> <ul style="list-style-type: none"> <li>• To meet the river transport demand of people and goods and support social and economic activities</li> <li>• Secure passengers' onboard and offboard safety</li> </ul>  | <b>Evaluation of the Project</b><br>a) Economic viability <ul style="list-style-type: none"> <li>• It is expected that the project is economically viable because safety of passengers greatly contributes to the economy.</li> </ul> b) Financial soundness <ul style="list-style-type: none"> <li>• No financial problems are anticipated</li> </ul> c) Environmental impact <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• Improvement of accessibility to boats for passengers</li> <li>• Decrease in accidents</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• River flow blockage is negligible (ratio that gross length of pier width of water flow width=1.0%)</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b> <ul style="list-style-type: none"> <li>• Present Malakal Port</li> </ul>   | <b>External Conditions</b> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b> <ul style="list-style-type: none"> <li>• Procurement and construction of passenger jetty</li> </ul>   | <b>Preconditions</b> <ul style="list-style-type: none"> <li>• Required area for setting is secured.</li> <li>• Rules for usage among ship owners/boatmen are drawn up.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b> <ul style="list-style-type: none"> <li>• Project implementation: MoPI&amp;RD, UNS or River Transport Department, MOT, ROSS</li> <li>• Operation: do.</li> <li>• Maintenance: do.</li> </ul>   | <b>Relationship with Other Projects</b> <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b> <ul style="list-style-type: none"> <li>• Total cost: US\$ 0.60 million</li> </ul>   | <b>Remarks</b><br>   |      |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b><br><table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td style="background-color: black; color: black;">█</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>   |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Construction |  | █ |  |  |  |  |  |  |  |  |  |  |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |              |  |   |  |  |  |  |  |  |  |  |  |  |
| Construction  |  | █    |      |      |      |      |      |      |      |      |      |      |              |  |   |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>PT-3: Construction of New Port Project (Phase 1)</b>  |  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
|--|--|------|------|------|------|------|------|------|------|------|------|------|-----|--|--|--|--|--|--|--|--|--|--|--|--------------|--|--|--|--|--|--|--|--|--|--|--|---|
| <b>Background of the Project</b>   | <b>Effect of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| The Malakal Port is very narrow without any manoeuvring space for trailer trucks. The apron is blocked by a slope and cannot expand landward. It is expected that the cargo handling volume will increase in the near future. Malakal Port will not be able to deal with this. A new container yard in Juba will be completed in 2015 and containerisation will soon begin. Construction of a new jetty will therefore be absolutely imperative.   | a) Target Beneficiaries <ul style="list-style-type: none"> <li>• The whole population of Malakal Town</li> <li>• The whole population of South Sudan</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Formulation/introduction of the planned urban structure framework</li> <li>• Transport cost savings</li> <li>• Enhancement of social and economic activities</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• To meet the river transport demand of people and goods and support social and economic activities</li> <li>• To enhance the capacities of port planning, design, construction and maintenance through implementation of the project</li> </ul>  | a) Economic Viability <ul style="list-style-type: none"> <li>• It is expected that the project is economically viable because a large benefit is expected to accrue from reductions in transport costs and time.</li> </ul> b) Financial Soundness <ul style="list-style-type: none"> <li>• No financial problem is anticipated</li> </ul> c) Environmental Impacts <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• Improvement of social and economic activities in Malakal Town and surroundings regions</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• Increase of traffic nuisances made by trailer trucks such as noise and air pollution</li> </ul> </li> </ul> |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Location of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• Two candidate locations exist: the old port area and Ogot (north of Malakal Airport).</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Scope of the Project</b>  | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• Construction of a new port including feasibility study in which the roles of Malakal Port and the new port will be examined</li> </ul>  | <ul style="list-style-type: none"> <li>• Land is procured.</li> <li>• Right-of-way is secured.</li> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Agencies Responsible</b>  | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• Project Implementation: GOSS/UNS</li> <li>• Operation: do.</li> <li>• Maintenance: do.</li> </ul>   | <ul style="list-style-type: none"> <li>• Urban development plan is one of preconditions for this project.</li> <li>• A future plan for a new port in Ogot is also a precondition for this project</li> <li>• Functional compartmentalisation of Malakal Port, the new port and the port in Ogot</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Estimated Cost</b>  |  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <ul style="list-style-type: none"> <li>• Detailed Design Cost:     US\$ 0.6 million</li> <li>• Construction Cost (including supervision cost)</li> <li>• Port Construction:</li> <li>• Total Cost:                     US\$ 3.00 million</li> </ul>  |  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| <b>Implementation Schedule</b>   | <b>Remarks</b>   |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| (Phase 1 & 2)<br><table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>F/S</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | F/S |  |  |  |  |  |  |  |  |  |  |  | Construction |  |  |  |  |  |  |  |  |  |  |  | F/S is necessary.<br> <p style="text-align: center;">Potential Locations for New Port</p> |
|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| F/S  |  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |
| Construction   |  |      |      |      |      |      |      |      |      |      |      |      |     |  |  |  |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |  |  |  |  |   |

Source: JICA Project Team

**(2) Primary Industry Development Programme**

| <b>EC-4: Upper Nile Fisheries Project</b>   |  |      |      |      |      |      |      |      |      |      |      |
|---|--|------|------|------|------|------|------|------|------|------|------|
| Background of the Project   | Effects of the Project   |      |      |      |      |      |      |      |      |      |      |
| <p>South Sudan has varied and extensive fisheries resources with the Nile River and its tributaries, reservoirs, lakes and swamps. The Nile River covers a surface area of 91,600 km<sup>2</sup>. The potential fishery capture is estimated to be 40,000 tons a year, equivalent to 2% of GDP. This potential, however, is underexploited.</p> <p>The amount of fish landing in Upper Nile is approximately 6,480 tons per year, while the state plans to increase it to 30,000 tons in the future based on its tremendous fish resources.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Direct beneficiaries are officers of MARF, fishermen and related workers, while indirect beneficiaries are the population of UNS.</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Improved diet</li> <li>• Increase in exports</li> <li>• Improvement in socio-economics conditions of fishermen and related workers</li> <li>• Improvement in food security</li> <li>• Increase in employment of youth and women</li> </ul>                                  |      |      |      |      |      |      |      |      |      |      |
| Objectives of the Project   | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• To improve the diet of an increasing population by providing more fish</li> <li>• To produce surplus fish for export</li> <li>• To improve the socio-economic conditions of fishermen and other related workers</li> <li>• To improve food security for the Upper Nile population</li> <li>• To create employment for redundant youth and women</li> </ul>   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• NPV: not applicable. Economic benefits include increase in exports, income for fishermen and employment opportunities for related workers</li> </ul> <p>b) Financial Soundness: not applicable</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>• Combination of grant aid and technical cooperation scheme assumed</li> </ul> <p>d) Environmental Impact:</p> <p>- Negative Impacts:</p> <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |      |
| Location of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Malakal Town and one other location in UNS</li> </ul>  |  |      |      |      |      |      |      |      |      |      |      |
| Scope of the Project  | Preconditions  |      |      |      |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Capacity development for the MARF in resource management, operations and maintenance of facilities, and fishing technology</li> <li>• Establishment of landing sites and fishing camps</li> <li>• Provision of fishing gear and equipment</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |
| Agencies Responsible  | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |      |
| <p>Project Implementation: MARF, UNS</p> <p>Operation: MARF, UNS</p> <p>Maintenance: MARF, UNS</p>  | <ul style="list-style-type: none"> <li>• FAO provided technical assistance for capacity development in the fishery sector some years ago. FAW, however, has shifted its focus to other areas.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |
| Estimated Cost  | Remarks  |      |      |      |      |      |      |      |      |      |      |
| Total Cost: US\$ 0.50 million   |  |      |      |      |      |      |      |      |      |      |      |
| Implementation Schedule   |  |      |      |      |      |      |      |      |      |      |      |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Implementation  |  |      |      |      |      |      |      |      |      |      |      |

Source: JICA Project Team


| <b>EC-5: Malakal Dairy Farm Project</b>   |   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|------|------|-------------|--|--|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>Food security is cited as one of the priority areas for the development of UNS. The vision of the livestock and fisheries sector is to promote sustainable production of livestock and fisheries products to reap and maintain benefits for producers, contribute to poverty eradication, and boost economic growth of the state.</p> <p>While dairy farming has high potential in UNS, current practices are still traditional with low productivity, resulting in a limited supply of dairy products to the Malakal population.</p>  | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Direct beneficiaries will be MARF, Makal County, UNU faculty and local dairy farmers, while indirect beneficiaries will be the population of UNS.</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Production of dairy products will contribute to improved nutrition of the UNS population, and reductions in poverty and crime rates.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Objectives of the Project   | Evaluation of the Project   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To transfer modern technical know-how to MARF officers and Upper Nile University (UNU) faculty and traditional producers</li> <li>• To provide clean and hygienic milk and milk products to the Malakal population</li> <li>• To improve local dairy breeds by cross-breeding with exotic breeds</li> <li>• To create employment</li> <li>• To encourage investment</li> </ul>   | <p>Economic Viability</p> <ul style="list-style-type: none"> <li>• NPV: not applicable</li> </ul> <p>b) Financial Soundness: not applicable</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>• Combination of grant aid and technical cooperation scheme assumed</li> </ul> <p>d) Environmental Impact</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• Increased social stability due to improved nutrition and a reduction in crime</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>  |   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Scope of the Project  | Preconditions   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Capacity development for MARF officers, extension workers, UNU faculty and dairy farmers</li> <li>• Research and development of best cross breeds</li> <li>• Establishment of facilities and provision of equipment</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul> <ul style="list-style-type: none"> <li>• MARF, Makal County and UNU have sufficient capacity for operations and maintenance.</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Agencies Responsible  | Relationship with Other Projects  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Project Implementation: MARF, Makal County, UNU<br>Operation and Maintenance: MARF, Makal County, UNU   | <ul style="list-style-type: none"> <li>• None</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Estimated Cost  | Remarks   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| <p>Technical Cooperation: 100 man-months</p> <p>Facilities and equipment: US\$ 4.80 million</p> <p>Implementation Schedule</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Preparation</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Tender</td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Implementation</td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |   | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Preparation |  |  |  |  |  |  |  |  |  |  |  | Tender |  |  |  |  |  |  |  |  |  |  |  | Implementation |  |  |  |  |  |  |  |  |  |  |  |  |
|   | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Preparation   |   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Tender  |   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| Implementation  |   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>EC-6: Malakal Poultry Breeding Farm Project</b>   |  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|------|------|-------------|--|--|---|--|--|--|--|--|--|--|--|--------|--|--|--|---|--|--|--|--|--|--|--|----------------|--|--|--|--|---|---|---|---|--|--|--|--|
| Background of the Project  | Effects of the Project   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| The local fowl in UNS have a tendency towards low productivity and eggs are much smaller than those of other breeds. In an effort to improve the nutrition status of UNS citizens, the MARF plans to introduce high egg producing breeds into the state. However, its breeding farm has been occupied by the military since the war period.<br>The Ministry therefore proposes a project to re-establish a farm for poultry breeding.  | a) Target Beneficiaries<br>• MARF, poultry farmers, Makal County, UNU<br>b) Effects of the Project<br>• Income generation of poultry farmers<br>• Stimulation of the development of other sectors in the value-chain of the poultry (egg) industry   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Objectives of the Project  | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| <ul style="list-style-type: none"> <li>To ensure food security and people's nutrition status through breeding productive fowls</li> <li>To create job opportunities for unemployed youth</li> </ul>  | a) Economic Viability: NPV: not applicable<br>b) Financial Soundness: not applicable<br>c) Finance<br>• Combination of grant aid scheme and technical cooperation scheme assumed<br>d) Environmental Impact<br>- Positive Impact:<br>• Reduction in negative environmental impacts on the surrounding area<br>- Negative Impacts<br>• No specific negative impact is anticipated |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Location of the Project  |  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| <ul style="list-style-type: none"> <li>Near Malakal Town</li> </ul>  |  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Scope of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| <ul style="list-style-type: none"> <li>To establish a poultry farm with modern equipment</li> <li>To provide training on modern breeding methods for graduates and technicians</li> </ul>  | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
|  | Preconditions  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
|  | <ul style="list-style-type: none"> <li>Land is secured.</li> <li>MARF has sufficient capacity for operations and maintenance.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Agencies Responsible   | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Project Implementation: MARF<br>Operation: MARF<br>Maintenance: MARF   | <ul style="list-style-type: none"> <li>None</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Estimated Cost   | Remarks  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Total: US\$ 0.50 million   |  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Implementation Schedule  |  |      |      |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
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|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Preparation  |  |      | ■    |      |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Tender   |  |      |      | ■    |      |      |      |      |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |
| Implementation   |  |      |      |      | ■    | ■    | ■    | ■    |      |      |      |      |             |  |  |   |  |  |  |  |  |  |  |  |        |  |  |  |   |  |  |  |  |  |  |  |                |  |  |  |  |   |   |   |   |  |  |  |  |

Source: JICA Project Team



| <b>EC-7: Malakal Slaughter House Construction Project</b>  |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|------|------|------|-------------|--|--|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <p>Food security is cited as one of the priority areas for the development of UNS. The vision of the livestock and fisheries sector is to promote sustainable production of livestock and fisheries products to reap and maintain benefits for producers, contribute to poverty eradication and boost economic growth of the state. Production of meat is a promising industry for Malakal and surrounding areas.</p> <p>The existing slaughterhouse in Malakal Town is in an unhygienic condition creating serious health risks (photos attached). The numbers of animals slaughtered in Malakal are 11,154 cattle, 9,958 sheep and 6,761 goats per year. It is important to provide an appropriate outlet for livestock products, whose increase is cited as one of the priorities for UNS development.</p>  | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Population of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Enjoyment of meat of a higher quality processed in a hygienic way by the population of Malakal</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>  |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To improve the physical environment of the existing slaughter area to supply meat in a hygienic way</li> <li>• To enhance capacity of management and technical skills of slaughterhouse operational staff</li> </ul>  | <p>Economic Viability</p> <ul style="list-style-type: none"> <li>• NPV: not applicable</li> </ul> <p>b) Financial Soundness: not applicable</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>• Combination of grant aid scheme and technical cooperation scheme assumed</li> </ul> <p>d) Environmental Impact</p> <p>- Positive Impact</p> <ul style="list-style-type: none"> <li>• Reduction in negative environmental impacts on the surrounding area</li> </ul> <p>- Negative Impacts</p> <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>   | <p>External Conditions</p> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul> <p>Preconditions</p> <ul style="list-style-type: none"> <li>• MARF and Malakal Town have sufficient capacity for operations and maintenance.</li> </ul>   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>   |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>  | <b>Relationship with Other Projects</b>   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To establish a slaughterhouse with sanitary equipment and tools</li> <li>• To provide training to slaughterhouse management officers and slaughterers</li> </ul>  | <ul style="list-style-type: none"> <li>• None</li> </ul>  |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>  | <b>Remarks</b>  |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <p>Project Implementation: MARF and Malakal Town Authority</p> <p>Operation and Maintenance: MARF and Malakal Town Authority</p>   |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>  |  <p style="text-align: center;">Stall Selling Meat</p>  |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| Total cost: US\$ 0.50 million  |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>   |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
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|  | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| Preparation  |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| Tender   |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |
| Implementation   |   |      |      |      |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |  |  |  |        |  |  |  |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

### (3) Investment Climate Improvement Programme

| EC-8: Malakal Light Industrial Park Development Project   |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|----------|--|--|--|--|--|--|--|--|--------------------|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project   |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <p>There are almost no industries in Malakal at present. Most goods for consumers and shops are either imported from neighbouring countries or transported from Juba. High transportation costs due to inferior transportation infrastructure is placing a burden on people, shops and companies. Even agro-processing products for which Malakal should have an advantage are brought in from other regions and sold at higher prices.</p> <p>A priority for economic development in Malakal is to promote manufacturing activities with an initial emphasis on locally available and competitive products such as agro-products. Establishment of an industrial park would contribute to industrial development with a number of advantages such as minimisation of negative environmental impacts and manufacturers being able to initiate activities with minimum input at the beginning.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Direct beneficiaries are officers of MARF, fishermen and related workers, while indirect beneficiaries are the population of UNS.</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Improved diet</li> <li>• Increase in exports</li> <li>• Improvement in socio-economic conditions of fishermen and related workers</li> <li>• Improvement in food security</li> <li>• Increase in employment of youth and women</li> </ul> |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Objectives of the Project   | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To create a small-scale industrial park equipped with all kinds of infrastructure provided as a government initiative on a pilot basis</li> <li>• To encourage and support private developers to expand the pilot industrial park to a full-scale industrial park</li> </ul>   | <p>a) Economic Viability: to be confirmed.</p> <p>b) Financial Soundness: to be confirmed</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>• Combination of grant aid and technical cooperation scheme is assumed initially, to be subsequently developed into a private initiative</li> </ul> <p>d) Environmental Impact</p> <p>- Negative Impact: to be confirmed</p>  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Industrial area in Malakal Town</li> </ul>   |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Scope of the Project  | Preconditions  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Planning of pilot industrial park (site selection, identification of potential types of industries, planning for site preparation, infrastructure, service facilities)</li> <li>• Preparation of industrial support programmes (training and business incubation services, IT promotion, incentive measures, etc.)</li> <li>• Engineering design and implementation</li> <li>• Promotion of private developers for expansion of the industrial park</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>   |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Agencies Responsible  | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <p>Project Implementation: Ministry of Commerce, Trade and Investment (MoCTI), UNS (subject to confirmation)</p> <p>Operation: MoCTI, UNS (subject to confirmation)</p> <p>Maintenance: MoCTI, UNS (subject to confirmation)</p>  | <ul style="list-style-type: none"> <li>• To be confirmed</li> </ul>  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Estimated Cost  | Remarks  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| <p>Expertise: Input of 50 man-months assumed for technical cooperation</p> <p>Total Cost: US\$ 10.00 million (to be confirmed)</p>  |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Implementation Schedule   |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
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|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Planning  |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Engineering/design  |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |
| Implementation  |  |      |      |      |      |      |      |      |      |      |          |  |  |  |  |  |  |  |  |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>EC-9: Logistics Hub Development Project</b>  |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|-------------|--|--|--|--|--|--|--|--|--------------|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <p>Malakal Town is located at the crossroads of international transport corridors, with Ethiopia to the east, and Sudan and Egypt to the north. However, international multi-modal transport is currently inactive and no containers are handled in Malakal Town. This is despite the fact that logistics is deemed as one of the promising areas as an economic driving force.</p> <p>Transport by the Nile River, international roads and the rural road network could be the basis of the potential enhancement of Malakal Town as a logistics centre.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Residents in Greater Upper Nile Region</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Increase in value add</li> <li>Increase of job opportunities</li> <li>Improvement of price stability and reduction of commodity prices</li> <li>Improvement of living conditions</li> </ul> |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Objectives of the Project   | Evaluation of the Project   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To provide infrastructure for the logistics industry to develop Malakal Town into an domestic and international logistics centre</li> <li>To enhance the handling capacity of multi-modal commodities including containers</li> <li>To add value in the commodity flow transaction process</li> </ul>  | <p>a) Economic Viability: to be confirmed.</p> <p>b) Financial Soundness: to be confirmed</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>Combination of grant aid and technical cooperation scheme is assumed initially</li> </ul> <p>d) Environmental Impact</p> <ul style="list-style-type: none"> <li>Negative Impact: to be confirmed</li> </ul>                          |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Near the regional transport node in Malakal Town</li> </ul>  |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Scope of the Project  | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> </ul>  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Planning of logistics centre (site selection, infrastructure, service facilities)</li> <li>Preparation of support programmes (training and business incubation services, IT promotion, incentive measures, etc.)</li> <li>Engineering design and implementation</li> </ul>   | Preconditions   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Agencies Responsible  | Relationship with Other Projects  |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <p>Project Implementation: MoCTI, UNS (subject to confirmation)</p> <p>Operation: MoCTI, UNS (subject to confirmation)</p> <p>Maintenance: MoCTI, UNS (subject to confirmation)</p>   | <ul style="list-style-type: none"> <li>To be confirmed</li> </ul>   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Estimated Cost  | Remarks   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Total Cost: US\$ 10.00 million (to be confirmed)  |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Implementation Schedule   |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th></th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> <th>2021</th> <th>2022</th> </tr> </thead> <tbody> <tr> <td>Plan/design</td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> </tr> </tbody> </table>                        |   |      | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Plan/design |  |  |  |  |  |  |  |  | Construction |  |  |  |  |  |  |  |
|   | 2015  | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Plan/design   |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |
| Construction  |   |      |      |      |      |      |      |      |      |      |             |  |  |  |  |  |  |  |  |              |  |  |  |  |  |  |  |

Source: JICA Project Team

#### (4) Research and Industrial Human Resources Development Programme

| EC-11: Malakal Vocational Training Centre Reinforcement Project   |      |      |  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
|---|------|------|--|------|------|------|------|------|--------------------|---|--|--|--|--|--------------------------------|--|---|--|--|--|--|--|--|--|
| Background of the Project   |      |      | Effects of the Project   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <p>Malakal Vocational Training Centre (MVTC) is an institute under the Ministry of Labour of the South Sudanese Government. It has three types of training courses: apprenticeship training, short course training and upgrading courses for technicians.</p> <p>The training subjects offered include auto-mechanics, diesel machinery, farm machinery, auto-electrics, machine shop, glass blowing (now ceased due to non-availability of job opportunities), carpentry, building, plumbing, fitting (filing), welding/blacksmithing/sheet metal fabrication, general electrics, food processing, tailoring and sewing, computing, driving, and refrigeration and air conditioning. Trainees suffer from various problems such as lack of materials, lack of fuel and low quality of trainers. The priority areas are auto-mechanics, auto-electrics and carpentry.</p> |      |      | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Direct beneficiaries are trainers and trainees of MVTC, while indirect beneficiaries are the population of Malakal and UNS</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Improved quality of training by MVTC and better services for society over the longer term</li> </ul>   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Objectives of the Project   |      |      | Evaluation of the Project  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To improve the quality of vocational training by MVTC by providing training materials and arranging training for trainers in the three priority areas of auto-mechanics, auto-electrics and carpentry</li> </ul>   |      |      | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>NPV: not applicable. Long-term benefit in human development expected</li> </ul> <p>b) Financial Soundness: not applicable</p> <p>c) Finance</p> <ul style="list-style-type: none"> <li>Japanese Grant Aid Scheme assumed</li> </ul> <p>d) Environmental Impact</p> <ul style="list-style-type: none"> <li>Positive Impacts</li> <li>Social stability through improved services (indirect)</li> <li>Negative Impacts</li> <li>No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Location of the Project   |      |      | <p>c) Finance</p> <ul style="list-style-type: none"> <li>Japanese Grant Aid Scheme assumed</li> </ul> <p>d) Environmental Impact</p> <ul style="list-style-type: none"> <li>Positive Impacts</li> <li>Social stability through improved services (indirect)</li> <li>Negative Impacts</li> <li>No specific negative impact is anticipated</li> </ul>   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Malakal Town</li> </ul>  |      |      |  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Scope of the Project  |      |      | External Conditions  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Provision of training materials, equipment and tools for auto-mechanics, auto-electrics and carpentry</li> </ul>   |      |      | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> </ul>   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Agencies Responsible  |      |      | Preconditions  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <p>Project Implementation: Ministry of Labour, ROSS and MVTC<br/>                     Operation: Ministry of Labour, ROSS and MVTC<br/>                     Maintenance: Ministry of Labour, ROSS and MVTC</p>  |      |      | <ul style="list-style-type: none"> <li>MVTC has sufficient capacity for operations and maintenance.</li> </ul>   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Estimated Cost  |      |      | Relationship with Other Projects   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Total Cost: US\$ 0.12 million   |      |      | <ul style="list-style-type: none"> <li>JICA's technical cooperation project (SAVOT)-2 for vocational training for the Ministry of Labour and four vocational training centres in South Sudan (Juba, Wau, Aluak-Luak, Malakal)</li> </ul>   |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Implementation Schedule   |      |      | Remarks  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th>Items</th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> </tr> </thead> <tbody> <tr> <td>Promotion/approval</td> <td>■</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Preparation/tender/procurement</td> <td></td> <td>■</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>   |      |      | Items  | 2012 | 2013 | 2014 | 2015 | 2016 | Promotion/approval | ■ |  |  |  |  | Preparation/tender/procurement |  | ■ |  |  |  |  |  |  |  |
| Items   | 2012 | 2013 | 2014   | 2015 | 2016 |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Promotion/approval  | ■    |      |  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |
| Preparation/tender/procurement  |      | ■    |  |      |      |      |      |      |                    |   |  |  |  |  |                                |  |   |  |  |  |  |  |  |  |

Source: JICA Project Team

### 19.7.3 Social Development Programme

#### (1) Health and Medical Improvement Programme

| <b>HE-1: Primary Health Care Centre Construction Project</b>  |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|--------|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <p>The State Ministry of Health is to ensure that a health facility coverage plan is developed through mapping the number and type of existing facilities and rationalising the location of new health facilities based on the facility/population ratio and evidence generated from epidemiological surveys. The State Ministry requires all stakeholders to abide by the health facility coverage plan, which will contain details on the type and building designs of proposed health facilities. No health agencies should renovate and/or build new facilities outside the framework of the plan without making provisions to equip it appropriately.</p> <p>In addition, the State Ministry is to ensure that newly constructed health facilities are well designed, built at an affordable cost, eco-friendly, and meet the needs of patients and staff. Standards will define the minimum number of rooms for each type of facility. A maintenance programme will be budgeted for and developed at the same time as planning.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Citizens of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Avoidance of concentration of patients at Malakal Teaching Hospital</li> <li>• Contribution to improving the patients' referral system in the county and state</li> </ul>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To construct new Primary Health Care Centres (PHCC) for the east side of Malakal Town, which is assumed will increase in population due to future town planning</li> <li>• To strengthen the referral system of general and emergency health care services in the town</li> <li>• To reduce the workload at Malakal Teaching Hospital</li> </ul>   | <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese Grant Aid has been requested</li> </ul> <p>c) Environmental Impact: <b>Category C</b></p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Improvement of the waste system through introduction of a garbage classification concept (separation of general and medical disposable waste, etc.)</li> <li>• Improvement of accessibility to social/public facilities</li> <li>- Negative Impacts</li> </ul> |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town (northern, central and southern areas of the eastern part of Malakal Town)</li> </ul>   |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Construction of a total of three PHCCs</li> <li>• Construction of PHCCs with inpatient and outpatient clinics (20 beds)</li> <li>• Installation of an elevated water supply system</li> <li>• Installation of a backup power supply system (generator)</li> <li>• Provision of medical equipment</li> <li>• Soft component for maintenance of facilities and equipment</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|   | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|   | <ul style="list-style-type: none"> <li>• Appropriate health staff and maintenance budget are available.</li> <li>• Human resources for maintaining the facilities and equipment are secured.</li> </ul>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Responsible Agency: State Ministry of Health</li> <li>• Project Implementation: Malakal Town Council (to be confirmed)</li> <li>• Operation: Malakal Town Council (to be confirmed)</li> <li>• Maintenance: Malakal Town Council (to be confirmed)</li> </ul>  | <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Preparatory Survey: US\$ 0.50 million</li> <li>• Detailed Design and Supervision Cost: US\$ 0.20 million</li> <li>• Procurement of Goods: <ul style="list-style-type: none"> <li>Facilities: US\$ 4.50 million</li> <li>Water Supply (elevated system): US\$ 0.60 million</li> <li>Backup Generators: US\$ 0.30 million</li> <li>Medical Equipment: US\$ 1.50 million</li> <li>Soft Component: US\$ 0.50 million</li> <li>Total Cost: US\$ 8.10 million</li> </ul> </li> </ul>   |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <table border="1"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>Survey</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Implementation</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  |  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Survey |  |  |  |  |  |  |  |  | Implementation |  |  |  |  |  |  |  |  |  |
|   | 2013   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| Survey  |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| Implementation  |  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |



| <b>HE-3: Health Service Capacity of Four Primary Health Care Centres (PHCCs) Upgrade Project</b>   |   |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|------|---------------|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>The State Ministry of Health is to ensure that a health facility coverage plan is developed through mapping the number and type of existing facilities and rationalising the location of new health facilities, based on the facility/population ratio and evidence generated from epidemiological surveys. The State Ministry requires all stakeholders to abide by the health facility coverage plan, which will contain details on the type and building designs of proposed health facilities. No health agencies should renovate and/or build new facilities outside the framework of the plan without making provisions to equip it appropriately.</p> <p>In addition, the State Ministry is to ensure that newly constructed health facilities are well designed, built at an affordable cost, eco-friendly, and meet the needs of patients and staff. Standards will define the minimum number of rooms for each type of facility. A maintenance programme will be budgeted for and developed at the same time as planning.</p> | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Citizens of Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Avoidance of concentration of patients at Malakal Teaching Hospital</li> <li>• Contribution to improving the patents' referral system in the county and state</li> </ul>   |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>• To upgrade the health service capabilities of four health centres to cater for the increasing population of the town</li> <li>• To provide appropriate basic health services for all citizens living in the town</li> </ul>   | <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese Grant Aid has been requested</li> </ul> <p>c) Environmental Impact: <b>Category C</b></p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• Improvement of the west system through introduction of garbage classification concept (separation of general and medical disposable, etc.)</li> <li>• Improvement to accessibility to social/public facilities</li> </ul> <p>- Negative Impacts</p> |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>• Malakal Town (Malakia, Assossa, Lwakat, Bam)</li> </ul>   | <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul> <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>• Appropriate health staff and maintenance budget are available.</li> <li>• Human resources for maintaining the facilities and equipment are secured.</li> </ul>  |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <ul style="list-style-type: none"> <li>• Expansion of inpatient wards (20 beds)</li> <li>• Renovation of toilet facilities</li> <li>• Installation of an elevated water supply system</li> <li>• Installation of a backup power supply system (generator)</li> <li>• Provision of medical equipment</li> <li>• Soft component for maintenance of facilities and equipment</li> </ul>  | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>• Responsible Agency: State Ministry of Health</li> <li>• Project Implementation: Malakal City Council (to be confirmed)</li> <li>• Operation: Malakal City Council (to be confirmed)</li> <li>• Maintenance: Malakal City Council (to be confirmed)</li> </ul>  | <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>• Preparatory Survey: US\$ 0.50 million</li> <li>• Detailed Design and Supervision Cost: US\$ 0.20 million</li> <li>• Procurement of Goods: <ul style="list-style-type: none"> <li>Facilities and Toilets: US\$ 2.40 million</li> <li>Water Supply (elevated system): US\$ 0.80 million</li> <li>Backup Generators: US\$ 2.00 million</li> <li>Medical Equipment: US\$ 2.00 million</li> <li>Soft Component: US\$ 0.50 million</li> <li>Total Cost: US\$ 8.40 million</li> </ul> </li> </ul>      |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">Survey/design</td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: left;">Implementation</td> <td></td> <td></td> <td></td> <td style="background-color: #cccccc;"></td> <td style="background-color: #000000;"></td> <td style="background-color: #000000;"></td> <td></td> <td></td> </tr> </tbody> </table>  |   |      | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Survey/design |  |  |  |  |  |  |  |  | Implementation |  |  |  |  |  |  |  |  |
|  | 2013  | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| Survey/design  |   |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| Implementation   |   |      |      |      |      |      |      |      |      |      |               |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>HE-4: Retrieval of Medical/Health Faculty in UNU Project</b>  |  |      |      |      |      |      |      |      |
|--|--|------|------|------|------|------|------|------|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |
| <p>The State Ministry of Health is to ensure the development of health-related human resources through improvement of UNU in Malakal Town. After the country gained independence from Sudan, the Medical Faculty of the UNU was still in a preliminary stage due to a lack of financial resources.</p> <p>The Medical Faculty of the UNU covers three states in the northern part of the country in terms of health-related human resources, of which these states are in urgent need. Therefore, the State Ministry has requested this project as one of its top priorities.</p> <p>A maintenance programme will be budgeted for and will be developed at the same time as the facility is planned.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Citizens of three states in the northern part of the country</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Fostering of health-related human resources (doctors and nurses) for three states of the northern part of the country</li> <li>• Contribution to improvement of medical/health services for patients</li> </ul>                                    |      |      |      |      |      |      |      |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• To foster capacity of doctors and nurses</li> <li>• To improve medical care services</li> </ul>   | <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese Grant Aid has been requested</li> </ul> <p>c) Environmental Impact: Category C</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• Improvement of health-related human resources (both qualitatively and quantitatively)</li> <li>• Improvement of accessibility to proper medical services and welfare</li> </ul> <p>- Negative Impacts</p> |      |      |      |      |      |      |      |
| <b>Location of the Project</b>   |  |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Malakal Town (UNU)</li> </ul>   |  |      |      |      |      |      |      |      |
| <b>Scope of the Project</b>  | <b>External Conditions</b>   |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Construction of a medical faculty</li> <li>• Construction of facilities for medical sciences education</li> <li>• Provision of equipment for health education</li> <li>• Installation of a backup power supply (generator)</li> <li>• Arrangement of personnel in the medical/health sector</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |
| <b>Agencies Responsible</b>  | <b>Preconditions</b>   |      |      |      |      |      |      |      |
|  | <ul style="list-style-type: none"> <li>• Appropriate health staff (teachers, etc.) and maintenance budget are available.</li> <li>• Human resources for maintaining facilities and equipment are secured.</li> </ul>   |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Responsible Agency: Ministry of Education, Science and Technology (MOEST)</li> <li>• Project Implementation: MOEST (to be confirmed)</li> <li>• Operation: MOEST (to be confirmed)</li> <li>• Maintenance: MOEST (to be confirmed)</li> </ul>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |
|  | <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |
| <b>Estimated Cost</b>  |  |      |      |      |      |      |      |      |
| <ul style="list-style-type: none"> <li>• Preparatory Survey: US\$ 0.50 million</li> <li>• Detailed Design and Supervision Cost: US\$ 0.20 million</li> <li>• Procurement of Goods: <ul style="list-style-type: none"> <li>Construction of Facilities: US\$ 8.00 million</li> <li>Water Supply (elevated system): US\$ 0.20 million</li> <li>Backup Generators: US\$ 0.20 million</li> <li>Education Equipment: US\$ 2.00 million</li> <li>Soft Component: US\$ 0.40 million</li> <li>Total Cost: US\$ 11.50 million</li> </ul> </li> </ul>   |  |      |      |      |      |      |      |      |
| <b>Implementation Schedule</b>   |  |      |      |      |      |      |      |      |
|  | 2013   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Survey/design  |  |      |      |      |      |      |      |      |
| Implementation   |  |      |      |      |      |      |      |      |

Source: JICA Project Team



| <b>HE-5: Urban Malaria Control Programme</b>  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|-----------------|--|---|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <p>Malaria is the main killer disease in the state, accounting for 41% of the total outpatients in hospitals across the state. The State Ministry of Health is engaged in preventive measures to combat this endemic disease.</p> <p>In the State Health Policy, malaria control is one of most challenging diseases to control (eradication).</p> <p>Control will be achieved through integrated deployment of evidence-based and cost-effective interventions, especially through case management and vector control.</p>   | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• The whole population of Makal County</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Improvement of citizen's knowledge of malaria prevalence in Makal County</li> <li>• Decrease in malaria patients compared to 2012</li> </ul>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To decrease the malaria pandemic, as well as number of patients</li> <li>• To increase the prevalence rate of bed net use</li> <li>• To promote citizens' awareness of the necessity of malaria control through mass campaigns</li> </ul>  | <p>a) Economic Viability</p> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Requested Japanese Grant Aid and technical cooperation</li> </ul> <p>c) Environmental Impact: Category C</p> <p>- Positive Impacts</p> <ul style="list-style-type: none"> <li>• Improvement of environmental management, such as construction of canals and improvement of rainwater drainage, etc.</li> <li>• Improvement of accessibility to social/public facilities</li> </ul> <p>- Negative Impacts</p> |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Distribution of insecticide-treated mosquito nets</li> <li>• Building of capacity of staff engaged in malaria control and prevention initiatives to assist with distribution of long-lasting insecticide-treated nets (LLIN) and sensitisation of the targeted communities</li> <li>• Delivery of a mass campaign to spread messages about malaria prevention</li> <li>• Delivery of outdoor/indoor (residual) spraying and environmental management (improvement of canals and drainage for rainwater)</li> <li>• Provision of sufficient manpower for vector control</li> <li>• Provision of insecticides and equipment for vector control</li> </ul>  | <ul style="list-style-type: none"> <li>• Contribution to citizens' health.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|   | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
|   | <ul style="list-style-type: none"> <li>• Health sector strategy of the State MOH has no change.</li> <li>• Budget for maintenance is secured.</li> <li>• Necessary funds are available.</li> </ul>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Responsible Agency: State Ministry of Health</li> <li>• Operation: Malakal Town Council (to be confirmed)</li> <li>• Maintenance: Malakal Town Council (to be confirmed)</li> <li>• Project Implementation: Malakal Town Council (to be confirmed)</li> </ul>  | <ul style="list-style-type: none"> <li>• None</li> </ul>   |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Preparatory Survey: US\$ 0.50 million</li> <li>• Detailed Design and Supervision Cost: US\$ 0.50 million</li> <li>• Procurement of Goods: <ul style="list-style-type: none"> <li>Consumables and Equipment: US\$ 3.50 million</li> <li>Total Cost: US\$ 4.50 million</li> </ul> </li> </ul>  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 5%;">2013</th> <th style="width: 5%;">2014</th> <th style="width: 5%;">2015</th> <th style="width: 5%;">2016</th> <th style="width: 5%;">2017</th> <th style="width: 5%;">2018</th> <th style="width: 5%;">2019</th> <th style="width: 5%;">2020</th> </tr> </thead> <tbody> <tr> <td>Detailed design</td> <td></td> <td style="text-align: center;">□</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Implementation</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Detailed design |  | □ |  |  |  |  |  |  | Implementation |  |  |  |  |  |  |  |  |  |
|   | 2013   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| Detailed design   |  | □    |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |
| Implementation  |  |      |      |      |      |      |      |      |      |                 |  |   |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>HE-6: EPI (DPT3, Measles) Vaccination Promotion Project</b>  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|--------------------|--|--|--|--|--|--|--|--|----------------|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <p>Newborn babies between 9-59 months are given one dose of vaccination for measles and DPT3 at an average cost per child of \$US 0.5 in South Sudan. The overall cost for a measles-vaccinated child (MVC) appears quite low compared to estimates from other neighbouring African countries.</p> <p>The coverage of EPI in Makal County is still less than 30%, which is very low, even in UNS.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>Newborn babies (9-59 months) in Makal County</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>Avoidance of preventable disease (measles)</li> <li>Improvement of citizens' knowledge in Makal County concerning public health</li> </ul>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>To increase EPI (DPT3, Measles) vaccination coverage for newborns (9-59 months) in Makal County</li> <li>To decrease vaccine preventable diseases such as tetanus and measles in newborn babies (9-59 months) in Makal County</li> </ul>   | <p>a) Financial Soundness</p> <ul style="list-style-type: none"> <li>Japanese Grant Aid has been requested.</li> </ul> <p>b) Environmental Impact: Category C</p> <p>- Positive Impact</p> <ul style="list-style-type: none"> <li>Epidemic disease will be decreased.</li> </ul> <p>- Negative Impact</p>  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Makal County</li> </ul>  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Provision of vaccines</li> <li>Improvement of cold chain system with necessary infrastructure</li> <li>Support for EPI campaign twice a year</li> </ul>  | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> <li>Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
|   | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
|   | <ul style="list-style-type: none"> <li>Appropriate health staff are allocated for activities.</li> <li>Local components for human resources</li> </ul>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Responsible Agency: State Ministry of Health</li> <li>Project Implementation: Malakal Town Council (to be confirmed)</li> <li>Operation: Malakal Town Council (to be confirmed)</li> <li>Maintenance: Malakal Town Council (to be confirmed)</li> </ul>  | <ul style="list-style-type: none"> <li>None</li> </ul>   |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>Preparatory survey: US\$ 0.50 million</li> <li>Implementation: <ul style="list-style-type: none"> <li>Provision of vaccine: US\$ 1.00 million</li> <li>Cold chain system : US\$ 2.00 million</li> <li>Promotion campaign: US\$ 0.50 million</li> <li>Strengthen surveillance: US\$ 0.50 million</li> <li>Total Cost: US\$ 4.50 million</li> </ul> </li> </ul>  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
|   | <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>Preparatory Survey</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Implementation</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> |      | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Preparatory Survey |  |  |  |  |  |  |  |  | Implementation |  |  |  |  |  |  |  |  |
|   | 2013   | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| Preparatory Survey  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |
| Implementation  |  |      |      |      |      |      |      |      |      |      |                    |  |  |  |  |  |  |  |  |                |  |  |  |  |  |  |  |  |

Source: JICA Project Team



## (2) Education Improvement Programme

| <b>ED-1: Primary School Establishment and Renovation Project</b>  |   |
|---|---|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>   |
| <p>50% of the population is estimated to be under 18 years old. This creates a massive need and demand for education at all levels, and approximately 1.3 million primary school children are currently not attending school. The situation is even worse for girls—a girl is three times more likely to die in childbirth than to enter Grade 8 (UNESCO, 2011).</p> <p>The ratio of qualified teachers to students is 117:1 as only 13% of teachers are qualified (SSDP, 2011). Since the CPA of 2005, enrolments have dramatically increased. While this is a positive indication of development, the rapid rise in enrolments without development of the necessary infrastructure has resulted in a rise in the student-to-classroom ratio to over 248:1 for permanent classrooms and 134:1 for all classroom types (SSDP, 2011).</p> <p>Furthermore, one third of schools do not have safe drinking water, while half of schools lack latrines of any kind. The vast majority of classes are still held under trees, with only about 25% of classrooms in permanent structures.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Children in Malakal Town</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Increase in access to education for additional</li> <li>• Improved focus in class for students</li> </ul>   |
|   | <b>Evaluation of the Project</b>  |
|   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Total benefits four new schools</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese Grant Aid has been requested for community</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Enhancement of educational opportunities</li> <li>- Negative Impacts</li> <li>• Creation of a feeling of inequality among non-beneficiaries</li> </ul> |
| <b>Objectives of the Project</b>  | <b>External Conditions</b>  |
| <ul style="list-style-type: none"> <li>• To increase learning spaces to enhance effective learning for Malakal Town</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>  |
| <b>Location of the Project</b>  | <b>Preconditions</b>  |
| <ul style="list-style-type: none"> <li>• Sah, Hay Matar, Asosa and Hay Temia primary schools</li> </ul>   | <ul style="list-style-type: none"> <li>• MOE will operate the school after construction.</li> <li>• Necessary funds are available.</li> <li>• Materials are obtained within the budget.</li> </ul>  |
| <b>Scope of the Project</b>   | <b>Relationship with Other Projects</b>   |
| <p>Construction of one school:</p> <ul style="list-style-type: none"> <li>• Class block 1, class block 2, office block</li> <li>• 4-cubicle toilet × 2</li> <li>• 2 sewage disposal pits</li> <li>• 2 cubicle toilets</li> <li>• 1 sewage disposal pit</li> <li>• Engineering design and supervision</li> </ul>   | <ul style="list-style-type: none"> <li>• The “School Construction Project” of the State Ministry of Education and other organisations will provide necessary information for this project.</li> <li>• There are about 20 donors and NGOs in Malakal. They have formed an “education cluster” and implemented several projects.</li> </ul>   |
| <b>Agencies Responsible</b>   |   |
| <ul style="list-style-type: none"> <li>• Project Implementation: Ministry of Education (MOE)</li> <li>• Operation: MOE</li> <li>• Maintenance: MOE</li> </ul>   |   |
| <b>Estimated Cost</b>   |   |
| <ul style="list-style-type: none"> <li>• Detailed Design and Supervision Cost (1 school): US\$ 10,000</li> <li>• Construction: <ul style="list-style-type: none"> <li>Material: US\$ 0.120 million</li> <li>Labour: US\$ 0.40 million</li> <li>Contingency: US\$ 0.05 million</li> <li>Total Cost (1 school): US\$ 0.58 million</li> <li>Total Cost (4 school): US\$ 2.30 million</li> </ul> </li> </ul>  |   |
| <b>Implementation Schedule</b>  |   |
| *Mobil: Mobilisation  |   |
| * D&B: Design and Building  |   |

Source: JICA Project Team


| <b>ED-2: Strengthening Mathematics and Science Education Project</b>   |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
|--|---|------|------|------|------|------|------|------|------|--------|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|--|--|
| Background of the Project  | Effects of the Project  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <p>After the CPA of 2005, enrolments have dramatically increased. However, the quality of teachers is low. Teachers are few, under qualified, poorly compensated, under supervised, and are often late or absent. 51.5% of primary teachers have either only primary school education, limited lower secondary education, or their education status is unknown.</p> <p>To address this issue, JICA is conducting the Strengthening Mathematics and Science Education (SMASSE) Project in Juba. Although some UNS teachers have attended this project, the Study Team proposes this project is extended to the whole of UNS. Based on the experience of the current SMASSE project in Juba, this project should encourage the Ministry of Education, Science and Technology (MOEST) to implement the project. Project team support only when MOEST try to implement SMASSE project.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Primary teachers in UNS</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Improvement of science and mathematics classes</li> <li>• Improvement of teacher training system</li> </ul>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Objectives of the Project  | Evaluation of the Project   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To provide technical guidance and advice on training for mathematics and science teachers at the primary level</li> </ul>   | <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that science and mathematics classes will be improved for students.</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Japanese technical assistance has been requested</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impact</li> <li>• Improvement to education quality</li> <li>- Negative Impact</li> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Location of the Project  | External Conditions   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Upper Nile State</li> </ul>   | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Counterpart agencies for the project have sufficient capacity to undertake training.</li> </ul>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Scope of the Project   | Preconditions   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <p>Technical Transfer of:</p> <ul style="list-style-type: none"> <li>• Assessment of current teacher capacity</li> <li>• Assessment of government capacity to plan and implement teacher training</li> <li>• Provision of cooperation for current teacher training</li> </ul>  | <ul style="list-style-type: none"> <li>• Requested Japanese aid is granted.</li> </ul>  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Agencies Responsible   | Relationship with Other Projects  |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <p>Project Implementation: MOEST</p> <ul style="list-style-type: none"> <li>• Counterpart: MOEST</li> <li>• Operation: MOEST</li> </ul>  | <ul style="list-style-type: none"> <li>• Cooperation with “Strengthening Mathematics and Science Education Project” in Juba.</li> </ul>   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Estimated Cost   |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Input: <ul style="list-style-type: none"> <li>• Project Implementation: 2 long-term experts<br/>(Project leader, science and mathematics education)<br/>(Short-term expert (as required))<br/>US\$ 3.00 million</li> </ul> </li> </ul> <p>Total Cost: US\$ 3.00 million</p>   |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Implementation Schedule  |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> </tr> </thead> <tbody> <tr> <td>Manage</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C&amp;B</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>*Manage: Ensure the management cycle<br/>*C&amp;B: Capacity building for teachers and staff</p>   |   | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Manage |  |  |  |  |  |  |  |  | C&B |  |  |  |  |  |  |  |  |  |
|  | 2012  | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| Manage   |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |
| C&B  |   |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team


| <b>ED-3: Capacity Building of State Ministry of Education Project</b>  |  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
|--|--|------|------|------|------|------|------|------|------|------|--------|--|--|--|--|--|--|--|--|-----|--|--|--|--|--|--|--|
| <p><b>Background of the Project</b></p> <p>The Ministry of General Education and Instruction in UNS is responsible for primary and secondary education in the state. However, its capacity for managing, supervising and monitoring schools is low in terms of abilities and capabilities.</p> <p>As a result, poor management, supervision and monitoring lead to a low quality of education in schools. According to directorate planning and statistics, staff (including at the director level) in UNS are not able to manage schools well, nor can inspectors monitor schools well. In addition, they do not have transportation vehicles for monitoring schools.</p>   | <p><b>Effects of the Project</b></p> <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• Staffs and inspectors at MoE</li> </ul> <p>b) Effects</p> <ul style="list-style-type: none"> <li>• Enhancement of management capacity for staff</li> <li>• Increase in monitoring ability of inspectors</li> </ul> <p><b>Evaluation of the Project</b></p> <p>a) Economic Viability</p> <ul style="list-style-type: none"> <li>• 3 vehicles and 1 car</li> </ul> <p>b) Financial Soundness</p> <ul style="list-style-type: none"> <li>• Requested Japanese Technical Assistance</li> </ul> <p>c) Environmental Impact</p> <ul style="list-style-type: none"> <li>- Positive Impacts</li> <li>• Enhancement of capacity of staff and inspectors</li> <li>- Negative Impacts</li> <li>• No specific negative impact is anticipated</li> </ul> |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Objectives of the Project</b></p> <ul style="list-style-type: none"> <li>• To improve and strengthen management, supervision and monitoring capacity for staff and inspectors at the MoE</li> </ul>  | <p><b>External Conditions</b></p> <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> <li>• Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Location of the Project</b></p> <ul style="list-style-type: none"> <li>• MoE in UNS</li> </ul>   | <p><b>Preconditions</b></p> <ul style="list-style-type: none"> <li>• Trained staff and inspectors continue to work after training.</li> <li>• Necessary funds are available.</li> </ul>  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Scope of the Project</b></p> <p>Technical Transfer of:</p> <ul style="list-style-type: none"> <li>• Assessment of government staff capacity at MoE to manage schools</li> <li>• Assessment of school conditions and teacher performance by inspectors</li> </ul> <p>Equipment Provision:</p> <ul style="list-style-type: none"> <li>• 3 bikes</li> <li>• 1 car (4WD)</li> </ul>  | <p><b>Relationship with Other Projects</b></p> <ul style="list-style-type: none"> <li>• Strengthening Mathematics and Science Education Project.</li> </ul>  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Agencies Responsible</b></p> <ul style="list-style-type: none"> <li>• Project Implementation: MoE, UNS</li> <li>• Operation: MoE, UNS</li> <li>• Maintenance: MoE, UNS</li> </ul>  |  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Estimated Cost</b></p> <ul style="list-style-type: none"> <li>• Input: 3 long-term experts</li> <li>• (Project leader, management specialist, monitoring specialist)</li> <li>• Short-term expert (as necessary)</li> <li>• 50MM</li> <li>• Detailed Design and Supervision Cost (1 school): US\$ 10,000</li> <li>• Equipment Provision Cost: <ul style="list-style-type: none"> <li>3 bikes: US\$ 9,000</li> <li>1 car: US\$ 30,000</li> </ul> </li> </ul>  |  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| <p><b>Implementation Schedule</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> </tr> </thead> <tbody> <tr> <td>Manage</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>C&amp;B</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>*Manage: Ensure the management cycle<br/>* C&amp;B: Capacity building</p> |  |      | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Manage |  |  |  |  |  |  |  |  | C&B |  |  |  |  |  |  |  |
|  | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| Manage   |  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |
| C&B  |  |      |      |      |      |      |      |      |      |      |        |  |  |  |  |  |  |  |  |     |  |  |  |  |  |  |  |

Source: JICA Project Team

### (3) Social Safety Net Programme

| <b>SW-1: BHN for Returnees Project</b>   |  |  |        |      |      |      |              |  |  |        |
|--|--|--|--------|------|------|------|--------------|--|--|--------|
| Background of the Project  | Effects of the Project   |  |        |      |      |      |              |  |  |        |
| The population of returnees in Malakal Town in 2012 was estimated at 15,300. Almost all those returnees are currently living in the eastern area east of the Ring Road and the southern area of Malakal Town outside of the existing urban area. No infrastructure has been provided to these areas as yet. The population living in those areas is expected to continue to expand.  | a) Target Beneficiaries  |  |        |      |      |      |              |  |  |        |
|  | <ul style="list-style-type: none"> <li>• About 10,000 inhabitants living in the area east of the Ring Road</li> </ul>  |  |        |      |      |      |              |  |  |        |
| Objectives of the Project  | b) Effects of the Project  |  |        |      |      |      |              |  |  |        |
|  | <ul style="list-style-type: none"> <li>• Ensuring basic living conditions of returnees</li> </ul>  |  |        |      |      |      |              |  |  |        |
| <ul style="list-style-type: none"> <li>• To provide BHN infrastructure (water supply, schools, public toilets, health facilities, etc.) in the area east of the Ring Road to secure sufficient living conditions for survival</li> </ul>   | Evaluation of the Project  |  |        |      |      |      |              |  |  |        |
|  | a) Economic Viability  |  |        |      |      |      |              |  |  |        |
| Location of the Project  | <ul style="list-style-type: none"> <li>• Although no economic analysis has been undertaken, it is expected that basic living conditions of the inhabitants of the area east of the Ring Road where no infrastructure is provided as yet will improve.</li> </ul> |  |        |      |      |      |              |  |  |        |
|  | b) Financial Soundness   |  |        |      |      |      |              |  |  |        |
| <ul style="list-style-type: none"> <li>• Area east of the Ring Road in Malakal Town</li> </ul>   | c) Environmental Impact: <b>Category C</b>   |  |        |      |      |      |              |  |  |        |
|  | - Positive Impacts   |  |        |      |      |      |              |  |  |        |
| Scope of the Project   | <ul style="list-style-type: none"> <li>• Improvement of hygiene services and living standards</li> </ul>   |  |        |      |      |      |              |  |  |        |
|  | - Negative Impacts   |  |        |      |      |      |              |  |  |        |
| <ul style="list-style-type: none"> <li>• Construction of health facility (PHCU)</li> <li>• Construction of primary school</li> <li>• Construction of public toilets</li> </ul>   | • No specific negative impact is anticipated   |  |        |      |      |      |              |  |  |        |
|  | External Conditions  |  |        |      |      |      |              |  |  |        |
| Agencies Responsible   |  |  |        |      |      |      |              |  |  |        |
|  | Preconditions  |  |        |      |      |      |              |  |  |        |
| <ul style="list-style-type: none"> <li>• Project Implementation: MoE, MoH, MoPI&amp;RD</li> <li>• Operation: MoE, MoH, MoPI&amp;RD</li> <li>• Maintenance: MoE, MoH, MoPI&amp;RD</li> </ul>  | <ul style="list-style-type: none"> <li>• Necessary funds are available.</li> <li>• Cooperation work is undertaken between relevant ministries</li> </ul>   |  |        |      |      |      |              |  |  |        |
|  | Relationship with Other Projects   |  |        |      |      |      |              |  |  |        |
| Estimated Cost   | <ul style="list-style-type: none"> <li>• Small-scale water supply project, 2012-14, JICA</li> </ul>  |  |        |      |      |      |              |  |  |        |
| PHCU Construction: US\$ 1.2 million<br>Primary School Construction: US\$ 2.4 million<br>Public Toilets: US\$ 0.8 million<br><ul style="list-style-type: none"> <li>• Total Cost: US\$ 5.0 million (to be confirmed)</li> </ul>   | Location Map   |  |        |      |      |      |              |  |  |        |
|  | Implementation Schedule  |  |        |      |      |      |              |  |  |        |
|  |  |  |        |      |      |      |              |  |  |        |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 10%;">2012</th> <th style="width: 10%;">2013</th> <th style="width: 10%;">2014</th> <th style="width: 10%;">2015</th> </tr> </thead> <tbody> <tr> <td>Construction</td> <td></td> <td></td> <td style="background-color: black; color: black;">██████</td> <td></td> </tr> </tbody> </table> |  |  | 2012   | 2013 | 2014 | 2015 | Construction |  |  | ██████ |
|  | 2012   | 2013   | 2014   | 2015 |      |      |              |  |  |        |
| Construction   |  |  | ██████ |      |      |      |              |  |  |        |

Source: JICA Project Team

| <b>SW-2: Malakal Street Children Centre Renovation Project</b>  |  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
|---|--|-------|------|------|------|--------------------|--|---|--|-------------------|--|--|---|--------|--|--|---|--------------|--|--|---|--------------|--|--|---|-----------|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| There are about 200 children accommodated in the Street Children Centre in Malakal (photos attached). These children were previously street children abandoned by their parents for different reasons. The physical environment of the centre is deteriorated and not suitable as a healthy environment for children, with a broken roof, unsanitary toilet, and no beds, sheets, blankets or mosquito nets. Children are currently sleeping on the concrete floor. Urgent improvement is needed.                                   | a) Target Beneficiaries <ul style="list-style-type: none"> <li>About 200 children aged from about 10 years old to 20 years old, who were previously street children but are now accommodated at the existing Street Children Centre</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>Improved living conditions for children</li> </ul>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <ul style="list-style-type: none"> <li>To improve the physical living environment of the Street Children Centre so that children can grow up in comfort and with dignity</li> </ul>   | a) Economic Viability <ul style="list-style-type: none"> <li>NPV: not applicable. Long-term benefit of human development expected</li> </ul> b) Financial Soundness: not applicable                     c) Finance <ul style="list-style-type: none"> <li>Japanese Grant Aid assumed</li> </ul> d) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impact:                             <ul style="list-style-type: none"> <li>Social stability through supporting the socially vulnerable young population</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> </li> </ul> |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Location of the Project</b>  |  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <ul style="list-style-type: none"> <li>Malakal Town, where the existing street children centre is located</li> </ul>  |  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <ul style="list-style-type: none"> <li>Renovation of the existing structure to create a children's room, canteen and toilet</li> <li>Construction of security guard watch house</li> <li>Provision of beds, sheets, blankets, mosquito nets, tables and chairs, utensils</li> </ul>   | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> <li>Street children problem continues.</li> </ul>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
|   | <b>Preconditions</b>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
|   | <ul style="list-style-type: none"> <li>Responsible agency for operations and maintenance has sufficient capacity.</li> </ul>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Project Implementation: State Ministry of Gender, Social Welfare and Religious Affairs and Malakal City Council<br>Operation and Maintenance: State Ministry of Gender, Social Welfare and Religious Affairs and Malakal City Council   | <ul style="list-style-type: none"> <li>None</li> </ul>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Estimated Cost</b>   | <b>Remarks</b>   |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Total Cost: US\$ 0.02 million   |  <p>Children sleep on the floor. They have no beds.</p>  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| <b>Implementation Schedule</b>  |  |       |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
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| Items   | 2012   | 2013  | 2014 |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Promotion/approval  |  | ■     |      |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Survey and design   |  |       | ■    |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Tender  |  |       | ■    |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Mobilisation  |  |       | ■    |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Construction  |  |       | ■    |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |
| Equipment   |  |       | ■    |      |      |                    |  |   |  |                   |  |  |   |        |  |  |   |              |  |  |   |              |  |  |   |           |  |  |

Source: JICA Project Team




| <b>SW-3: MoGSW Speed Boat Project</b>   |   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
|---|---|-------|------|------|------|------|--------------------|--|--|---|--|--------------------|--|--|--|---|----------|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| The State Ministry of Gender and Social Welfare UNS (MoGSW), faces the problem of a lack of transportation means. It is unable to dispatch its officers to counties to solve problems and make assessments of the conditions. Officers are also not able to rescue rape victims and transport them to Malakal Hospital or conduct awareness activities for peacebuilding and HIV/AIDS. The problem worsens during the rainy season. MGSWRA will be able to undertake its activities more effectively and efficiently once speed boats are made available. | a) Target Beneficiaries <ul style="list-style-type: none"> <li>• Direct beneficiaries are the officers of MOGSW, while indirect beneficiaries are vulnerable people needing urgent support</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Improvement in the effectiveness and efficiency of MOGSW activities</li> </ul>   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <ul style="list-style-type: none"> <li>• To improve the effectiveness and efficiency of MOGSW's activities in supporting vulnerable populations by providing two speed boats for officers to visit counties</li> </ul>  | a) Economic Viability <ul style="list-style-type: none"> <li>• NPV: not applicable.</li> <li>• Enhancement of efficiency in supporting vulnerable populations</li> </ul> b) Financial Soundness: not applicable<br>c) Finance <ul style="list-style-type: none"> <li>• Grant aid scheme assumed</li> </ul> d) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>• Increase in social stability by supporting socially vulnerable populations</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> </li> </ul> |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Location of the Project</b>  |   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town</li> </ul>  |   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <ul style="list-style-type: none"> <li>• Provision of two speed boats</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
|   | <b>Preconditions</b>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
|   | <ul style="list-style-type: none"> <li>• MOGSW has sufficient capacity for operations and maintenance.</li> </ul>   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| Project Implementation: MOGSW<br>Operation & Maintenance: MOGSW   | <ul style="list-style-type: none"> <li>• None</li> </ul>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Estimated Cost</b>   | <b>Remarks</b>  |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| Procurement of two speed boats: US\$ 0.1 million/boat x 2 boats<br>= US\$ 0.2 million   |   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| <b>Implementation Schedule</b>  |   |       |      |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
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| Items   | 2012  | 2013  | 2014 | 2015 |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| Promotion/approval  |   |       | ■    |      |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| Tender/procurement  |   |       |      | ■    |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |
| Delivery  |   |       |      | ■    |      |      |                    |  |  |   |  |                    |  |  |  |   |          |  |  |  |

Source: JICA Project Team

| <b>SW-4: Malakal Reformatory Centre Establishment Project</b>   |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
|---|---|-------|------|------|------|--------------------|--|--|--|-------------------|--|--|--|--------|--|--|--|--------------|--|--|--|--------------|--|--|--|------------------------------|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Juvenile delinquents are currently imprisoned at Malakal Prison together with adult prisoners. This situation makes it difficult to provide corrective education to juvenile delinquents.   | a) Target Beneficiaries <ul style="list-style-type: none"> <li>Juvenile delinquents currently imprisoned at Malakal Prison</li> </ul> b) Effects <ul style="list-style-type: none"> <li>Increase in social stability through better corrective education for juvenile delinquents</li> </ul>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <ul style="list-style-type: none"> <li>To establish a reformatory centre for juvenile delinquents in order to create an environment in which corrective education can be provided</li> </ul>  | a) Economic Viability <ul style="list-style-type: none"> <li>NPV: not applicable.</li> <li>Long-term benefit in human development expected</li> </ul> b) Financial Soundness: not applicable<br>c) Finance <ul style="list-style-type: none"> <li>Japanese Grant Aid assumed</li> </ul> d) Environmental Impact <ul style="list-style-type: none"> <li>- Positive Impacts                             <ul style="list-style-type: none"> <li>Social stability through correction of juvenile delinquents</li> </ul> </li> <li>- Negative Impacts                             <ul style="list-style-type: none"> <li>No specific negative impact is anticipated</li> </ul> </li> </ul> |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Location of the Project</b>  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <ul style="list-style-type: none"> <li>Malakal Town (near UNMIS)</li> </ul>   |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Scope of the Project</b>   | <b>External Conditions</b>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <ul style="list-style-type: none"> <li>Construction of reformatory building and exterior</li> <li>Provision of beds, sheets, blanket, mosquito nets, tables, chairs, utensils etc.</li> </ul>   | <ul style="list-style-type: none"> <li>Peace and order is maintained.</li> </ul>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
|   | <b>Preconditions</b>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
|   | <ul style="list-style-type: none"> <li>MOGSWRA has the sufficient capacity for operating and maintaining the reformatory centre.</li> </ul>   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Agencies Responsible</b>   | <b>Relationship with Other Projects</b>   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Project Implementation: Ministry of Gender, Social Affairs and Religious Affairs, UNS (MGOSW)<br>Operation & Maintenance: Same  | <ul style="list-style-type: none"> <li>None</li> </ul>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Estimated Cost</b>   | <b>Remarks</b>  |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Total: US\$ 1.05 million  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| <b>Implementation Schedule</b>  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
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| Items   | 2013  | 2014  | 2015 |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Promotion/approval  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Survey and design   |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Tender  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Mobilisation  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Construction  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |
| Provision of equipment, etc.  |   |       |      |      |      |                    |  |  |  |                   |  |  |  |        |  |  |  |              |  |  |  |              |  |  |  |                              |  |  |

Source: JICA Project Team

| <b>SW-6: Malakal Town Women's Group Community Empowerment Project</b>  |  |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
|--|--|------|------|------------|------|------|------|------|----------------|--|--|--|------------|--|--|--|--|
| <b>Background of the Project</b><br>The Pilot Project (the Urgent Small-scale Water Supply Development Project) will construct 22 public taps. The beneficiaries are expected to form a Water User's Committee. However, the communities where the Pilot Project will be implemented have only been formed recently. Residents of these communities are mostly returnees, may be stable and weak to collaborate to work together with other residents. To promote solidarity in the communities, this project will give opportunities for woman water users to participate in various training sessions. | <b>Effects of the Project</b><br>a) Target Beneficiaries: <ul style="list-style-type: none"> <li>• Women water users of the Pilot Project</li> </ul> b) Effects <ul style="list-style-type: none"> <li>• Enhancement of solidarity in communities</li> <li>• Strengthening of community ties and reintegration of returnees</li> </ul> |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Objectives of the Project</b> <ul style="list-style-type: none"> <li>• To empower and support the reintegration of women in newly expanded areas in Malakal Town</li> <li>• To encourage women water users in communities to form groups together with other residents</li> <li>• To provide women water users with knowledge and skills to improve livelihoods (women who are not water users will be also invited)</li> </ul>   | <b>Evaluation of the Project</b><br>a) Economic Viability: Fair<br>b) Financial Soundness: Good<br>c) Environmental Impact: Category C   |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Location of the Project</b> <ul style="list-style-type: none"> <li>• Eastern Payam and Southern Payam of Malakal Town</li> </ul>  | <b>External Conditions</b> <ul style="list-style-type: none"> <li>• Local NGO/s with experience of community development is/are identified.</li> </ul>   |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Scope of the Project</b> <ul style="list-style-type: none"> <li>• Organisation of workshops for women water users</li> <li>• Selection of a training courses (cooking, sewing, hygiene, home economics, forestation, kitchen gardening, literacy education, etc.)</li> <li>• Strengthening of knowledge and skills of women water users for the improvement of livelihoods</li> </ul>   | <b>Preconditions</b> <ul style="list-style-type: none"> <li>• Water user's committee is formed by the Pilot Project.</li> </ul>  |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Agencies Responsible</b> <ul style="list-style-type: none"> <li>• Local government (Eastern Payam and Southern Payam)/NGO/s</li> </ul>  | <b>Relationship with Other Projects</b> <ul style="list-style-type: none"> <li>• The Urgent Small-scale Water Supply Development Project (Pilot Project)</li> </ul>  |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Estimated Cost</b> <ul style="list-style-type: none"> <li>• US\$ 44,000 (US\$ 2,000 x 22)</li> </ul>  | Many women want to work, but do not know how. (Ms. Susan in Southern Payam)  |      |      |            |      |      |      |      |                |  |  |  |            |  |  |  |  |
| <b>Implementation Schedule</b> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> </tr> </thead> <tbody> <tr> <td>Implementation</td> <td></td> <td></td> <td></td> <td style="background-color: black; color: black;">██████████</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  |  | 2012 | 2013 | 2014       | 2015 | 2016 | 2017 | 2018 | Implementation |  |  |  | ██████████ |  |  |  |  |
|  | 2012   | 2013 | 2014 | 2015       | 2016 | 2017 | 2018 |      |                |  |  |  |            |  |  |  |  |
| Implementation   |  |      |      | ██████████ |      |      |      |      |                |  |  |  |            |  |  |  |  |

Source: JICA Project Team

#### (4) Culture and Sports Promotion Programme

| <b>SW-5: Upper Nile Culture Centre Project</b>   |   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|--|---|-------|------|------|------|--------------------|---|--|--|-------------------|--|---|--|--------|--|---|--|--------------|--|---|--|--------------|--|--|---|------------------------------|--|--|---|
| <b>Background of the Project</b>   | <b>Effects of the Project</b>   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| The long-lasting war resulted in a loss of traditional values and culture. A sense of sharing a common future will be important in planning the development of Malakal with participation from its people. Culture could be a catalyst to unite people.  | a) Target Beneficiaries <ul style="list-style-type: none"> <li>• General population of Malakal</li> </ul> b) Effects of the Project <ul style="list-style-type: none"> <li>• Increased stability of Malakal society</li> </ul>                  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Objectives of the Project</b>   | <b>Evaluation of the Project</b>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <ul style="list-style-type: none"> <li>• To create a physical environment where various cultural activities can take place through construction of a culture centre building</li> </ul>  | <b>Economic Viability</b> <ul style="list-style-type: none"> <li>• NPV: not applicable.</li> <li>• Long-term benefit of social stability</li> </ul> <b>b) Financial Soundness: not applicable</b>   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Location of the Project</b>   | <b>c) Finance</b>   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <ul style="list-style-type: none"> <li>• Malakal (within the central park area proposed in the land use plan for 2022)</li> </ul>  | <ul style="list-style-type: none"> <li>• Grant aid scheme assumed</li> </ul>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Scope of the Project</b>  | <b>d) Environmental Impact</b>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <ul style="list-style-type: none"> <li>• Construction of a culture centre building</li> </ul>  | - Positive Impacts <ul style="list-style-type: none"> <li>• Social stability through enhancing cultural activities</li> </ul> - Negative Impacts <ul style="list-style-type: none"> <li>• No specific negative impact is anticipated</li> </ul> |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|  | <b>External Conditions</b>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|  | <b>Preconditions</b>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|  | <ul style="list-style-type: none"> <li>• MoCYS is able to maintain the culture centre.</li> </ul>   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Agencies Responsible</b>  | <b>Relationship with Other Projects</b>   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Project Implementation: State Ministry of Culture, Youth and Sports (MoCYS)<br>Operation and Maintenance: MoCYS  | <ul style="list-style-type: none"> <li>• None</li> </ul>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Estimated Cost</b>  | <b>Remarks</b>  |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Total Budget: US\$ 3.00 million  |   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <b>Implementation Schedule</b>   |   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Items</th> <th style="width: 15%;">2020</th> <th style="width: 15%;">2021</th> <th style="width: 15%;">2022</th> </tr> </thead> <tbody> <tr> <td>Promotion/approval</td> <td style="text-align: center;">■</td> <td></td> <td></td> </tr> <tr> <td>Survey and design</td> <td></td> <td style="text-align: center;">■</td> <td></td> </tr> <tr> <td>Tender</td> <td></td> <td style="text-align: center;">■</td> <td></td> </tr> <tr> <td>Mobilisation</td> <td></td> <td style="text-align: center;">■</td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td></td> <td style="text-align: center;">■</td> </tr> <tr> <td>Provision of equipment, etc.</td> <td></td> <td></td> <td style="text-align: center;">■</td> </tr> </tbody> </table> |   | Items | 2020 | 2021 | 2022 | Promotion/approval | ■ |  |  | Survey and design |  | ■ |  | Tender |  | ■ |  | Mobilisation |  | ■ |  | Construction |  |  | ■ | Provision of equipment, etc. |  |  | ■ |
| Items  |   | 2020  | 2021 | 2022 |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Promotion/approval   | ■   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Survey and design  |   | ■     |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Tender   |   | ■     |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Mobilisation   |   | ■     |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Construction   |   |       | ■    |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
| Provision of equipment, etc.   |   |       | ■    |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |
|  |   |       |      |      |      |                    |   |  |  |                   |  |   |  |        |  |   |  |              |  |   |  |              |  |  |   |                              |  |  |   |

Source: JICA Project Team

### (5) Participatory Development Promotion Programme

| PD-2: Human Resource Development for Community Development Officer (CDO) Project  |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
|---|--|---------------------------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| <p>The State Ministry of Gender and Social Welfare in UNS employs Community Development Officers (CDO). While CDOs are expected to play an important role in connecting community needs to policy making, half of 26 posts (two posts per county) are still vacant. As many of them have little practical experience, they undertake training as CDOs.</p> <p>However, training is usually conducted in Juba, making it difficult to attend . This project will provide needed training with CDOs in Malakal Town.</p>  | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• CDOs, MOGSWRA</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Increase in work efficiency and effectiveness of public officers</li> <li>• Improvement of the quality of public services</li> <li>• Improvement of people’s standard of living</li> <li>• Behaviour changes in people</li> </ul> |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
|   | Objectives of the Project  | Evaluation of the Project |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To support CDOs to obtain required knowledge and skills for community development</li> </ul>   | <p>a) Economic Viability: N/A</p> <p>b) Financial Soundness: N/A (Technical Cooperation)</p> <p>c) Environmental Impacts: None</p>   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town and one other location in UNS</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Scope of the Project  | Preconditions  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| <p>The main training content is as follows:</p> <ul style="list-style-type: none"> <li>• Baseline survey and mobilisation</li> <li>• Communication and conflict resolution</li> <li>• Organisation of community</li> <li>• Community-based planning (action plan)</li> <li>• Implementation and facilitation</li> <li>• Monitoring and evaluation</li> </ul>  | <ul style="list-style-type: none"> <li>• The MOGSWRA allocates CDOs to Malakal City</li> </ul>   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Capacity Development  | Relationship with Other Projects   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Please refer to the scope of the project  | <ul style="list-style-type: none"> <li>• JICA (The Project for Livelihood Improvement in and around Juba for Sustainable Peace and Development)</li> </ul>   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Agencies Responsible  | Remarks  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Project Implementation: MGSWRA, Malakal City Council  | <pre> graph TD     PIU[Project Implementation Unit] --- CP[C/P] --- MOGSW[MOGSW]     MOGSW --&gt; CG[in County Government]     CG --&gt; CDOs[CDOs]     CDOs --&gt; CPeople[Community People]             </pre>   |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Estimated Cost  |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| <p>Expertise: Input of 24 man-months assumed (Training Plan/Community Development)</p> <p>Training: OECD countries, neighbouring countries, Juba</p>  |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Implementation Schedule   |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
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|   | 2012   | 2013                      | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Project   |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Training  |  |                           |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

## 19.7.4 Peacebuilding/Governance Strengthening Programme

### (1) Individual Capacity Development Programme

| CD-1: Local Government Administration Improvement Project   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|----------|--|--|--|--|--|--|--|--|--|
| Background of the Project   | Effects of the Project   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Due to the long-lasting war and large-scale movement of people due to the separation from Sudan, the number of experienced and able government officers is scarce, and many junior officers have not received proper education and/or training. In order to accelerate ROSS's socio-economic development, each local government has to be properly established and provide public services to its people.<br><br>This project is expected to develop administrative capabilities of public officers at the state level (in the governor's office, sectorial ministries, agencies, etc.) | a) Target Beneficiaries<br>• Public officers, UNS<br>b) Effects of the Project<br>• Increase in work efficiency and effectiveness of public officers<br>• Improvement of the quality of public services<br>• Improvement of people's standards of living<br>• Behaviour changes in people  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Objectives of the Project   | Evaluation of the Project  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| • To develop the knowledge and skills of public officers about public administration<br>• To support each organisation to establish its training system   | a) Economic Viability: N/A<br>b) Financial Soundness: N/A (technical cooperation)<br>c) Environmental Impacts: N/A   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Location of the Project   | External Conditions  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| • Malakal Town and one other location in UNS  | • Peace and order is maintained.   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Scope of the Project  | Preconditions  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| • Planning policies: baseline survey, problem identification and analysis, policy planning, action plan making<br>• Management: implementation structure (organisation and human resources), reporting and monitoring, budget planning and management, evaluation<br>• Leadership<br>• Communication/collaboration with others<br>• Knowledge management, data management   | • The contents/details of decentralisation are formulated and authorised.  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Capacity Development  | Relationship with Other Projects   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Project Implementation: UNS government and ministries   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Agencies Responsible  | Remarks  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Implementation: UNS sectorial ministries  | <pre> graph TD     Governor --&gt; CouncilOfMinisters[Council of Ministers]     CouncilOfMinisters --&gt; ProjectImplementationUnit[Project Implementation Unit C/P]     CouncilOfMinisters --&gt; OtherMinistries[Other Ministries]     ProjectImplementationUnit --&gt; TrainingUnitMOLG[Training Unit in MOLG&amp;PS]     TrainingUnitMOLG --&gt; ProvisionTOT[Provision of TOT]     ProvisionTOT --&gt; TrainingUnitsEachMinistry[Training Units of Each Ministry]     TrainingUnitsEachMinistry --&gt; TrainedPersons[Trained Persons Trainers]     TrainedPersons --&gt; PublicOfficials[Public Officials Training Beneficiaries]     </pre> |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Estimated Cost  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| • Expertise: 60 MM (administrative management, training plans, data analysis)<br>• Training: in OECD countries, neighbouring countries, Juba  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Implementation Schedule   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
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|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Project   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |
| Training  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |          |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

| <b>CD-2: Cost Recovery System Improvement Project</b>   |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
|---|---|------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <p>Since 2007, 15% of collected water tariffs are sent to a general account of the central government. In lieu, the SSUWC has received consumable items such as fuel and chemical from the central government once a year. However, this is insufficient to continuously operate the water supply facilities. SSUWC-Malakal can only operate its facilities for less than 14 hours. Water production is stagnating at one-third of design capacity.</p> <p>In addition, SSUWC was notified by ministerial order by the central government of its increased allotment on 17 May 2012. Furthermore, it may be difficult for SSUWC-Malakal to raise enough revenues to cover O&amp;M costs.</p> <p>Public enterprises such as Urban Water Corporation, National Electricity Corporation, etc., should be amalgamated into a single entity in order to utilise the entire tariff collected from users for O&amp;M costs. Otherwise, public services will not be sustained due to lack of revenue.</p> <p>Thus this project is expected to examine the feasibility of the current system, and to improve the cost recovery system.</p> | <p>a) Target Beneficiaries</p> <ul style="list-style-type: none"> <li>• SSUWC, water users</li> </ul> <p>b) Effects of the Project</p> <ul style="list-style-type: none"> <li>• Increase in the sustainability of O&amp;M</li> <li>• Increase in incentives for staff</li> <li>• Increase in work efficiency and effectiveness</li> <li>• Improvement of the services of SSUWC</li> </ul> |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
|   | <b>Evaluation of the Project</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
|   | <p>a) Economic Viability: N/A</p> <p>b) Financial Soundness: N/A (technical cooperation/ long-term expert)</p> <p>c) Environmental Impacts: None</p>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• To improve the cost recovery system in the water supply sector</li> </ul>  |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  | <b>External Conditions</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Malakal Town and one other location in UNS</li> </ul>  | <ul style="list-style-type: none"> <li>• Peace and order is maintained.</li> </ul>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>Preconditions</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <ul style="list-style-type: none"> <li>• Review of financial status</li> <li>• Innovation of financial policy</li> <li>• Advise on the cost control programme</li> <li>• Advise on principle systems to ensure cost recovery in a practicable manner</li> </ul>   |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Capacity Development</b>   | <b>Relationship with Other Projects</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| Please refer to the scope of the project  | <ul style="list-style-type: none"> <li>• Water supply projects in accordance with the Master Plan</li> </ul>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Remarks</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| Project Implementation: MOF, ROSS   |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation/Construction Cost</b><br>(including construction supervision cost) :<br>Consulting Fee:                      US\$ 0.34 million<br>Total Cost:                              US\$ 0.34 million  |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 5%;">2013</th> <th style="width: 5%;">2014</th> <th style="width: 5%;">2015</th> <th style="width: 5%;">2016</th> <th style="width: 5%;">2017</th> <th style="width: 5%;">2018</th> <th style="width: 5%;">2019</th> <th style="width: 5%;">2020</th> <th style="width: 5%;">2021</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> </tr> </tbody> </table>   |   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Project |  |  |  |  |  |  |  |  |  |  |
|   | 2013  | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |      |         |  |  |  |  |  |  |  |  |  |  |
| Project   |   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team

## (2) Organisational, Institutional, and Social Capacity Development Programme

| <b>ID-2: Malakal-Juba Urban Management System Project</b>   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
|---|--|------|------|------|------|------|------|------|------|------|---------|--|--|--|--|--|--|--|--|--|--|
| <b>Background of the Project</b>  | <b>Effects of the Project</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| Two urban infrastructure master plans, “The Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and Surrounding Areas in South Sudan” and “The Project for Comprehensive Planning and Support for Urgent Development on Social Economic Infrastructure in Malakal Town” were implemented and funded by JICA.<br><br>However, the urban infrastructure master plan for Juba has not yet been authorised and the control of private activities is not well performed by the authorities. A similar problematic situation is also expected for Malakal Town without any legal building controls. | a) Target Beneficiaries<br>• Residents in Juba and Malakal<br>b) Effects of the Project<br>• Restriction of private construction activities in line with urban infrastructure master plan<br>• Realisation of urban infrastructure master plan<br>• Improvement of urban amenity |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Objectives of the Project</b>  | <b>Evaluation of the Project</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| • To reinforce the organisation so that it can control private building activities to realise the urban infrastructure master plan  | a) Economic Viability: N/A<br><br>b) Financial Soundness: N/A (technical cooperation/long-term expert)<br><br>c) Environmental Impacts: None   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Location of the Project</b>  | <b>External Conditions</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| • Juba and Malakal  | • Peace and order is maintained.   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Scope of the Project</b>   | <b>Preconditions</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| • Review of urban control methods<br>• Identification of urban control methods applicable to Juba and Malakal<br>• Arrangement of institutional framework   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Capacity Development</b>   | <b>Relationship with Other Projects</b>  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| • Training for computer-aided planning (AutoCAD, ArcGIS, etc.)  | • Water supply projects in Malakal Town in accordance with the Master Plan   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Agencies Responsible</b>   | <b>Remarks</b>   |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| Project Implementation: MOLH&PP of ROSS, CES and UNS  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Estimated Cost</b>   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| Implementation/Construction Cost (including construction supervision cost):<br>Consulting Fee<br>Total Cost:  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <b>Implementation Schedule</b>  |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>2019</th> <th>2020</th> </tr> </thead> <tbody> <tr> <td>Project</td> <td></td> <td></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td style="background-color: black;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>  |  | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Project |  |  |  |  |  |  |  |  |  |  |
|   | 2012   | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |      |         |  |  |  |  |  |  |  |  |  |  |
| Project   |  |      |      |      |      |      |      |      |      |      |         |  |  |  |  |  |  |  |  |  |  |

Source: JICA Project Team



## 19.8 SELECTION OF URGENT DEVELOPMENT PROJECTS

Urgent Development Projects are selected for implementation in this Project (The Project for Comprehensive Planning and Support for Urgent Development on Social Economic Infrastructure in Malakal Town). The projects proposed are urgent are again evaluated in terms of eligibility.

The project scale and implementation schedule are rather limited because of the nature of the urgent support projects, meaning that they are treated as sub-projects to be implemented within the duration of time and total project cost of the larger Project. The criteria for choosing Urgent Support Projects are the following:

- To meet the urgent needs of residents for subsistence
- To transfer knowledge and technical skills for project implementation to counterparts
- To meet the JICA assistance schemes

The household interview survey results conducted in the Town Profile Survey revealed the residents difficulties and highest needs in living in Malakal Town as shown in **Table 19.8-1**.

**Table 19.8-1 Difficulties and Highest Needs of Residents Living in Malakal**

| Difficulty Encountered in Living in his/her Boma/Block |        | Highest Need Felt by People |        |
|--|--------|-----------------------------|--------|
| Difficulty   | %      | Highest Need                | %      |
| No water   | 57.9%  | Water                       | 65.3%  |
| No electricity   | 22.1%  | Medical facility            | 10.8%  |
| Flooding   | 12.3%  | School                      | 8.5%   |
| No medical facilities                                  | 3.4%   | Electricity                 | 6.8%   |
| No job/source of income                                | 3.0%   | Paved road                  | 5.9%   |
| No primary school                                      | 0.6%   | Police post                 | 2.7%   |
| No early childhood centre                              | 0.4%   | Shops                       | 0.0%   |
| No shelter   | 0.2%   | Religious facilities        | 0.0%   |
| Violence in the neighbourhood/ethnic clashes           | 0.0%   | Others                      | 0.0%   |
| No secondary school                                    | 0.0%   | Total                       | 100.0% |
| Total  | 100.0% |                             |        |

Source: Household Survey conducted in the Town Profile Survey, JICA Project Team

At the meetings and workshops organised by the Project Team, governmental officials presented their views on the urgent needs of not only residents, but also urgent needs to develop industry and improve security.

**Table 19.8-2 Views on the Urgent Development Projects**

| No. | Organization   | Comments  |
|-----|--|---|
| 1   | State Ministry of Physical Infrastructure and Rural Development, UNS | <ul style="list-style-type: none"> <li>- Need for standard roads with good materials</li> <li>- Importance of improvement of the water supply pipe network before construction of roads</li> </ul>  |
| 2   | State Ministry of Labour Public Services and Human Resources, UNS    | <ul style="list-style-type: none"> <li>- Importance of taking into consideration the current expansion of population growth and basing the design of roads and drainage on accurate topographic mapping in the Comprehensive Plan</li> <li>- Urgent need for water supply project</li> <li>- Responsibility for fuel should lie with the Government of Upper Nile State</li> <li>- Necessity of introducing culverts to eliminate flooding</li> </ul> |
| 3   | State Ministry of Education, UNS                                     | <ul style="list-style-type: none"> <li>- Identification of priorities and the urgent need for the project to be implemented, and also of the unavailability of the materials, which might cause delays in implementation</li> </ul>   |
| 4   | State Ministry of Physical Infrastructure and Rural Development, UNS | <ul style="list-style-type: none"> <li>- Importance of the improvement of the economy drainage system, roads, buildings and industries.</li> </ul>  |
| 5   | State Ministry of Physical Infrastructure and Rural Development, UNS | <ul style="list-style-type: none"> <li>- Immediate need for master plan of existing areas in Malakal Town for adequate planning of future city zones</li> <li>- Necessity of water supply by JICA</li> <li>- Benefit of labour based technology for residents</li> </ul>  |
| 6   | Directorate of River Transport                                       | <ul style="list-style-type: none"> <li>- Jetty construction appreciated</li> <li>- Taxing port users without services not appreciated</li> </ul>  |

Source: JICA Project Team

The sub-sectors urgently needed are water supply, port development, roads, and drainage as shown in the results of the Household Survey and presented at a workshop of UNS Governmental officials. Since residents felt the lack of electricity caused difficulty in their everyday lives, residents didn't put high priority for electricity supply compared with water supply. This may be attributable to electricity not being an essential utility for subsistence. Provision of medical facilities and primary schools were also identified as essential needs in the Household Survey results.

Unlike the fundamental projects that are designed to solve the problems shown in **Figure 4.1-1**, Problem Structure of Malakal, Urgent Support Projects are treated as emergency and pilot projects under the limitations of the budget and schedule. In line with the investment principle shown in **Figure 19.6-1**, Urgent Support Projects should be those that place more importance on living conditions rather than on economic development.

Urgent Support Projects should be subject to the JICA project principles, namely self-help and infrastructure focus because of the scope of work of this Project. In consideration of the above, the following projects are proposed as Urgent Support Project candidates.

**Table 19.8-3 Proposed Urgent Support Projects**

| No | Sector          | Project Title                                   | Rationale  |
|----|-----------------|---|--|
| 1  | Water Supply    | Small-scale Water Supply Development Project    | Social Infrastructure Development Project.<br>The project covers the southern and western part of Malakal Town to solve the water shortage in these areas.<br>As for the land for the water plant, consensus was found already between the relevant department and SSUWC.  |
| 2  | Water Transport | Reconstruction of Jetty at Malakal Port Project | Social Infrastructure Development Project.<br>The project is to provide a passenger platform at the present Malakal Port to improve safety of boarding and alighting to reinforce passenger movement.<br>The beneficiaries are located in and around Malakal Town, especially on the western bank of the Nile River where Shilluk people reside.                 |
| 3  | Water Transport | Construction of Passenger Jetty Project         | Economic Infrastructure Restoration Project.<br>The project is to improve the existing port for smooth, safe and effective loading and unloading of cargo. According to the Household Survey this project is not regarded as an imminent project for the betterment of residents' living conditions, but in reality it would have the effect of price stability. |
| 4  | Road Transport  | Community Road Construction Project (LBT)       | Social Infrastructure Restoration Project.<br>This project was designed to give job opportunities to youth and women by applying labour based technology.<br>The candidate community roads have already been selected by the Road and Bridge Department, MoPI&RD, UNS and JICA Project Team.   |

Source: JICA Project Team

Reconstruction of Main Drains in Central Malakal is urgently needed as excess storm water causes muddy roads and disturbs the management of solid waste, the sewer system, public transport, school commuting, etc. The drainage system is to be improved together with the road reconstruction project currently being undertaken by UNS. Therefore, the drainage improvement project was dropped.

## 19.9 CONCLUSION

The list of the projects proposed in the master plan is presented below.

The required capital funds for the implementation of the Comprehensive Plan exceed locally available funds. In order to meet the required funds for investment and costs for operations and management, methods such as the beneficiary-pay principle or appeals to donor/international agencies are proposed.

Urgent Support Projects are selected in consideration of needs assessment results obtained in the Household Survey, potential for technology transfer to counterparts, the JICA project scheme, and views of UNS government officials. The small-scale water supply project, port rehabilitation/construction project and community roads improvement project were selected.

**Table 19.9-1 List of the Projects of the Comprehensive Plan**

P: Priority Project, C: Priority Project and Committed for Implementation (by ROSS or JICA)

| Project  | Contents  | Cost (million USD) |                  |                   |       | Priority |
|--|---|--------------------|------------------|-------------------|-------|----------|
|  |   | Urgent2<br>012-14  | Short<br>2015-18 | Medium<br>2019-22 | Total |          |
| <b>1 Malakal Infrastructure Improvement Strategy</b>                             |   |                    |                  |                   |       |          |
| <b>1.1 Water Supply Programme</b>  |   |                    |                  |                   |       |          |
| WS-1 Small-scale Water Supply Development Project                                | Scheme 1: 4 water tank trucks, water purification plant (60m <sup>3</sup> ), 12public water taps, 9 elevated water tanks; Scheme 2: water purification (common: 71m <sup>3</sup> ), public faucet, distribution pipe, 2013-2014 (Urgent Development Project ) | 2.20               | 0.00             | 0.00              | 2.20  | C        |
| WS-2 Rehabilitation Project of the Treatment Plant and Distribution Pipe Network | Rehabilitation of the existing water purification plant (15,000m <sup>3</sup> ), replace of the distribution pipe 55km, installation of elevated water tank, 2013-2019  | 10.63              | 29.64            | 7.73              | 48.00 | C        |
| WS-3 Technical Cooperation Project on Improvement of Water Supply Service        | Technical project for improving rate of non-revenue water, and O&M of the facilities, 2013 - 2016   |                    |                  |                   | TA    |          |
| WS-4 Expansion of the Treatment Plant and Distribution Pipe Network Project      | Extension of the existing water purification plant (5,000m <sup>3</sup> ), replace of the distribution pipe 50km, installation of elevated water tank, 2020 - 2022  | 0.00               | 0.00             | 20.60             | 20.60 |          |
| Sub-Total  |   | 12.83              | 29.64            | 28.33             | 70.80 |          |
| <b>1.2 Road Improvement Programme</b>  |   |                    |                  |                   |       |          |
| RT-1 Community Road Construction Project (LBT)                                   | Construction of community road by LBT (Urgent Developmet Project ) ,J-06 (2,070m), J-13(2,150m), J-16(1,280m), 2013-2014  | 2.00               | 0.00             | 0.00              | 2.00  | C        |
| RT-2 Malakal Town Secondary Arterial Road Improvement Project                    | Improvement of secondary arterial roads by mechnized construction, length 18km, 2014 - 2016   | 4.50               | 9.00             | 0.00              | 13.50 | P        |
| RT-3 Malakal Town Arterial Road Improvement Project                              | Improvement of arterial roads by mechnized construction, length 45km, 2015-2019   | 0.00               | 53.33            | 6.67              | 60.00 |          |
| RT-4 Road Maintenance and Management Project                                     | Technical project for road maintenance including procurement of equipment, 2014-2015  |                    |                  |                   | TA    |          |
| RT-8 Intersection and Traffic Facility Improvement Project                       | Construction of roundabout, installation of sidewalk & zebra crossing, etc, 2017 - 2018   | 0.00               | 2.00             | 0.00              | 2.00  |          |
| Sub-Total  |   | 6.50               | 64.33            | 6.67              | 77.50 |          |
| <b>1.3 Public Transportation and Traffice Safety Programme</b>                   |   |                    |                  |                   |       |          |
| RT-5 Public Transport Management Project   | Technical project for public transport management including establishment of the department for public transport management, 2017 - 2018  |                    |                  |                   | TA    |          |
| RT-6 Malakal Town Bus Terminal and Bus Stop Facilities Construction Project      | Construction of bus terminal and taxi bay, 2016 - 2017  | 0.00               | 2.20             | 0.00              | 2.20  |          |
| RT-7 Traffic Management Project  | Technical project for capacity development for traffic management in response to road infrastructure improvement (including intallment of traffic signs), 2014-2016   |                    |                  |                   | TA    | P        |
| RT-9 Malakal Town Traffic Safety Management Project                              | Dissemination of traffic education, campaign for road safety, 2019 -2021  |                    |                  |                   | TA    |          |
| Sub-Total  |   | 0.00               | 2.20             | 0.00              | 2.20  |          |
| <b>1.4 Sanitation Improvement Programme</b>                                      |   |                    |                  |                   |       |          |
| SS-1 Community Sanitary System and Public Toilet Installation Project            | Installation of 231 public toilets, procurement of 18 vacuum cars, 2013 - 2022  | 2.28               | 4.56             | 4.56              | 11.40 | P        |
| SS-2 Construction of Sludge Treatment Facilities Project                         | Wastewater sludge treatment facilities using oxidation pond method (150m <sup>3</sup> /day), 2014 - 2021  | 0.43               | 1.70             | 1.28              | 3.40  | P        |
| SS-3 Technical Project for Toilet Operation and Maintenance                      | Tecnical project for maintenance of public toilets, including hygiene education   |                    |                  |                   | TA    |          |
| SS-4 Project for Improving Sanitary Environment in Malakal Town                  | Deployment of public health workers in public health centers, holding community health meeting, immunization and preventive health care, etc, 2014 -2020  |                    |                  |                   | TA    |          |
| SS-5 Public Toilet Operation and Maintenance Project                             | Hygiene education, establishment of community public toilet maintenance committee, accounting capability development, etc, 2018 -2022   |                    |                  |                   | TA    |          |
| Sub-Total  |   | 2.71               | 6.26             | 5.84              | 14.80 |          |
| <b>1.5 Drainage Improvement Programme</b>  |   |                    |                  |                   |       |          |
| WD-1 Reconstruction of Main Drains in Central Malakal Project                    | Reconstruction of 5 major drains in central Malakal, gradient 0.1 - 0.2%, installation of pipe culvert at intersections, 2014 - 2015  | 2.10               | 2.10             | 0.00              | 4.20  | P        |
| WD-2 Reconstruction of Main Drains Project                                       | Reconstruction of other 4 major drains in central Malakal, grade 0.1 - 0.2%, installation of pipe culvert at intersection, 2014 - 2016  | 1.17               | 2.33             | 0.00              | 3.50  |          |
| WD-3 Extension of Trunk Drain 1 Project  | Extension of drains in ther southern Malakal, 2014 - 2015   | 3.50               | 3.50             | 0.00              | 7.00  |          |
| WD-4 Construction of Trunk Drain 2 Project                                       | Construction of drains along the Ring road 2016-2018  | 0.00               | 10.70            | 0.00              | 10.70 |          |
| WD-5 Construction of Main Drains in New Urban Area Project                       | Construction of major drains in new development area of Malakal, 2018-2022  | 0.00               | 0.70             | 2.80              | 3.50  |          |
| WD-6 Capacity Development Project for Operation and Maintenance of Drains        | Capacity development for officials in charge of drainage in MPI&RD, mainteance activity by community, procurement of equipment, 2015-2016   |                    |                  |                   | TA    |          |
| Sub-Total  |   | 6.77               | 19.33            | 2.80              | 28.90 |          |
| <b>1.6 Solid Waste Management Programme</b>                                      |   |                    |                  |                   |       |          |
| SM-1 Solid Waste Collection Activities Improvement Project                       | Procurement of 6 solid waste collection cars, establishment of 73 solid waste collection sites, and human resource development, 2014 - 2017   |                    |                  |                   | TA    | P        |
| SM-2 Landfill Management Improvement Project                                     | Improvement of landfill (recycle area, drainage, weigh station, fence, office, etc), 2014 - 2016  | 0.90               | 1.80             | 0.00              | 2.70  |          |
| SM-3 Medical Waste Management Improvement Project                                | Project for establishing independent treatment system for medical solid waste, 2015 - 2017  | 0.00               | 2.00             | 0.00              | 2.00  |          |
| Sub-Total  |   | 0.90               | 3.80             | 0.00              | 4.70  |          |

Source: JICA Project Team

**Table 19.9-1 Continued.**

P: Priority Project, C: Priority Project and Committed for Implementation (by ROSS or JICA)

| Project   | Contents  | Cost (million USD) |                  |                   |               | Priority  |
|---|---|--------------------|------------------|-------------------|---------------|-----------|
|   |   | Urgent2<br>012-14  | Short<br>2015-18 | Medium<br>2019-22 | Total         |           |
| <b>1.7 Power Supply Programme</b>                                       |   |                    |                  |                   |               |           |
| EN-1 Power Plant Rehabilitation Project                                 | 3 DEG being installed for peak load, diesel generator (2.5MWx4) to be installed for base load, (construction of power plant building, fuel storage facilities (600m <sup>2</sup> x2)), 2014-2018  | 4.00               | 16.00            | 0.00              | 20.00         | P         |
| EN-2 Expansion of 11kV Distribution Network Project                     | Expansion of 11kV distribution network in the northern and southern areas, 2017-2019  | 0.00               | 0.67             | 0.33              | 1.00          |           |
| EN-3 Solar Power Pilot Project  | Installation of solar power street light for reducing the burden of DEG by alternative energy supply and improving security during night time, 2014-2016  | 0.33               | 0.67             | 0.00              | 1.00          |           |
| Sub-Total   |   | 4.33               | 17.33            | 0.33              | 22.00         |           |
| <b>1.8 Emergency Service Reinforcement Programme</b>                    |   |                    |                  |                   |               |           |
| ES-1 Firefighting System Improvement Project                            | Procurement of equipment and human resource development for firefighting  |                    |                  |                   |               | TA        |
| ES-2 Project for Improving Support System for Emergency Medical Service | Procurement of equipment (ambulances) and human resource development for emergency medical service support system   |                    |                  |                   |               | TA        |
| Sub-Total   |   | 0.00               | 0.00             | 0.00              | 0.00          |           |
| <b>Total of Malakal Infrastructure Developmet Strategy</b>              |   | <b>34.03</b>       | <b>142.90</b>    | <b>43.97</b>      | <b>220.90</b> |           |
| <b>2 Region-wide Economic Development Strategy</b>                      |   |                    |                  |                   |               |           |
| <b>2.1 Region-wide Transportation and Logistics Development</b>         |   |                    |                  |                   |               |           |
| EC-1 International Transport Corridor Establishment Project             | Development of international all-weather road network including between Malakal and Ethiopia, and between Malakal and Kenya.  |                    |                  | n.a.              |               | C         |
| EC-2 Malakal Airport Internationalization Project                       | Planned in 2006: i) fence construction, ii) extension of the runway by 1km, iii) expansion of the airplane parking area (100m x 100m), iv) reconstruction of control tower and passenger building |                    |                  | n.a.              |               |           |
| EC-3 Malakal Rural Road Network Improvement Project                     | Improvement of road network connecting local areas of UNS and Malakal, Deleib - Fadit - Panyikang, Melut - Malakal, and Maban - Tonga - Oriny   |                    |                  | n.a.              |               | P         |
| PT-1 Reconstruction of Jetty at Malakal Port Project                    | Construction of cargo jetty (20m x 10m) at present port and improvement of apron (Urgent Support Project ) 2013-2014.   | 2.00               | 0.00             | 0.00              | 2.00          | C         |
| PT-2 Procurement of Crane Project                                       | Procurement of mobile crane (40-50t) 2014   | 0.75               | 0.00             | 0.00              | 0.75          | P         |
| PT-3 Construction of New Port Project (Phase 1)                         | Construction of a new port for cargo container transportation (35m wharf), 2014-2015  | 1.50               | 1.50             | 0.00              | 3.00          | P         |
| PT-4 Construction of New Port Project (Phase 2)                         | Construction of a new port for cargo container transportation (extension to 300m wharf), warehouse, administration building, and access road construction, 2016-2018                              | 0.00               | 21.00            | 0.00              | 21.00         |           |
| PT-5 Construction of Passenger Jetty Project                            | Construction of passenger jetty at present port and improvement of apron (Urgent Development Project ) 2013-2014  | 0.60               | 0.00             | 0.00              | 0.60          | C         |
| PT-6 Development of West Side (Left Bank) of River Nile Project         | Construction of floating pier in Lolo Area (opposit side of existing Malakal port) 2017-2018  | 0.00               | 0.50             | 0.00              | 0.50          |           |
| PT-7 Improvement of Malakal Port Project                                | Improvement of facilities in the existing port for passengers, fishermen and tourists 2017-2018   | 0.00               | 1.50             | 0.00              | 1.50          |           |
| PT-8 Procurement of Ferry Project                                       | Procurement of ferries for passengers and vehicles transport, 2019  | 0.00               | 0.00             | 6.00              | 6.00          |           |
| PT-9 Improvement of River Bank Protection Project                       | Improvement of river bank protection at the present existing port, 2020-2021  | 0.00               | 0.00             | 0.15              | 0.15          |           |
| PT-10 Improvement of New Port Road Project                              | Construction of access road to the new port, 2014-2015  | 0.30               | 0.30             | 0.00              | 0.60          | P         |
| PT-11 Port Management Capacity Development Project                      | Technical project for port management, statistical data preparation, and security management, 2013-2015   |                    |                  |                   |               | TA<br>C/P |
| Sub-Total   |   | 5.15               | 24.80            | 6.15              | 36.10         |           |
| <b>2.2 Primary Industry Development Programme</b>                       |   |                    |                  |                   |               |           |
| EC-4 Upper Nile Fisheries Project                                       | MARF human resource development, improvement for fishery port, and provision of fishing equipment for increasing fish catch, 2014-2018  | 0.10               | 0.38             | 0.00              | 0.48          | P         |
| EC-5 Malakal Dairy Farm Project   | Human resource development for MARF, dairy farmers, and UN University and provision of machine and equipment, 2014-2018   | 0.96               | 3.84             | 0.00              | 4.80          |           |
| EC-6 Malakal Poultry Breeding Farm Project                              | Construction of large scale poultry breeding facilities, 2014-2018  | 0.10               | 0.40             | 0.00              | 0.50          |           |
| EC-7 Malakal Slaughter House Construction Project                       | Relocation of slaughter house to southern part of Malakal Town  |                    |                  |                   |               | TA<br>P   |
| Sub-Total   |   | 1.16               | 4.62             | 0.00              | 5.78          |           |
| <b>2.3 Investment Climate Improvement Programme</b>                     |   |                    |                  |                   |               |           |
| EC-8 Malakal Light Industrial Park Development Project                  | Development of light industrial park in the northern Malakal (industrial cluster assumed, converting from government-led to private-led development) 2015-2018                                    | 0.00               | 10.00            | 0.00              | 10.00         |           |
| EC-9 Logistics Hub Development Project                                  | Logistic hub development for cargo container transport for international traffic network, local road, airline, river in the southern Malakal, 2019-2021   | 0.00               | 0.00             | 10.00             | 10.00         | P         |
| Sub-Total   |   | 0.00               | 10.00            | 10.00             | 20.00         |           |
| <b>2.4 Research and Industrial Human Resource Development Programme</b> |   |                    |                  |                   |               |           |
| EC-10 Research Function and Support Services Development Project        | Relization of "Policy Framework and Strategic Plans 2012 - 2016"  |                    |                  |                   |               | TA        |
| EC-11 Malakal Vocational Training Center Reinforcement Project          | Programmes related to industrial development in Malakal and neighboring areas, and provision of equipment   |                    |                  |                   |               | TA<br>C   |
| Sub-Total   |   | 0.00               | 0.00             | 0.00              | 0.00          |           |
| <b>Total of Region-wide Economic Developmet Strategy</b>                |   | <b>6.31</b>        | <b>39.42</b>     | <b>16.15</b>      | <b>61.88</b>  |           |

Source: JICA Project Team

Table 19.9-1 Continued.

P: Priority Project, C: Priority Project and Committed for Implementation (by ROSS or JICA)

| Project   | Contents   | Cost (million USD) |                  |                   |               | Priority |
|---|--|--------------------|------------------|-------------------|---------------|----------|
|   |  | Urgent2<br>012-14  | Short<br>2015-18 | Medium<br>2019-22 | Total         |          |
| <b>3 Social Development Strategy</b>  |  |                    |                  |                   |               |          |
| <b>3.1 Health and Medical Improvement Programme</b>                             |  |                    |                  |                   |               |          |
| HE-1 Primary Health Care Center Construction Project                            | Construction of 3 primary health care centers in the northern, central and southern areas, and procurement of equipment, 2017-2019   | 0.00               | 5.40             | 2.70              | 8.10          |          |
| HE-2 Malakal Teaching Hospital Health Infrastructure Improvement Project        | Enhancement of facilities for Malakal Teaching Hospital, procurement of ambulances, introduction of water and power supply system, 2015-2016   | 0.00               | 12.00            | 0.00              | 12.00         |          |
| HE-3 Health Service Capacity of 4 Major Health Centers Upgrade Project          | Increase of beds for 4 major public health centers (Sora Malakia, Assosa, Luakat, Bum), improvement of water and power supply, 2016-2017   | 0.00               | 8.40             | 0.00              | 8.40          |          |
| HE-4 Revitalisation of Medical/Health Faculty in UNU Project                    | Securing human resource, procurement of equipment, and improvement of facilities for reconstruction of UNU Faculty of Medicine & Public Health, 2015 - 2016  | 0.00               | 11.50            | 0.00              | 11.50         |          |
| HE-5 Urban Malaria Control Programme  | Promotion of mosquit nets, antiseptis of ditch, human resource development (for community cooperation), etc, 2014-2017   |                    | Operational      |                   |               | C        |
| HE-6 EPI (DPT3, Measles) Vaccination Promotion Project                          | Immunization for DPT3, Measles and the like, campaign, establishment of cold chain, etc, 2014 - 2016   |                    |                  |                   | TA            | P        |
| HE-7 Human Resources Development for Maternal and Child Health Project          | Education and training for nurses and midwives, 2015 - 2019  |                    |                  |                   | TA            |          |
| Sub-Total   |  | 0.00               | 37.30            | 2.70              | 40.00         |          |
| <b>3.2 Education Improvement Programme</b>                                      |  |                    |                  |                   |               |          |
| ED-1 Primary School Establishment and Renovation Project                        | Construction of 4 new primary schools, improvement of the existing primary schools, 2013-2016  | 1.03               | 1.03             | 0.00              | 2.05          |          |
| ED-2 Strengthening Mathematics and Science Education Project                    | Technical project for mathematics and science education for teachers of the primary schools in UNS, 2013-2016  |                    |                  |                   | TA            | C        |
| ED-3 Capacity Building of MoE Project   | Technical project for school management for UNS Ministry of Education, 2014-2015   |                    |                  |                   | TA            |          |
| ED-4 Malakal Teachers' Training School Construction and Renovation Project      | Construction of Teachers Training Dormitory that was used for SAF dormitory during civil war, and renovation of water supply facilities. Assuming 600 students, and 45 teachers 2019-2020  | 0.00               | 0.00             | 11.00             | 11.00         |          |
| ED-5 Malakal Teachers' Dormitory Reconstruction Project                         | Construction of teachers' dormitories in 10 sites (100 teachers targeted) 2021-2022  | 0.00               | 0.00             | 3.80              | 3.80          |          |
| ED-6 Malakal Primary School Construction Project                                | Construction of 8 primary schools 2016-2018  | 0.00               | 7.10             | 0.00              | 7.10          |          |
| ED-7 Malakal Middle School Construction Project                                 | Construction of 4 middle schools 2016-2018   | 0.00               | 10.80            | 0.00              | 10.80         |          |
| Sub-Total   |  | 1.03               | 18.93            | 14.80             | 34.75         |          |
| <b>3.3 Social Safety Net Programme</b>  |  |                    |                  |                   |               |          |
| SW-1 BHN for Returnees Project  | BHN infrastructure improvement in residential areas of returnees for community development, geared with land use zoning 2014-2015  | 2.50               | 2.50             | 0.00              | 5.00          | P        |
| SW-2 Malakal Street Children Center Renovation Project                          | Renovation of street children center with poor sanitation and insufficient facilities, 2014-2015   | 0.20               | 0.20             | 0.00              | 0.40          |          |
| SW-3 MOGSW Speed Boat Project   | Securing means of transportation for improving government service of Ministry of Gender and Social Welfare and Religious Affairs, 2014-2015  | 0.01               | 0.01             | 0.00              | 0.02          |          |
| SW-4 Malakal Reformatory Center Establishment Project                           | Construction of juvenile reformatory facilities, 2014-2015   | 0.53               | 0.53             | 0.00              | 1.05          |          |
| SW-6 Malakal Town Women's Group Community Empowerment Project                   | Vocational training for women in the southern and eastern areas in Malakal for women empowerment   |                    |                  |                   | TA            | P        |
| Sub-Total   |  | 3.24               | 3.24             | 0.00              | 6.47          |          |
| <b>3.4 Culture and Sports Promotion Programme</b>                               |  |                    |                  |                   |               |          |
| SW-5 Upper Nile Culture Center Project  | Construction of culture center where events that value tradition and culture are to be held. 2021-2022   | 0.00               | 0.00             | 3.00              | 3.00          |          |
| Sub-Total   |  | 0.00               | 0.00             | 3.00              | 3.00          |          |
| <b>3.5 Participatory Development Promotion Programme</b>                        |  |                    |                  |                   |               |          |
| PD-1 Participatory Development Planning System Establishment Project            | Human resource development for UNS officials on participatory development planning and pilot project implementation, 2015-2017   |                    |                  |                   | TA            |          |
| PD-2 Human Resource Development for Community Development Officer (CDO) Project | Capacity development for CDOs on planning, implementation, and evaluation, 2015-2020   |                    |                  |                   | TA            | P        |
| Sub-Total   |  | 0.00               | 0.00             | 0.00              | 0.00          |          |
| <b>Total of Social Development Strategy</b>                                     |  | <b>4.26</b>        | <b>59.46</b>     | <b>20.50</b>      | <b>84.23</b>  |          |
| <b>4 Peace Building/Governance Enhancement Strategy</b>                         |  |                    |                  |                   |               |          |
| <b>4.1 Conflict Mitigation Programme</b>  |  |                    |                  |                   |               |          |
| - Measures for Conflict Prevention (included in every sector)                   | Service provision, employment of labor, consensus building among tribes, appropriate countermeasure for land issue(s), decrease of economic impartiality, departure from nepotism, etc.  | -                  | -                | -                 |               | C        |
| ID-1 Police Box and Community Police System Establishment Project               | Establishment of police box and community police system linked with government police HQ 2015-2017   |                    |                  |                   | TA            |          |
| Sub-Total   |  | 0.00               | 0.00             | 0.00              | 0.00          |          |
| <b>4.2 Individual Capacity Development Programme</b>                            |  |                    |                  |                   |               |          |
| CD-1 Local Government Administration Improvement Project                        | Capacity development for planning, budget implementation and management, coordination with other sector departments, 2014- 2020  |                    |                  |                   | TA            |          |
| CD-2 Cost Recovery System Improvement Project                                   | Technical project for cost recovery system through controlling cost and increasing service revenue of the administration for public services   |                    |                  |                   | TA            |          |
| Sub-Total   |  | 0.00               | 0.00             | 0.00              | 0.00          |          |
| <b>4.3 Organization/Institution/Social Capacity Development Programme</b>       |  |                    |                  |                   |               |          |
| ID-2 Malakal-Juba Urban Management System Project                               | Monitoring of implementation progress of Malakal and Juba urban infrastructure M/P supported by JICA, and human resource development (law, land registration, detailed planning, participatory development, social research, GIS, etc), 2014 -2016 |                    |                  |                   | TA            | P        |
| ID-3 Land Registration System Improvement Project                               | Mechanization and computerization of land registration, computer data base establishment, human resource development for land registration, use of JICA prepared topographic maps, 2017-2019   |                    |                  |                   | TA            | P        |
| Sub-Total   |  | 0.00               | 0.00             | 0.00              | 0.00          |          |
| <b>Total of Peace Building/Governance Enhancement Strategy</b>                  |  | <b>0.00</b>        | <b>0.00</b>      | <b>0.00</b>       | <b>0.00</b>   |          |
| <b>Grand Total</b>  |  | <b>44.60</b>       | <b>241.79</b>    | <b>80.62</b>      | <b>367.01</b> |          |

Source: JICA Project Team

**< PART V >**

**URGENT DEVELOPMENT PROJECTS**

## **CHAPTER 20 URGENT DEVELOPMENT PROJECT IN WATER SUPPLY SECTOR**

In **Chapter 20**, the scope of work, construction plan, operation and management plan of an Urgent Development Project in the water supply sector are presented. Construction work and procurement work commenced from May 2013, funded by JICA South Sudan Office (SSO). Water committees are created for each public tap for the operation and management of the water supply. Capacity development of these water committees was entrusted to a non-governmental organization (NGO) on a sub-contract basis under the JICA Project Team (JPT).

In 2013 the proposed “Rehabilitation Project of the Treatment Plant, Transmission & Distribution Facilities” was started as another project funded by JICA.

### **20.1 OUTLINE OF THE PROJECT<sup>1</sup>**

#### **20.1.1 Identification of the Project**

The problems of the water supply service were reported in **Chapter 5**. South Sudan Urban Water Corporation (SSUWC) Malakal has been facing non-service coverage, low water pressure, poor quality of treated water, high rate of non-revenue water (leaks), etc. Of importance is that those who live in the areas of non-service coverage have been forced to take untreated water from the Nile River.

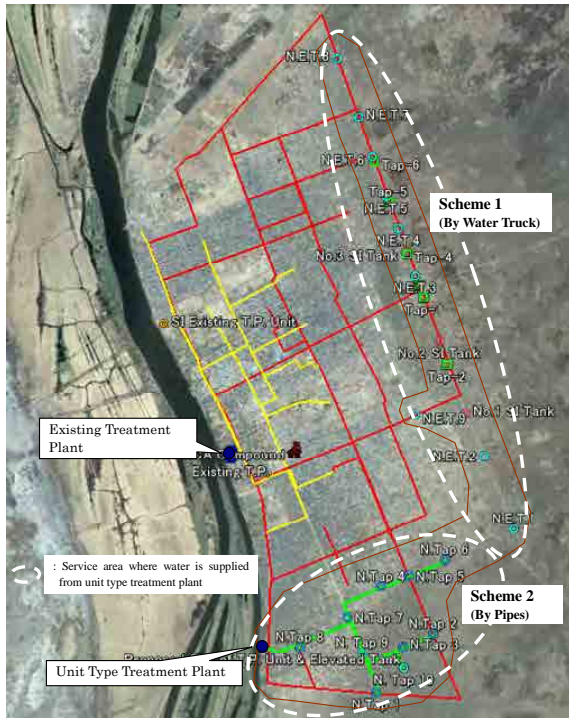
Accordingly, the implementation of this Urgent Development Project focuses on non-service coverage areas so as to reduce the use of the untreated water as much as possible.

It is envisaged that there are three alternatives namely “Alternative 1”, “Alternative 2” and “Alternative 3” as an Urgent Development Project. Alternative 1, Alternative 2 and Alternative 3 are composed of Scheme 1, Scheme 2 and Scheme 3 respectively. Those who live in the areas of Scheme 1 and Scheme 2 shown in Alternative 1, Alternative 2 and Alternative 3 with the exception of northern half part of Scheme 1 shown in Alternative 3 receive purified water from the unit type treatment plant being proposed. While, dwellers in other service areas receive the treated water from the existing treatment plant of SSUWC Malakal.

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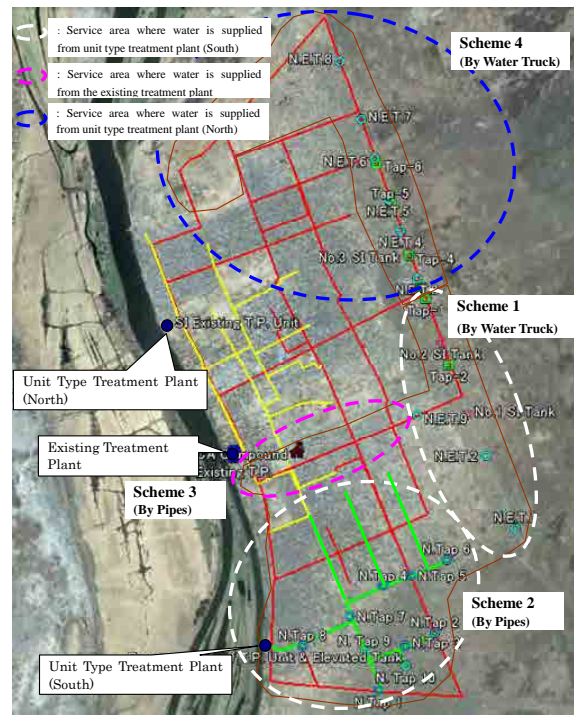
<sup>1</sup> The Urgent Development Support Project in water supply sector was started after signing of MOU dated 11 January 2013 between JICA and counterpart agency. The details are reported in the supplementary report. See Appendix A-13 for the report. In this chapter explanation was made for initial contents proposed by JICA Project Team.





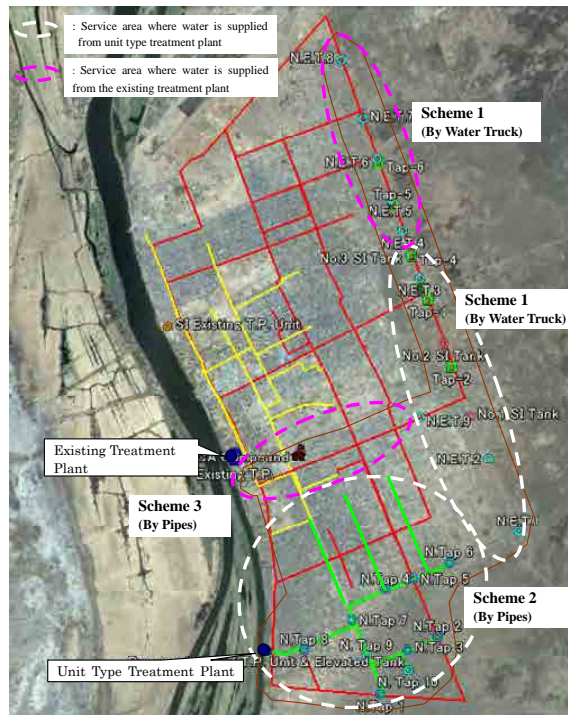
Source: JICA Project Team

Figure 20.1-1 Alternative 1



Source: JICA Project Team

Figure 20.1-2 Alternative 2



Source: JICA Project Team

Figure 20.1-3 Alternative 3

**Table 20.1-1** shows the result of examination on alternatives of the Urgent Development Project considering the problems on water supply service and the prioritized needs of SSUWC Malakal.

**Table 20.1-1 Examination of Alternatives for the Urgent Development Project in the Water Supply Sector**

| Condition                                | Overview  |   |  |
|--|---|---|--|
| Objective                                | To supply safe water and stable supply of water to areas of Malakal Town in water scarcity.   |   |  |
| Outline of the Project                   | Develop water supply facilities & conduct the training on O&M in Southern, Eastern and Northern Zone, Malakal Town  |   |  |
| Problems in current Water Supply Service | <ul style="list-style-type: none"> <li>• There are some areas in water shortage (especially southern zone and eastern zone along Ring Road).</li> <li>• There are some areas in low water pressure (especially the eastern and northern zones).</li> <li>• Poor quality of treated water</li> <li>• High rate of Non-Revenue Water (leaks)</li> <li>• Lack of fuel for generator operation</li> <li>• There are no layout drawings of the existing pipelines</li> <li>• There is no water tariff collection system.</li> <li>• Chronic financial deficit of SSUWC Malakal.</li> </ul> |   |  |
| Prioritized Needs of SSUWC Malakal       | <ol style="list-style-type: none"> <li>1. Replacement of the existing distribution network damaged by road construction which is located in a densely populated area in the southern area</li> <li>2. Rehabilitation of the existing treatment plant (reinforcement of transmission pumps &amp; generator, extension of purification tank)</li> <li>3. Replacement of water distribution network (Approx. 50km)</li> <li>4. Introduction of water trucks</li> <li>5. Non-revenue water reduction</li> </ol>   |   |  |
| Factors                                  | Alternative 1   | Alternative 2   | Alternative 2  |
| Service Area                             | Southern zone and eastern zone along Ring Road  | Southern zone and eastern zone along Ring Road, and northern zone along Ring Road   | Southern zone and eastern zone along Ring Road   |
| Beneficiaries                            | Approx. 9,500   | Approx. 15,500  | Approx. 11,000   |
|  | <b>3</b>  | <b>4</b>  | <b>3</b>   |
| Outlines of Alternatives                 | <ul style="list-style-type: none"> <li>• Southern zone: Supply purified water through pipeline (Scheme 2)</li> <li>• Eastern zone along Ring Road: Supply purified water by water truck (Scheme 1)</li> <li>• Highly populated area in southern zone: Supply water treated in the existing treatment plant of SSUWC Malakal through a rehabilitated pipeline. (Scheme 3)</li> </ul>   | <ul style="list-style-type: none"> <li>• Southern zone: Supply purified water through pipeline (Scheme 2)</li> <li>• Eastern zone along Ring Road and northern Ring Road: Supply purified water by water truck (Scheme 1&amp;4)</li> <li>• Highly populated area in southern zone: Supply water treated in the existing treatment plant of SSUWC Malakal through a rehabilitated pipeline (Scheme 3)</li> </ul> | <ul style="list-style-type: none"> <li>• Southern zone: Supply purified water through pipeline (Scheme 2)</li> <li>• Eastern zone along Ring Road: Supply the purified water by water truck (Scheme 1), (however, the water treated in the existing treatment plant of SSUWC Malakal will be supplied by water truck in half-north part area in eastern zone along Ring Road.)</li> <li>• Highly populated area in southern zone: Supply water treated in the existing treatment plant of SSUWC Malakal through a rehabilitated pipeline (Scheme 3)</li> </ul> |
| Composition of Water Supply Facilities   | <u>Scheme 1:</u> <ul style="list-style-type: none"> <li>• Unit Type Treatment Plant</li> <li>• Small scale storage tank (5m<sup>3</sup> x 12sites)</li> <li>• Public taps (12sites)</li> </ul>  | <u>Scheme 1:</u> <ul style="list-style-type: none"> <li>• Unit type treatment plant</li> <li>• Small scale storage tank (5m<sup>3</sup> x 6sites)</li> <li>• Public taps (6sites)</li> </ul>  | <u>Scheme 1:</u> <ul style="list-style-type: none"> <li>• Unit type treatment plant</li> <li>• Small scale storage tank (5m<sup>3</sup> x 12sites)</li> <li>• Public taps (12sites)</li> </ul>   |

| Condition   | Overview   |   |   |
|---|--|---|---|
|   | <ul style="list-style-type: none"> <li>Water truck (5t x 3vehicles)</li> </ul> <p><u>Scheme 2:</u></p> <ul style="list-style-type: none"> <li>Unit type treatment plant (to use plant both as Scheme 1 and Scheme 2)</li> <li>Elevated tank (10m<sup>3</sup> x 1site)</li> <li>Transmission and distribution pipes (approx. 5,000m)</li> <li>Public taps (10sites)</li> </ul> <p><u>Scheme 3:</u></p> <ul style="list-style-type: none"> <li>Distribution pipes (approx. 4,000m)</li> </ul>  | <ul style="list-style-type: none"> <li>Water truck (5t x 6vehicles)</li> </ul> <p><u>Scheme 2:</u></p> <ul style="list-style-type: none"> <li>Unit type treatment plant (to use plant both as Scheme 1 and Scheme 2)</li> <li>Elevated tank (10m<sup>3</sup> x 1site)</li> <li>Transmission and distribution pipes (Approx. 10,000m)</li> <li>Public taps (15sites)</li> </ul> <p><u>Scheme 3:</u></p> <ul style="list-style-type: none"> <li>Distribution pipes (approx. 4,000m)</li> </ul> <p><u>Scheme 4:</u></p> <ul style="list-style-type: none"> <li>Unit type treatment plant</li> <li>Small scale storage tank (5m<sup>3</sup> x 24sites)</li> <li>Public taps (24sites)</li> <li>Water truck (use truck both as Scheme 1 and Scheme 4)</li> </ul> | <ul style="list-style-type: none"> <li>Water truck (5t x 3vehicles)</li> </ul> <p><u>Scheme 2:</u></p> <ul style="list-style-type: none"> <li>Unit type treatment plant (to use plant both as Scheme 1 and Scheme 2)</li> <li>Elevated tank (10m<sup>3</sup> x 1site)</li> <li>Transmission and distribution pipes (approx. 10,000m)</li> <li>Public taps (15sites)</li> </ul> <p><u>Scheme 3:</u></p> <ul style="list-style-type: none"> <li>Distribution pipes (approx. 4,000m)</li> </ul>  |
| Design Capacity of Unit Type Treatment Plant                      | 150m <sup>3</sup> /day x 1set =150m <sup>3</sup> /day  | 150m <sup>3</sup> /day x 2set =300m <sup>3</sup> /day   | 150m <sup>3</sup> /day x 1set =150m <sup>3</sup> /day   |
| Problems relating to Land Acquisition for Water Supply Facilities | <p>There is no extra space to develop an additional independent facility in the compound of the existing treatment plant because it may be rehabilitated, resulting in mobilizing some parts of the facilities and operating the treatment plant.</p> <p>Therefore, in order to install the unit type treatment plant, the site where the rubber bladder tank had been installed by UNICEF was selected in southern zone.</p> <p>Water has irregularly been stored in the rubber bladder but not treated because of a mechanical defect and lack of maintenance. Area of approx. 1,900m<sup>2</sup> (35m x 55m) is required for installation of unit type treatment plant.</p> | <p>There is no extra space to develop an additional unit type treatment plant in the site where the rubber bladder tank was installed by UNICEF.</p> <p>Therefore, another site with area of approx. 1,900m<sup>2</sup> must be acquired. There is enough space available in the site adjoining the existing unit type treatment plant (the one installed by Solidarities International).</p>   | <p>There is no extra space to develop the additional independent facilities in the compound of the existing treatment plant because it may be rehabilitated, resulting in the mobilizing the some parts of facilities and operating the treatment plant.</p> <p>Therefore, in order to install the unit type treatment plant, the site where the rubber bladder tank had been installed by UNICEF was selected in southern zone.</p> <p>Water has irregularly been stored in the rubber bladder but not treated because of a mechanical defect and lack of maintenance. Area of approx. 1,900m<sup>2</sup> (35m x 55m) is required for installation of unit type treatment plant.</p> |
| Pre-condition for Implementation of the Project                   | <ul style="list-style-type: none"> <li>Establish water truck section in SSUWC Malakal</li> <li>Appoint nine staff members, seven persons will be outsourced out of nine.</li> <li>Arrange personnel budget for training period prior to operation</li> <li>Appoint two staff members in SSUWC Malakal for operation of unit type treatment plant</li> </ul>  | <ul style="list-style-type: none"> <li>Establish water truck section in SSUWC Malakal</li> <li>Appoint 13 staff members, eleven persons will be outsourced out of 13.</li> <li>Arrange personnel budget for training period prior to operation</li> <li>Appoint each two staff members in SSUWC Malakal for operation of two unit type treatment plants</li> </ul>  | <ul style="list-style-type: none"> <li>Establish water truck section in SSUWC Malakal</li> <li>Appoint nine staff members, seven persons will be outsourced out of nine.</li> <li>Arrange personnel budget for training period prior to operation</li> <li>Appoint two staff members in SSUWC Malakal for operation of unit type treatment plant</li> </ul>   |

| Condition  | Overview  |   |   |
|--|---|---|---|
|  | <ul style="list-style-type: none"> <li>Establish water committee for public tap management</li> <li>Collect water tariff</li> <li>Rehabilitate the existing distribution pipes of approx. 4,000m which were damaged by road construction in order to serve SSUWC Malakal's water to 3,500 beneficiaries</li> </ul>  | <ul style="list-style-type: none"> <li>Establish water committee for public tap management</li> <li>Collect water tariff</li> <li>Rehabilitate the existing distribution pipes of approx. 4,000m which were damaged by road construction in order to serve SSUWC Malakal's water to 3,500 beneficiaries</li> <li>Out of two unit type treatment plants, one will be installed at the site near-by unit type treatment plant of Solidarities International. Therefore, an approval will be required by Solidarities International, UNS and local resident operators</li> </ul>   | <ul style="list-style-type: none"> <li>Establish water committee for public tap management</li> <li>Collect water tariff</li> <li>Rehabilitate the existing distribution pipes of approx. 4,000m which were damaged by road construction in order to serve SSUWC Malakal's water to 5,000 beneficiaries</li> </ul>  |
|  | <b>3</b>  | <b>2</b>  | <b>3</b>  |
| Problems relating to Implementation of the Project | <ul style="list-style-type: none"> <li>Qualified water will be supplied to 6,000 (63%) out of 9,500 beneficiaries. However, the treated water of SSUWC Malakal which is not applied for WHO guideline in turbidity and E.coli will be supplied to the remained 3,500 persons.</li> </ul>  | <ul style="list-style-type: none"> <li>Qualified water will be supplied to 12,000 (77%) out of 15,500 beneficiaries. However, the treated water of SSUWC Malakal which is not applied for WHO guideline in turbidity and E.coli will be supplied to the remained 3,500 persons.</li> <li>Water pressure is insufficient in the northern zone. Low water pressure in the northern Zone will be overcome through the rehabilitation of the existing treatment plant. This is a policy of SSUWC Malakal.</li> <li>To install unit type treatment plant at the site near by the site of Solidarities International will require approval by SSUWC, UNS and local resident operators.</li> </ul> | <ul style="list-style-type: none"> <li>Qualified water will be supplied to 6,000 (55%) out of 11,000 beneficiaries. However, the treated water of SSUWC Malakal which is not applied for WHO guideline in turbidity and E.coli will be supplied to the remained 5,000 persons.</li> </ul>   |
|  | <b>3</b>  | <b>3</b>  | <b>3</b>  |
| Problems on Operation of Water Supply Facilities   | <ul style="list-style-type: none"> <li>At least two staff members must be appointed as operators for unit type treatment plant. Two staff members will easily be selected in water treatment operation section (21 staff members) of SSUWC Malakal. But a budget arrangement to outsource two staff members during the training period prior to plant operation is a serious issue because of the current poor</li> </ul> | <ul style="list-style-type: none"> <li>At least four staff members must be appointed as operators for unit type treatment plant. Actually, it is very difficult to shift four staff members to two unit type treatment plants. In addition, a budget arrangement to outsource four staff members during the training period prior to plant operation is a serious issue because of the current poor financial situation.</li> </ul>   | <ul style="list-style-type: none"> <li>At least two staff members must be appointed as operators for unit type treatment plant. Two staff members will easily be selected in water treatment operation section (21 staff members) of SSUWC Malakal. But a budget arrangement to outsource two staff members during the training period prior to plant operation is a serious issue because of current poor</li> </ul> |

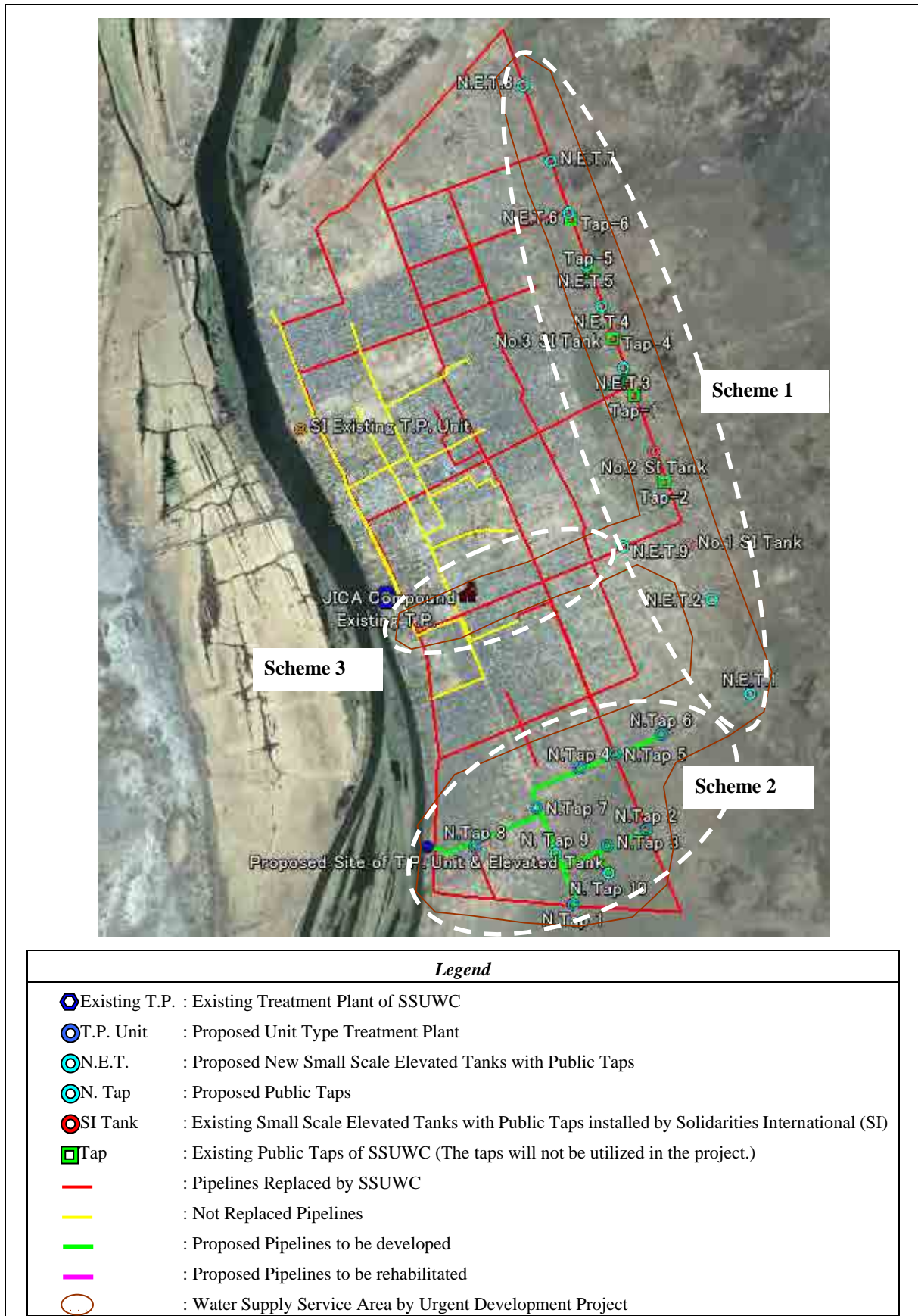
| Condition   | Overview  |   |  |
|---|---|---|--|
|   | financial status.   | <ul style="list-style-type: none"> <li>In case of “Alternative 2”, two unit type treatment plants and the existing treatment plant will operate at the same time. It is doubtful that three water treatment plants can be operated properly taking into account the current organization of SSUWC Malakal and their operational capacity into consideration.</li> </ul> | financial status. <ul style="list-style-type: none"> <li>In order to supply water in northern-half part of eastern zone from the pipelines which are repaired in the high densely populated area, their water pressure of the existing pipelines may be getting low. This is because the existing pipelines have not been formulated in network. An approval will be required for applying Alternative 3 through discussion with SSUWC Malakal.</li> </ul> |
|   | <b>3</b>  | <b>2</b>  | <b>3</b>   |
| Construction Period   | 9 Months  | 15 Months   | 11 Months  |
|   | <b>4</b>  | <b>2</b>  | <b>3</b>   |
| Approximate Construction Cost   | SSP <sup>*3</sup> 10mil.  | SSP16.7mil.   | SSP14.6mil.  |
|   | SSP1,052/capita   | SSP1,077/capita   | SSP1,327/capita  |
| Approximate Construction Cost including that of Water Truck   | SSP11.3mil.   | SSP18.0mil.   | SSP15.9mil.  |
| Approximate Construction Cost per beneficiary including that of Water Truck   | SSP1,189/capita   | SSP1,161/capita   | SSP1,445/capita  |
|   | <b>3</b>  | <b>3</b>  | <b>2</b>   |
| Approximate monthly Water Tariff per Household  | SSP239  | SSP301  | SSP191   |
|   | <b>3</b>  | <b>3</b>  | <b>4</b>   |
| Conceptual Drawings of the Alternatives   | See Alternative 1 shown in <b>Figure 20.1-1</b>   | See Alternative 2 shown in <b>Figure 20.1-2</b>   | See Alternative 3 shown in <b>Figure 20.1-3</b>  |
| <b>Score</b>  | <b>25</b>   | <b>22</b>   | <b>24</b>  |
| <b>Evaluation</b>   | SSUWC Malakal focuses on rehabilitation of the existing treatment plant and distribution pipe networks. Judging from current management system of SSUWC Malakal and their needs, development of relatively large scale facilities as an urgent project cannot be justified at an initial stage. In order to development the capacity required for chemical dosing, water pressure & water quantity & water quality control, and water tariff collection, the Urgent Development Project must be of an appropriate scale to use as a pilot project. Accordingly, considering the purpose of supply of safe and stable water, the above aspects, and scoring, “Alternative 1” is proposed as an Urgent Development Project. |   |  |
| Note: Absolute evaluation was done for the items which are able to be evaluated quantitatively. In three the Alternatives, a score of neutral Alternative is marked in “3”, and that of other Alternatives was evaluated based on quantitative value mentioned in the Table.<br>Score Legend: 5: Excellent, 4: Very Good, 3: Medium, 2: Good, 1: Not Good |   |   |  |

\*UNICEF: United Nations Children’s Fund, WHO: World Health Organization, SSP: South Sudan Pounds

Note: Scheme 3 to construct distribution pipes of approximately 4,000m length was decided to implement not in this Project but in future JICA supported project.

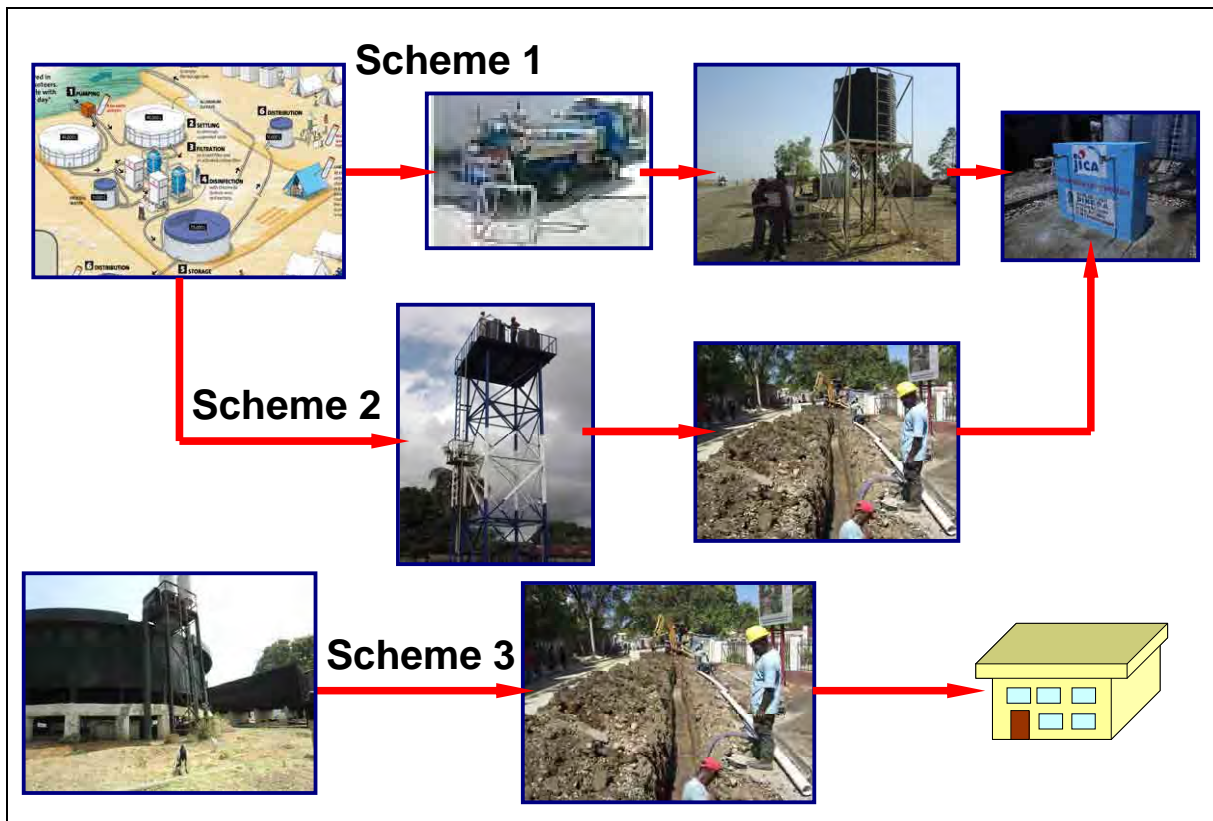
Source: JICA Project Team

It is concluded that Alternative 1 is more advantageous over other two alternatives. Conceptual layout of the Urgent Development Project is shown in **Figure 20.1-4**. In addition, the system of water provision is illustrated in **Figure 20.1-5**.



Source: JICA Project Team

Figure 20.1-4 Conceptual Layout of the Urgent Development Project



Source: JICA Project Team

Figure 20.1-5 System of Water Provision in the Urgent Development Project

### 20.1.2 Design

In order to set the capacity and scale of the water supply facilities, the design criteria for Scheme 1 & 2 and Scheme 3 is summarized in **Table 20.1-2** and **Table 20.1-3** respectively.

**Table 20.1-2 Design Criteria of Scheme 1 & 2 in the Urgent Development Project**

| No.      | Calculation       | Contents   | Scheme 1                | Scheme 2                    | Total   |
|----------|-------------------|--|-------------------------|-----------------------------|---------|
|          |                   |  | Service by Water Trucks | Service through Pipe System |         |
| <b>A</b> |                   | <b>Water Demand</b>  |                         |                             |         |
| 1        |                   | Beneficiaries at each Public Tap                                     | 250                     | 300                         | -       |
| 2        |                   | Number of Public Taps  | 12                      | 10                          | 22      |
| 3        | [1] x [2]         | Total Beneficiaries  | 3,000                   | 3,000                       | 6,000   |
| 4        |                   | Daily per-capita Water Consumption (l/capita/day)                    | 20                      | 20                          |         |
| 5        | [3] x [4]         | Daily Water Consumption (l/day)                                      | 60,000                  | 60,000                      | 120,000 |
| 6        |                   | Water Loss (%)   | 0                       | 15                          | -       |
| 7        | [5] / (1-[6]/100) | Water Demand (l/day)   | 60,000                  | 70,588                      | 130,588 |
| 8        | [7]/12hr/[2]/3600 | Water Demand at a Tap (l/s) in Tap Operation of Daily 12 hours       | 0.116                   | 0.163                       |         |
| <b>B</b> |                   | <b>Operation</b>   |                         |                             |         |
| 11       |                   | Daily Tap Operation (hr)   | -                       | 12                          | -       |
| 12       |                   | Daily Treatment Plant Operation (hr)                                 | -                       | -                           | 12      |
| 13       |                   | Engine pump operation for supplying water to the elevated tank       | -                       | 12                          | -       |
| 14       |                   | Daily Trips of Water Trucks  | 4                       | -                           | -       |
| 15       |                   | Engine pump operation for transferring water to the water truck (hr) | 12                      | -                           | -       |
| 16       |                   | Effective Pressure (Mpa)   | 0.03                    | 0.05                        |         |

Source: JICA Project Team

**Table 20.1-3 Design Criteria of Scheme 3 in the Urgent Development Project**

| No. | Calculation   | Contents   | Scheme 3  |
|-----|---|--|---|
|     |   |  | Service through Pipe System to be rehabilitated |
| 1   | 475 connections x 7.5person/household =3,562 ≈ 3,500persons | Beneficiaries  | 2,400   |
| 2   |   | Daily per-capita Water Consumption (L/capita/day) based on historical data | 50  |
| 3   | [1] x [2]   | Daily Water Consumption (L/day)  | 120,000   |

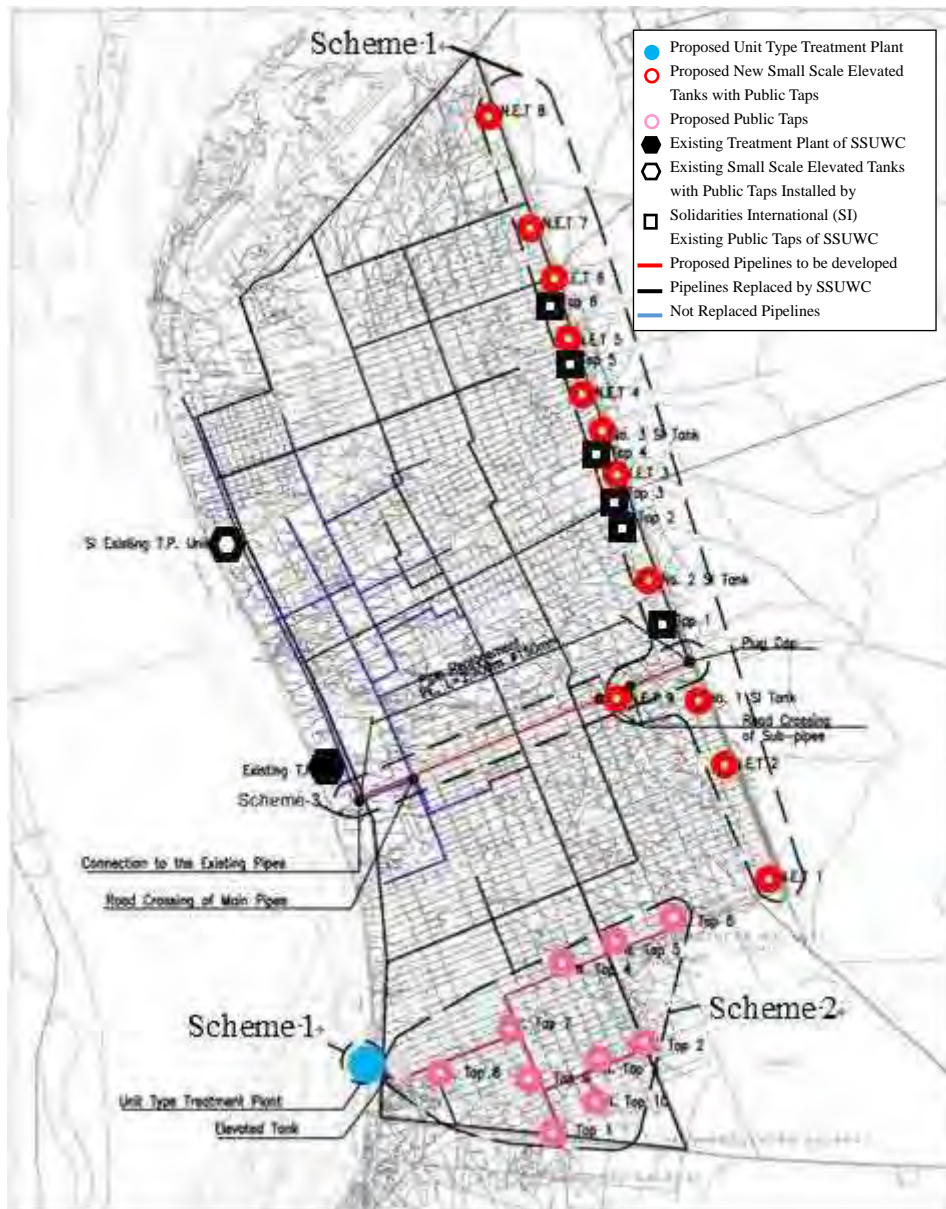
Source: JICA Project Team

## 20.2 RECOMMENDATION ON CONFLICT PREVENTION

Water supply is the greatest necessity in Malakal Town. A survey into the water supply found people are making great efforts to secure water for themselves; 64% of the people who were questioned drew water directly from the Nile River or bought water from a peddler on donkeys. For those who carry water from the Nile River, especially for the people who live in the eastern and southern areas in Malakal Town, the distance makes great difficult for them to obtain water.

This project will install common water taps in the eastern and southern parts of Malakal Town on the Ring Road, located 2km away from the Nile River. The population of these areas has been dramatically increased lately with the returnees and immigrants from the rural areas. Construction of water facilities will give an opportunity for the local residents to have access to safer and less expensive water at lower cost. However, the project will recommend some interventions to prevent any conflicts and ensure the sustainable use of the water facilities.





Source: JICA Project Team

**Figure 20.2-1 Water Taps Plan**

First of all, the project covers a large area; it includes 6 bomas (Hai El Matar, Thorat Luakat, Biathin, Hai Saha, Hai Television and Assossa) on the eastern part of Malakal Town, and there are at least two newly created bomas (Hai Salam and Hai Freedom) on the eastern side of the Ring Road. The boma leaders have claimed the project does not have sufficient water points to cover all the population, but it is important for the boma leaders to be persuaded that the aim of the project is to give assistance to help the emergency condition of the people while the government works to construct formal water supply system in the near future. The water points will have to be shared by all people who are living in these areas.

Secondly, to ensure the water points are shared peacefully with other water users (who live in the same boma and/or other bomas), the boma leaders and NGOs specializing in the water sector expressed a strong desire to make rules and regulations to avoid possible conflicts among the

water users and communities. The discussions groups to agree rules and regulations should be attended by all the respective boma representatives and community leaders, to ensure that the decisions are agreed by all the parties.

Thirdly, the boma leaders and NGOs specializing in the water sector also expressed firm interest in forming a water user's committee for the management of the water facility. However, according to the assessment report on the operation of other public taps in Malakal Town, those who are working for the water system did not know clearly "who is doing what" in the operation and management of water provision. Based on the lessons learned from the experience of other public water facilities, people who will be involved in the administration of the new public taps, both the government (SSUWC and local government) and the communities (community leaders, traditional authorities, and water users) should have clearly defined roles and responsibilities. During operation, a reporting system should be also established to improve the accountability of both sides.

Finally, conducting an assessment of the newly developed communities is recommended. The solidarity of the new community may not be fully developed in the areas where they have experienced rapid growth or population. Are they capable of working together? The newly formed communities may need workshops or activities to strengthen and empower the community solidarity before the project is initiated. The water user's committee should also decide if the members of the committee should be paid or not. If it is to be paid work, consideration should be given to hiring unemployed youth and female householders who make up 25% of the population of Malakal Town. Also, members of the water user's committee must reflect the tribal and ethnic groups from the area receiving the water service. People from different tribes and ethnic origins will be encouraged to cooperate and work together to maintain a common facility.

### **20.3 CONSTRUCTION**

From the experience of the construction of the JICA compound and the installation of the unit type treatment plant by the Solidarities International fund, it took a long time to procure the construction material and equipment. Therefore, it is desirable that approximately three months is taken for procurement .A tentative time schedule is shown in **Table 20.3-1**.

**Table 20.3-1 Construction Plan**

| Period<br>Work                             | 2012 |    |    |    |    |    |   |    |    |   |    |    | 2013 |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
|--|------|----|----|----|----|----|---|----|----|---|----|----|------|----|----|---|----|----|---|----|----|---|----|----|---|----|----|
|  | 7    | 8  | 9  | 10 | 11 | 12 | 1 | 2  | 3  | 4 | 5  | 6  | 7    | 8  |    |   |    |    |   |    |    |   |    |    |   |    |    |
|  | 1    | 15 | 31 | 1  | 15 | 31 | 1 | 15 | 30 | 1 | 15 | 31 | 1    | 15 | 28 | 1 | 15 | 31 | 1 | 15 | 30 | 1 | 15 | 31 | 1 | 15 | 31 |
| Procurement of Water Trucks                |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| Preparation for Urgent Support Project     |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Design                                   |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Preliminary Construction Plan            |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Cost estimate                            |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Preparation of Tender Documents          |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| Implementation & Supervision               |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Tender                                   |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| - Supervision                              |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Preparation and Mobilization              |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Installation of Unit Type Treatment Plant |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Installation of Small Scale Storage Tanks |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Installation of Elevated Tank             |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Installation of Public Taps               |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Pipe Laying                               |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *Commissioning                             |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |
| *De-mobilization                           |      |    |    |    |    |    |   |    |    |   |    |    |      |    |    |   |    |    |   |    |    |   |    |    |   |    |    |

Source: JICA Project Team

## 20.4 OPERATION AND MANAGEMENT PLAN

### 20.4.1 Organization

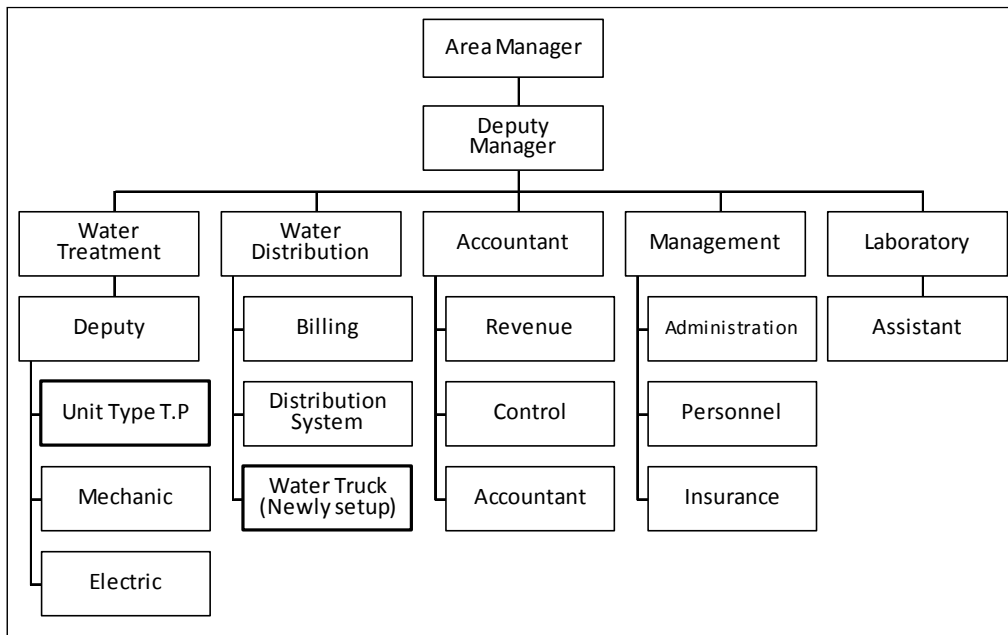
There are 81 staff members in SSUWC Malakal as of May 2012. The composition of staff members is as shown in **Table 20.4-1**. According to SSUWC Malakal, since technical trouble in the water supply system occur daily, their number of staff member is by no means enough.

**Table 20.4-1 Staff Member of SSUWC Malakal**

| Job Title                      | Number of Staff Members |
|--------------------------------|-------------------------|
| Engineer                       | 2                       |
| Supervisor                     | 6                       |
| Technician                     | 5                       |
| Laboratory                     | 2                       |
| Administration                 | 8                       |
| Accounting                     | 12                      |
| Water Treatment Plant Operator | 21                      |
| Plumber                        | 14                      |
| Others                         | 11                      |
| <b>Total</b>                   | <b>81</b>               |

Source: SSUWC Malakal

In order to operate and maintain the water supply facilities to be built in the Urgent Development Project, two new management sections are required in SSUWC. These will carry out the O&M work for the unit type treatment plant and the water truck. It is proposed that each O&M section is managed by the Water Treatment Division and Water Distribution Division respectively as highlighted in **Figure 20.4-1**. The Unit type treatment plant section and water truck section consist of two and nine persons respectively. The staff members of the unit type treatment plant section will be selected from the Water Treatment Division.



Source: SSUWC Malakal

**Figure 20.4-1 Organization of SSUWC Malakal**

## 20.4.2 Operation and Management Plan

Water Committees will be established so as to operate and maintain the public tap and small-scale storage on a daily basis as well as unit type treatment section and water truck section. Therefore, operation and maintenance of the water supply system in the Urgent Development Project will be conducted by their collaboration.

### (1) Water Truck Section

#### (a) Number of Staff Members

Composition of the water truck section is shown in **Table 20.4-2**.

**Table 20.4-2 Composition of Water Truck Section**

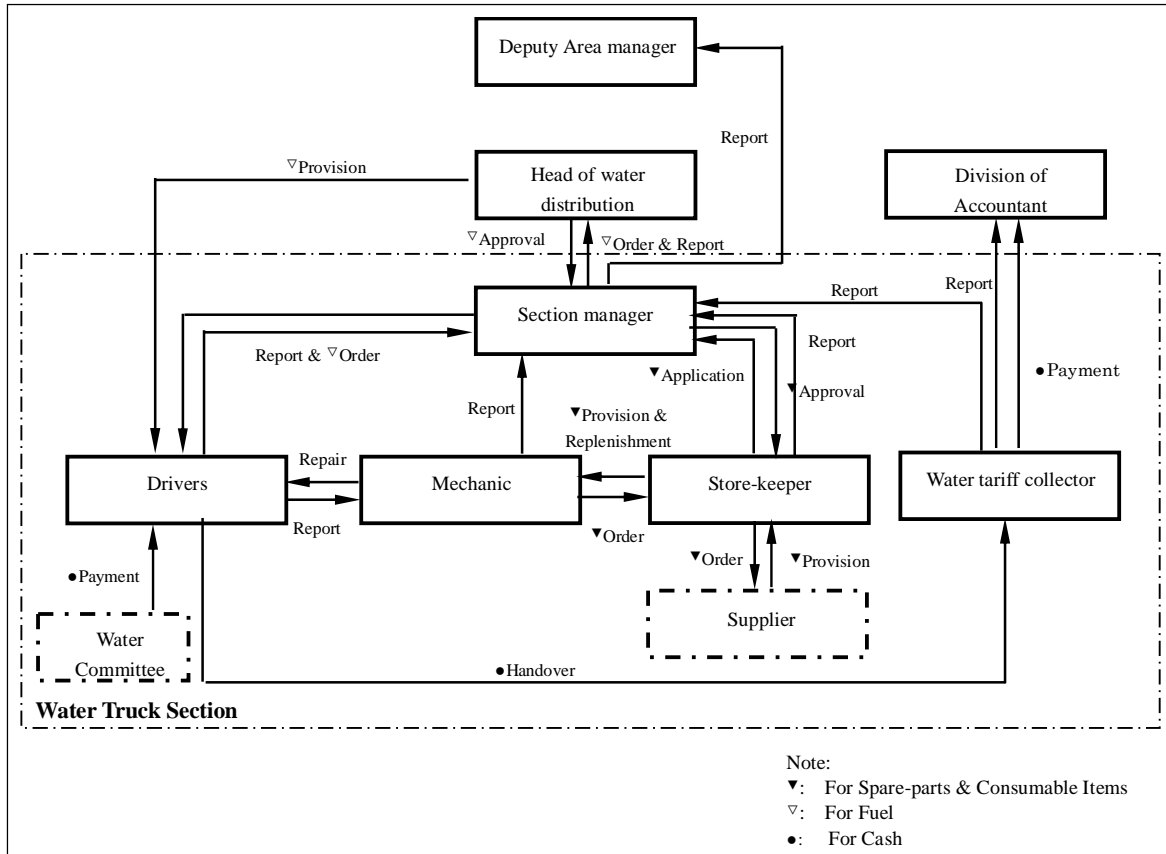
| SSUWC Staff in Water Truck Section | Number |
|------------------------------------|--------|
| Section manager                    | 1      |
| Drivers                            | 4 (1)* |
| Mechanics                          | 2      |
| Store-keeper                       | 1      |
| Water tariff collector             | 2      |
| Total                              | 10     |

Note: \*one driver out of four drivers is stand-by in case of unforeseen circumstances.

Source: JICA Project Team

#### (b) Network in Water Truck Section

A relevant network of the water truck section is illustrated in **Figure 20.4-2**.



Source: JICA Project Team

**Figure 20.4-2 O&M Structure of Water Truck Section**

**(c) Role & Activities of the Water Truck Section**

The detailed activities of the Water Truck Section are shown in **Table 20.4-3**.

**Table 20.4-3 Activities of O&M on Water Truck**

| SSUWC Staff in Water Truck Section | Key Roles & Responsibilities   |
|------------------------------------|--|
| a. Section manager                 | a.1 Approval of spare-parts and fuel procurement<br>a.2 Approval of replenishment of other consumable items<br>a.3 Preparation of weekly O&M work plan<br>a.4 Order of fuel from division head of distribution<br>a.5 Weekly and monthly report to deputy Area Manager and division head of water distribution |
| b. Drivers                         | b.1 Daily drive<br>b.2 Daily inspection of water trucks<br>b.3 Order of fuel from section manager<br>b.4 Record of daily driving log<br>b.5 Weekly collection of water tariff from water committee<br>b.6 Daily report to mechanic, section manager and water tariff collection                                |
| c. Mechanic                        | c.1 Repair of water trucks<br>c.2 Order of spare-parts and consumable items with the exception of fuel from store-keeper<br>c.3 Weekly maintenance of water trucks<br>c.4 Weekly report to section manager   |
| d. Store-keeper                    | d.1 Procurement of spare-parts<br>d.2 Replenishment of consumable items such as engine oil with the exception of fuel<br>d.3 Inventory management<br>d.4 Order of spare-parts and consumable items with the exception of fuel from suppliers<br>d.5 Weekly report to section manager                           |
| e. Water tariff collector          | e.1 Weekly collection of water tariff from water committee through drivers<br>e.2 Record of water tariff collection<br>e.3 Weekly report to accountants and section manager  |

Source: JICA Project Team

#### **(d) Works to be Done Prior to Operation of Water Supply**

##### Preparation work by SSUWC Malakal

1. Set-up the water truck section under the division of water distribution in SSUWC Malakal.
2. Outsource staff member (4 Drivers, 2 Mechanic and 1 Store-keeper) for water truck section.  
The section manager and water tariff collector will be selected from SSUWC Malakal.
3. Prepare O&M manual for the section manager, driver, mechanic, store-keeper and water tariff collector based on this O&M work plan.
4. Train staff members to follow O&M manual
5. Define water service area for each public tap (N.E.T.1 to 9 and No.1 to No.3 SI tank).
6. Prepare forms for weekly & monthly reporting, record of the daily driving log, daily inspection, work record for repair, weekly maintenance record, procurement order, and record of water tariff collection.
7. Establish a water tariff system taking the operational cost for other piped schemes (Scheme 2) into account.
8. Select water tariff collectors and operator in water committee.
9. Conduct workshop for the water committees.

Schedule of preparation work

As mentioned above, SSUWC should take responsibility with preparation work on O&M prior to the start of the operation of the water truck water supply service. The time schedule of the preparation work is as follows:

**Table 20.4-4 Time Schedule of the Preparation Work**

| Work Activities  | 2012   |           |         |          |          | 2013    |          |
|--|--------|-----------|---------|----------|----------|---------|----------|
|  | August | September | October | November | December | January | February |
| 1) Set-up water truck section                                    | ■      |           |         |          |          |         |          |
| 2) Select staff members  |        |           | ■       | ■        |          |         |          |
| 3) Prepare O&M manual  |        | ■         | ■       |          |          |         |          |
| 4) Train staff members   |        |           |         |          | ■        | ■       |          |
| 5) Define water service area for each public tap                 |        |           | ■       |          |          |         |          |
| 6) Prepare forms for report and record                           |        | ■         | ■       |          |          |         |          |
| 7) Establish water tariff system                                 |        |           |         | ■        |          |         |          |
| 8) Select water tariff collector and operator in water committee |        |           |         | ■        |          |         |          |
| 9) Conduct workshop for water committee                          |        |           |         |          |          |         | ■        |

Source: JICA Project Team

Measures of the training

As mentioned above, the Water Truck Section is composed of five responsibilities such as section manager, drivers, mechanics, store-keepers and water tariff collector. The section manager and water tariff collector will be appointed from SSUWC Malakal, and four drivers, two mechanics and store-keeper will be outsourced. As indicated in **Table 20.4-3**, all the staff members shall be trained prior to starting operation. The experience to be required for the staff members, their training period, key training and trainer is shown in **Table 20.4-5**.

**Table 20.4-5 Experience to be Required and Measure of the Training**

| Staff Members (Experience required)   | Training Period (Month) | Key Training  | Proposed Trainer  | Cost required for Trainer | Remarks                        |
|---------------------------------------|-------------------------|---|---|---------------------------|--------------------------------|
| One Section Manager (10-15years)      | 3                       | <ul style="list-style-type: none"> <li>• Role of water truck section</li> <li>• Flow of daily work</li> <li>• Flow of procurement process and its measures</li> <li>• Work planning of O&amp;M</li> <li>• Reporting</li> </ul>                                      | Deputy Manager, SSUWC Malakal                             | -                         | -                              |
| Four Drivers (8-10years)              | 2                       | <ul style="list-style-type: none"> <li>• Flow of daily work</li> <li>• Flow of procurement process and its measures</li> <li>• Daily inspection</li> <li>• Flow of water tariff collection and its measures</li> <li>• Reporting and recording</li> </ul>           | Supplier of water trucks                                  | US\$19,800                | US\$330* <sup>1</sup> x 60days |
| Two Mechanics (8-10years)             | 3                       | <ul style="list-style-type: none"> <li>• Flow of daily work</li> <li>• Mechanism of water trucks</li> <li>• Weekly maintenance and its measures</li> <li>• Flow of procurement process and its measures</li> <li>• Daily inspection</li> <li>• Reporting</li> </ul> | Supplier of water trucks                                  | US\$29,700                | US\$330* <sup>1</sup> x 90days |
| One Store-keeper (5-8years)           | 1                       | <ul style="list-style-type: none"> <li>• Flow of daily work</li> <li>• Flow of procurement process and its measures</li> <li>• Inventory management</li> <li>• Reporting</li> </ul>   | Division of Purchasing & Procurement of SSUWC Headquarter | US\$3,900                 | US\$130* <sup>2</sup> x 30days |
| Two Water Tariff Collector (3-5years) | 1                       | <ul style="list-style-type: none"> <li>• Flow of daily work</li> <li>• Significance of water tariff collection</li> <li>• Water audit analysis</li> <li>• Reporting and recording</li> </ul>  | Division of Accountant of SSUWC Headquarter               | US\$3,900                 | US\$130* <sup>2</sup> x 30days |
| Total                                 |                         |   |   | US\$57,300                |                                |

Note: \*1: The unit cost includes training, accommodation, travel and insurance charges.

\*2: The unit cost is daily allowance.

Source: JICA Project Team

### Budget Arrangement for Training

In order to outsource drivers, mechanics and store-keepers, etc., the cost shown in **Table 20.4-5** is required. Therefore, an initial cost of capacity development for outsourcing and the training is calculated to be approx. US\$57,300. As SSUWC has been suffering from inflationary fuel cost since last April 2012, it is difficult for SSUWC to find a budget for the initial cost for the staff members to be outsourced and their training prior to operation of water supply system. SSUWC needs fund assistance from donors such as JICA before commencement of operation.

The cost required for staff member defined as O&M should be covered by the water tariff. However, the following personnel cost during the training period will not be covered with it. Therefore, it has to be undertaken by SSUWC side.



**Table 20.4-6 Cost for Personnel to be Outsourced for Training Period**

| Staff        | Proposed Personnel Expenses (SSP/Month) | Number of Members | Period (Month) | Total Personnel Expenses (SSP) |
|--------------|---|-------------------|----------------|--------------------------------|
| Drivers      | 750                                     | 4                 | 3              | 9,000                          |
| Mechanics    | 1,000                                   | 2                 | 3              | 6,000                          |
| Store-keeper | 750                                     | 1                 | 3              | 2,250                          |
| Total        |   |                   |                | 17,250                         |

Note: Personnel expenses do not include allowance required for overtime because of the training.

Source: JICA Project Team

## **(2) Unit Type Treatment Plant Section**

### **(a) Number of Staff Members**

Two staff members are to be selected in the Treatment Division as operators. Since the staff members are familiar with the operation of the treatment plant, less training is required.

Two staff members in the treatment plant should be job-shifted every six months to a year in order to avoid a decline of motivation.

### **(b) Collaboration with the Water Truck Section**

The unit type treatment plant section should operate the plant in collaboration with water truck section.

### **(c) Role & Activities of the Unit Type Treatment Plant Section**

Two operators will take the following activities:

1. Daily operation works such as chemical dosing, disinfection, back-washing, generator operation, pump operation, etc. of the unit type treatment plant
2. Daily inspection of the unit type treatment plant
3. Order of fuel from section manager of the water truck section
4. Record of daily driving log
5. Daily report to section manager of the water truck section

### **(d) Works to be Done Prior to Operation of Water Supply**

#### Preparation work by SSUWC Malakal

1. Set-up the unit type treatment plant under the division of Treatment Plant in SSUWC Malakal
2. Select two operators for the section
3. Prepare O&M manual for the operators based on this O&M work plan
4. Train operators following O&M manual
5. Prepare forms for weekly & monthly report, record of the daily driving log, daily inspection, work record for repair, weekly maintenance record, procurement order

#### Schedule of preparation work

Time schedule of the preparation work is as follows:

**Table 20.4-7 Time Schedule of the Preparation Work**

| Work Activities                             | 2012   |           |         |          |          |
|---|--|-----------|---------|----------|----------|
|   | August   | September | October | November | December |
| 1) Set-up unit type treatment plant section | ■  |           |         |          |          |
| 2) Select staff members                     |  | ■         |         |          |          |
| 3) Prepare O&M manual                       |  | ■         |         |          |          |
| 4) Train staff members                      | Train the staff members through a demonstration of the plant as soon as it is delivered. |           |         |          |          |
| 5) Prepare forms for report and record      |  | ■         |         |          |          |

Source: JICA Project Team

#### Key training of the operators

Operators will be trained by the senior technicians who belong to the Treatment Plant Division as follows:

1. Learn flow of daily work
2. Flow of procurement process and its measures
3. Daily operation works such as chemical dosing, disinfection, generator & engine pump operation, etc.
4. Daily inspection of the plant
5. Reporting and recording

#### Budgeting the training

Costs such as the trainee's personnel wage, the trainer's fee, etc. during the training is included in the original budget of the SSUWC Malakal, so additional budget is not necessary for the training on the unit type treatment plant.

#### **20.4.3 Monthly O&M Cost**

Two types of monthly O&M cost of water trucks were suggested as shown in **Table 20.4-8**. Due to fuel price escalation, the O&M costs as of July 2012 has increased, almost double the cost of March 2012.

**Table 20.4-8 Monthly O&M Cost on Water Trucks**

(As of July 2012)

| Items  | Quantity     | Amount (SSP) | Remarks  |
|--|--------------|--------------|--|
| <b>Personnel Expenses (SSUWC Malakal)</b>                |              |              |  |
| Section manager  | 1            | 2,000        |  |
| Accountants (Water tariff collector)                     | 2            | 2,000        |  |
| Drivers  | 4            | 4,000        |  |
| Mechanics  | 2            | 2,400        |  |
| Store-keeper   | 1            | 1,000        |  |
| Plant operator   | 2            | 3,000        |  |
| Sub-total  |              | 14,400       |  |
| <b>Personnel Expenses (Water Committee)</b>              |              |              |  |
| Valve & Faucet Operators                                 | 22           | 11,000       |  |
| Tariff Collectors  | 22           | 11,000       |  |
| Sub-total  |              | 22,000       |  |
| <b>Consumable Expenses for Trucks</b>                    |              |              |  |
| Fuel (Diesel)  | 2,854 litres | 45,664       | 222km/day x 3 trucks / 7km/litres x 30days = 2,854litres |
| Engine Oil   | 16.0 litres  | 800          | 0.67times x 3trucks x 8litres                            |
| Tire   | 3Nos         | 1,500        | 0.25times x 3trucks x 4nos                               |
| Oil Filter   | 0.99Nos      | 49           | 0.33times x 3trucks x 1nos                               |
| Sub-Total  |              | 48,013       |  |
| <b>Consumable Expenses for Unit Type Treatment Plant</b> |              |              |  |
| Fuel (Diesel) for 75kVAGenerator                         | 3,960 litres | 63,360       | 11litres/hr x 12hrs x 30days                             |
| Fuel (Diesel) for Engine Pump                            | 2,772 litres | 44,352       | 7.2litres/hr x 12hrs x 30days                            |
| Coagulant (Aluminium Sulphate)                           | 483kg        | 231          |  |
| Coagulant Aid (Soda ash)                                 | 220kg        | 220          |  |
| Calcium Hypo-chlorite                                    | 50kg         | 200          |  |
| Sub-Total  |              | 108,363      |  |
| Total  |              | 191,776      |  |

Note: Personnel cost is excluded. Cost of engine oil, tire and oil filter was negligible because fuel cost accounts for the majority in the total cost.

- ✓ Condition of O&M cost estimate
- ✓ Daily millage per truck: Approx. 222km
- ✓ Fuel consumption: 7km/litre
- ✓ Replacement of engine oil (8litres): 10,000km
- ✓ Replacement of four tires: 30,000km
- ✓ Replacement of oil filter: 20,000km
- ✓ Fuel unit cost: SSP20/litre (as of May 2012)

Source: JICA Project Team

SSUWC Malakal will revise the water tariff charged so as to cover approximately South Sudan Pounds (SSP)191,776/month. If SSP191,776 is collected from 800 households in Scheme 1 and 2, the water tariff per household will be approximately SSP240/month. This price is not so high for those who buy water from water vendors. They spend daily SSP15/200 litres per household; this is equivalent to SSP450/month.

## 20.5 CONCLUSION

The Town Profile Survey clarified that the need for water is outstandingly high among all the needs people identified. “WS-1 Small-scale Water Supply Development Project” contains the components of procuring three water trucks, installation of a water purification plant with a capacity of 150 m<sup>3</sup>, installation of public taps at 22 points and installation of an elevated water tank. Operation and maintenance will be made by the ring fence method by creating an independent organization within SSUWC. The public water taps will be managed by water committees to be formed from the beneficiary communities. This system is planned to start operation in 2014 in the eastern and southern parts of Malakal Town where water supply service has not been able to keep pace with the rapid population increase in recent years.

**Table 20.5-1 Contents of Urgent Development Project in Water Supply Sector**

| Item                              | Description                           | Remarks                   |
|-----------------------------------|---------------------------------------|---------------------------|
| Scheme 1                          |                                       |                           |
| Target                            | Eastern Zones in Malakal Town         |                           |
| Facilities to be constructed      | Unit Type Treatment Plant*            | 150 cubic meters per day  |
|                                   | Twelve (12) small scale storage tanks | 5 cubic meters per tank   |
|                                   | Twelve (12) public taps               |                           |
| Equipment to be provided          | Three (3) water trucks                | 5 tons per truck          |
| Clear water transmission facility | Water truck                           |                           |
| Water supply equipment            | Public taps                           |                           |
| Scheme 2                          |                                       |                           |
| Target                            | Southern Zone in Malakal Tow          |                           |
| Facilities to be constructed      | Unit Type Treatment Plant*            | 150 cubic meters per day  |
|                                   | One (1) Elevated tank                 | 10 cubic meters           |
|                                   | Ten (10) public taps                  |                           |
|                                   | Water pipelines                       | Appropriately 5,000 meter |
| Clear water transmission facility | Pipeline                              |                           |
| Water supply equipment            | Public taps                           |                           |

Note: \* One unit type treatment plant will be installed in Southern zone and utilized both for both scheme 1 and 2.

Source: JICA Project Team

This Urgent Development Project including sub-contract of the formation of the water committees was also terminated in February 2014.

## **CHAPTER 21 URGENT DEVELOPMENT PROJECT IN WATER TRANSPORT SECTOR**

This chapter presents an Urgent Development Project in the port sector. The project consists of the rehabilitation of the present cargo jetty at the Malakal port and the construction of a passenger jetty. The project was commenced in June 2013 funded by JICA South Sudan Office (SSO).

### **21.1 OUTLINE OF THE PROJECT<sup>1</sup>**

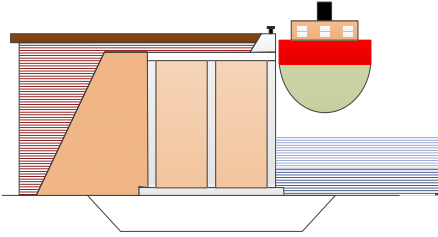
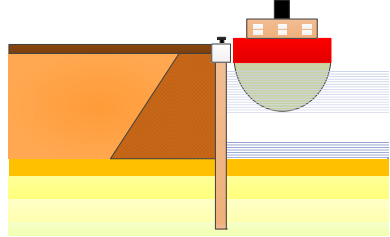
#### **21.1.1 Selection of the Structure**

Malakal Port will play an important role in the international logistics infrastructure of South Sudan. Moreover, due to economic growth and increase in industrial activity in Malakal Town in the future, cargo and passenger volume are predicted to increase dramatically. As a result of the above, it is necessary to strengthening the port function. The Urgent Development Projects were selected in **Chapter 19**. **Table 21.1-1** shows the result of the study investigating the reconstruction method for the Jetty.

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<sup>1</sup> The Urgent Development Support Project in water transportation sector was started after signing of MOU dated 16 January 2013 between JICA and counterpart agency. The details are reported in the supplementary report. See Appendix A-13 for the report. In this chapter explanation was made for initial contents proposed by JICA Project Team.

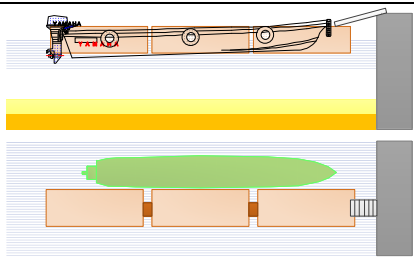
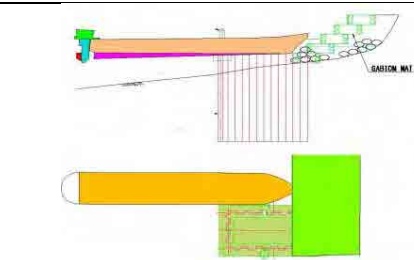
**Table 21.1-1 Study on the Type of Reconstruction of Jetty**

| Item                       | General Description   |  |
|----------------------------|---|--|
| Existing Problems          | <ul style="list-style-type: none"> <li>Narrow handling space (apron width 10m, normally more than 20m + cargo handling yard)</li> <li>Lack of mooring facilities</li> </ul>   |  |
| Comparison                 | 2 kinds of typical type of mooring facilities were selected.  |  |
| Type                       | Gravity Type Jetty  | Steel Sheet Pile Type Jetty  |
|                            |    |    |
| Structure                  | Install caisson or cellular block on top of levelled rubble stone. Stability of the structure shall be kept by the weight itself (deadweight).  | Drive Steel Sheet Piles (SSP). Connect on top by concrete and install concrete apron.  |
| Characteristics            | Deadweight and friction force shall resist against the external force.  | There are several types of SSP type jetty, such as cantilever type, double layer type with tie rods.   |
| Advantage                  | <ul style="list-style-type: none"> <li>*Firm and durable</li> <li>*Long expected life time</li> <li>*Good in stability during construction</li> <li>*Economic in shallow place</li> <li>*Can be resisted against big berthing force</li> </ul>  | <ul style="list-style-type: none"> <li>*Very simple and light structure compare to gravity type</li> <li>*Shorter construction period than gravity wall</li> <li>*Cheaper construction cost than gravity wall</li> <li>*No need for wide fabrication yard</li> </ul> |
| Weak point                 | <ul style="list-style-type: none"> <li>*Vulnerable to earthquake</li> <li>*Need wide space for fabrication</li> <li>*Nile River water is turbid and no diving work can be conducted.</li> </ul>   | <ul style="list-style-type: none"> <li>*Need to treat corrosion protection</li> <li>*Rather short expected life time</li> <li>*Need firm compaction</li> </ul>   |
| Constraint to construction | <ul style="list-style-type: none"> <li>*Easy to construct when using pre cast parts such as blocks</li> <li>*Need to enclose by sheet pile and pump out.</li> </ul>   | *Easier and faster than gravity type.  |
| Adaptation to Malakal Port | *When a certain area (approximately 70m x 70m) is obtained for material stock yard and fabrication yard, this method is very suitable for jetty.  | *It is necessary to have enough embankment length of SSP, otherwise SSP will lean forward by earth pressure.   |
| Conclusion                 | <ul style="list-style-type: none"> <li>*Comparing gravity type and SSP type, SSP type is more suitable for Malakal Port due to the following reasons</li> <li>- Construction period is shorter.</li> <li>- Construction cost is cheaper</li> <li>- Simple construction procedure</li> </ul> |  |

Source: JICA Project Team

As to selection of passenger jetty, two types, the floating type and the steel sheet pile type, are compared. When the floating platform is applied, the weather condition, purpose, size, material, mooring method, etc. shall be carefully examined. **Table 21.1-2** shows the result of the study on the type of Jetty for Passengers.

**Table 21.1-2 Study on the Type of Jetty for Passengers**

| Items                      | General Description  |   |
|----------------------------|--|---|
| Type                       | Floating Type Jetty  | Steel Sheet Pile Type Jetty   |
|                            |   |   |
| Structure                  | Float is made of concrete or steel. Midair box type is called pontoon. pontoons are connected and used as a pier. They shall be fixed by anchor or by studs.   | Drive Steel Sheet Piles (SSP). Connect on top by concrete and install Gabion around the river bank.   |
| Characteristics            | Pontoons can be installed either soft ground or deep water. The most effective use is to install at a big tide difference location.  | There are several types of SSP type jetty, such as cantilever type, double layer type with tie rods.  |
| Advantage                  | *Easy for installation<br>*Easy for relocation<br>*Cheap in fabrication cost<br>*Suitable for small ships  | *Not sunk<br>*Durable in the event of crash<br>* Easy getting on and off because of fixing  |
| Weak point                 | *Not suitable for big ship's mooring nor unloading   | * Relatively expensive compared to floating type  |
| Constraint to construction | *It shall be fabricated at iron factory or shipyard. Connection of pontoons shall be conducted at installation site.   | * Very simple construction  |
| Adaptation to Malakal Port | *During dry season and rainy season, water level differs more than 1.5m at Malakal Port. Therefore this type is suitable for mooring of small boats.   | * This type of jetty can accommodate both small boats and large boats.<br>*No displacement and deformation due to river flow compared to floating type jetty. |
| Conclusion                 | Steel sheet pile type jetty is advantageous because of following reasons.<br>- No displacement would occur in case of torrential river flow and change in water level and relatively easy to operate<br>- Durable against the collision of the boat and barge<br>- Convenient for passengers to getting on and off for women and elderly persons |   |

Source: JICA Project Team

## 21.1.2 Design

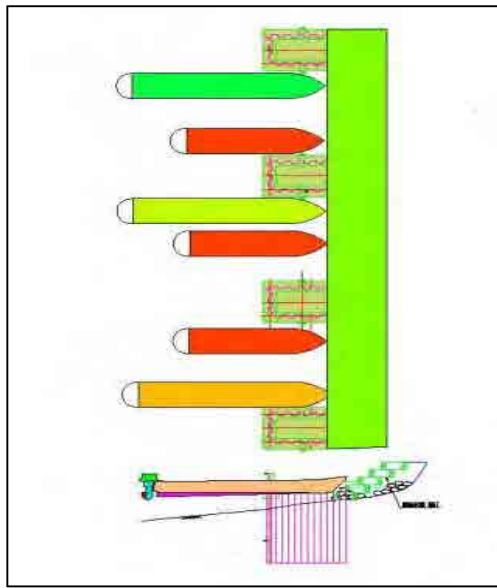
### (1) Construction of Passenger Jetty

As shown in **Table 6.4-5** and **Table 6.4-6**, the maximum number of speed boats and passenger boats counted was 39 between 10:00 and 11:00 on Monday. 39 counts mean that 20 boats per hour occupy a berth. The average mooring period is around 15 minutes. So, 4 boats can moor at one berth per hour. Therefore, 5 berths (20 boats / 4 boats) are at least needed.

A middle size boat is around 8m and common large size boat is around 12m. The widths of the boats are 1.5m to 2m. Considering the size of the boats and assuming 6 ships mooring at the same time with one spare, the following figures show the most effective shape. **Figure 21.1-1** and **Figure 21.1-2**

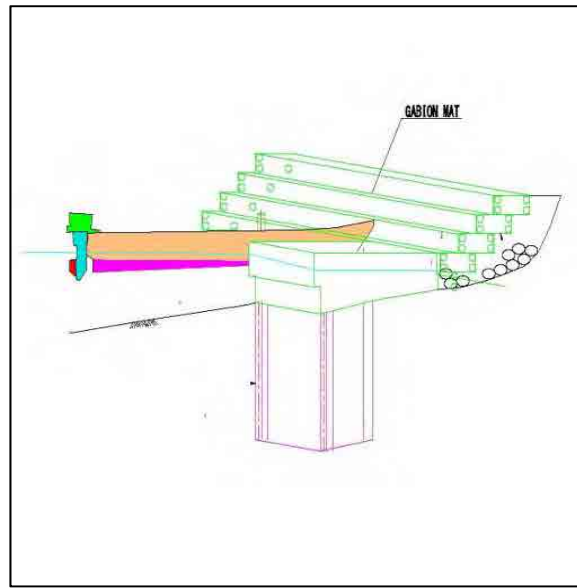
The space created by steel sheet pile Type III driven into riverbed will be filled by soil cement and concrete to construct a fixed type passenger jetty. The fixed jetty is stable mooring in the event of

changes in river water velocity or the level of water surface.



Source: JICA Project Team

**Figure 21.1-1 General Drawing of Steel Sheet Pile for Passenger Jetty**



Source: JICA Project Team

**Figure 21.1-2 Outline Drawing of Passenger Jetty**

## (2) Reconstruction of Existing Jetty

The following Japanese standards and design criteria were adopted for design of jetty.

### Design Standard

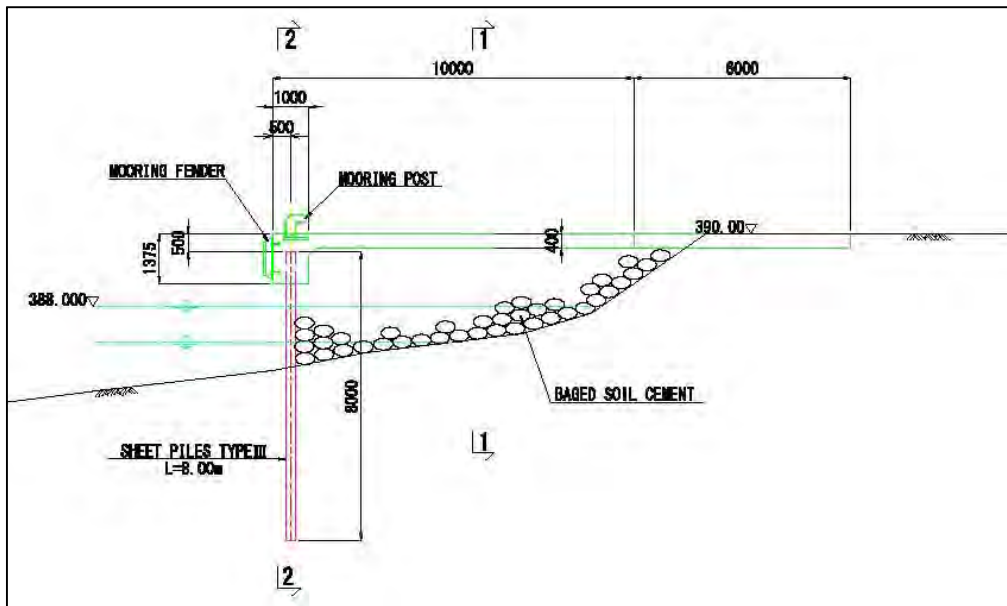
- Technical Standard and Commentaries for Port and Harbour Facilities in Japan
- Standard Specification for Concrete Structure 2007

### Design Criteria

- Concrete: Design Strength:  $f'_{ck}=21\text{N/m}^2$   
Quality Compressive Strength:  $f_{cr}=24\text{ N/mm}^2$   
Young's Modulus:  $E_c=25\text{KN/mm}^2$
- Rebar: Material: SD345  
Design Tensile Yield Strength:  $f_{yd}=345\text{N/mm}^2$
- Young's Modulus:  $E_s=200\text{N/mm}^2$
- Rubber Fender: Target barge: 500t  
Berthing Velocity: 0.2m/s  
Maximum Resistance Force: less than 30t

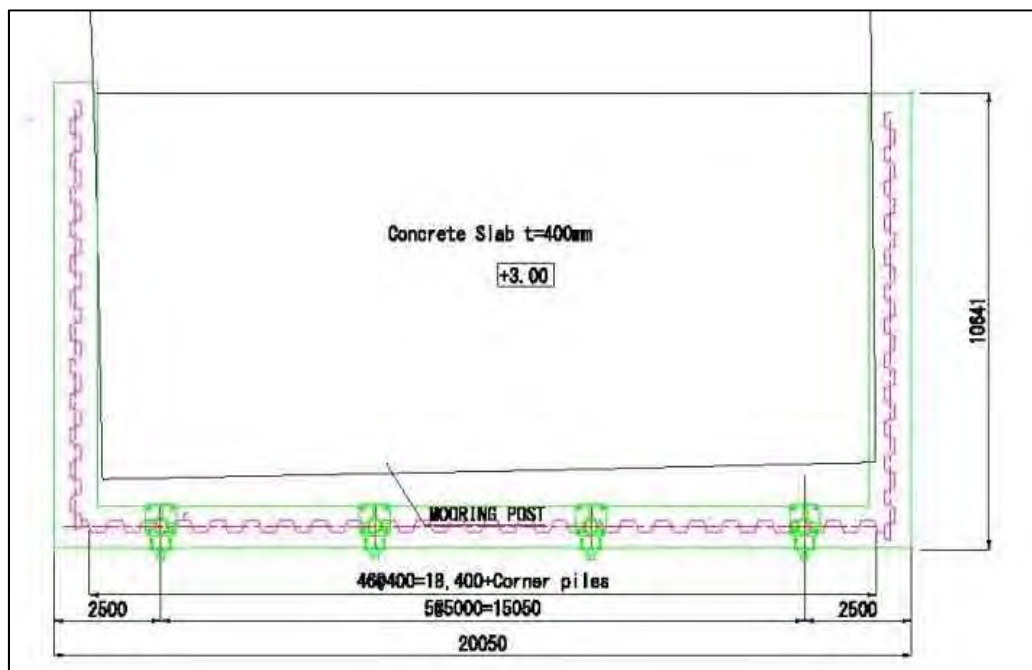
The existing wrecked jetty is located at the best position in Malakal Port to load and unload cargos trucks in the 20m width space available. The new jetty shall therefore be constructed at the same place. The width of a 300t barge is around 7m and that of a 500t barge is around 10m. So, 20m space is necessary for mooring 2 barges at the same time. During the dry season, water depth at 10m from the shore becomes more than 2m is enough water depth for loaded barge. Therefore the length and width of jetty shall be 20m x 10m.





Source: JICA Project Team

**Figure 21.1-3 Structure of Jetty**



Source: JICA Project Team

**Figure 21.1-4 Plan of Jetty**

For reasons of workability, steel sheet pile shall be adopted, because it is easier than the cellular blocks type. The steel sheet piles and equipment shall be imported from a foreign country. The steel sheet piles shall be driven into the riverbed around the existing jetty. Then are inside the sheet pile shall be filled with soil cement bags or yellow soil. The coping concrete with rubber fender will receive bigger bearing forces and will be tied with concrete slab.

Four sufficiently sized of rubber fenders shall be installed in front of the sheet pile jetty.

### 21.1.3 Construction Plan

#### (1) Construction of Passenger Jetty

Steel sheet piles and a piling machine will be imported from a foreign country. Corner piles will be driven in at the corners, and normal piles will be driven between corners.

After steel sheet piles are driven, space inside will be filled. Then top concrete slabs will be made together with setting up step type gabions to protect the river bank. The stones for filling gabions are most likely to come from El-higak or Paloich located to the north of Malakal Town.

#### (2) Reconstruction of Jetty

The main materials for construction of the jetty are steel materials, concrete, rubble stones and filling materials. Steel materials shall be procured in either Japan or third countries. Rubble stone and aggregate can be procured in either North of Malakal or Juba. Sino Hydro has a crusher plant in El-higak, which is about 230km north from Malakal Town and sand can be purchased at Paloich which is about 100km from Malakal Town. However those places cannot supply materials constantly. Moreover the road are be closed during rainy season.

There is a big crusher plant about 20km west of Juba. The price and supply are stable through the year. Therefore sand, aggregate and rubble stones shall be hauled from Juba by using 1 ton bag,. Cement can be purchased in Nairobi or Kampala.

All the construction equipment shall be procured either in Nairobi or Kampala. A location for the material stock yard and fabrication yard is proposed at the Old Port. Approximately 70m x 70m in area is required for the yard. The Old Port has enough vacant space to be occupied during construction period.

**Table 21.1-3 Material Plan**

| Works                            | Details             | Specification Size       | Unit           | Quantity |
|----------------------------------|---------------------|--------------------------|----------------|----------|
| Steel sheet pile type Jetty      | Sheet pile Type III | 60kg/m                   | no.            | 96       |
|                                  | Concrete            | f'ck=24N/mm <sup>2</sup> | m <sup>3</sup> | 124      |
|                                  | Rebar               | SD345                    | ton            | 7.4      |
|                                  | Backfill            | Yellow soil              | m <sup>3</sup> | 730      |
|                                  | Rubber Fender       | V Type                   | no             | 4        |
|                                  | Mooring Bitt        | 10t type                 | no.            |          |
| Steel sheet pile passenger jetty | Sheet pile III      | 60kg/m                   | no             | 120      |
|                                  | Concrete            | f'ck=24N/mm <sup>2</sup> | m <sup>2</sup> | 80       |
|                                  | Backfill            | Yellow soil              | m <sup>3</sup> | 190      |
|                                  | Gabion              |                          | m <sup>3</sup> | 330      |
|                                  | Rubber Fender       |                          | no             | 8        |
|                                  | Mooring Bitt        | 10t type                 | no.            | 12       |

Source: JICA Project Team

## **21.2 RECOMMENDATIONS FOR CONFLICT PREVENTION**

From the conflict prevention point of view, to reduce the negative impact and increase the positive impact is assessed as follows. The Malakal port offers many kinds of transportation services for people; small boats for crossing the river to the opposite bank, ships and ferry boats going around Malakal Town to the neighbouring villages, and big barges for carrying food and daily items between the capital Juba and Renk. Reconstruction of the barge jetty and the building of a new passenger jetty in the River port will revitalise the barge facilities of the River port. The new facilities will contribute to promote efficiency of the second largest port in the country.

From the conflict prevention point of view, to reduce the negative impact and increase the positive impact is assessed as follows.

First of all, the River port is manned by several hundreds of labour workers. Currently, all the port work is physically carried out by the port workers. But, in the course of time the port may install a crane truck to land the heavy cargos. The employment of the labour workers would be a concern after installation of the crane. In order not to have a conflict between the port authority and the association of port workers after the project is implemented, it is essential for the counterpart of the project and the association of port workers to negotiate to obtain consent to the project.

Secondly, the administration of the port is shared by both the State Government and the local Government, namely Upper Nile State. To sustain the project investment, the administration of the River port should be clearly understood and agreed by the project counterparts of both sides.

The positive impact of the project is that the ripple-effect of economic and social development in Malakal Town is expected to positively effect the neighbouring villages of Malakal Town. The household survey conducted in Malakal Town found about 10% of the Malakal residents use boat as a common mode of transportation. Also, there are people on the opposite side of the bank who engage in production such as farm products and wood charcoal, and sell them in Malakal Town, while others attend University and some government employee stay and work in Malakal Town during the weekdays and return to their home across the river on weekends. Although the opposite side of the Nile River does not fall directly under the urbanization plan, the improvement of the River port facilities will help strengthen the link between Malakal Town and the neighbouring villages.

## **21.3 CONSTRUCTION**

### **21.3.1 Work Plan**

#### **(1) Construction of Passenger Jetty**

The main materials and construction machines will be imported from third country or Japan. In the meanwhile, domestic materials and construction machines of a sufficient standard will be procured

during the dry season.

Immediately after bringing steel sheet piles and piling machines to the site, the piling works of steel sheet piles will be commenced. After the completion of steel sheet piling works, the concrete coping and concrete slab will be made. At the same time the gabion works for the riverbank protection will be implemented and completed.

**Table 21.3-1 Implementation Schedule for Construction of Passenger Jetty**

|                        | (month) |   |   |   |   |   |   |   |   |    |    |    |    |
|------------------------|---------|---|---|---|---|---|---|---|---|----|----|----|----|
|                        | 1       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Mobilization           | ■       |   |   |   |   |   |   |   |   |    |    |    |    |
| Sheet piling           |         |   |   | ■ |   |   |   |   |   |    |    |    |    |
| Backfilling & Concrete |         |   |   |   | ■ |   |   |   |   |    |    |    |    |
| Installation Fender    |         |   |   |   |   |   |   |   | ■ |    |    |    |    |
| Remobilization         |         |   |   |   |   |   |   |   |   |    | ■  |    |    |

Source: JICA Project Team

## (2) Reconstruction of Jetty

Main materials will be imported from Japan or third country. Other necessary local equipment and materials will be purchased and transported to Malakal during the mobilization period. After the completion of the demolition of the existing jetty and the steel sheet piling works, the concrete coping and concrete slab will be made.

**Table 21.3-2 Implementation Schedule of Reconstruction of Jetty**

|                        | (month) |   |   |   |   |   |   |   |   |    |    |    |    |
|------------------------|---------|---|---|---|---|---|---|---|---|----|----|----|----|
|                        | 1       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Mobilization           | ■       |   |   |   |   |   |   |   |   |    |    |    |    |
| Sheet piling           |         |   |   | ■ |   |   |   |   |   |    |    |    |    |
| Removal existing port  |         |   |   |   | ■ |   |   |   |   |    |    |    |    |
| Backfilling & Concrete |         |   |   |   |   | ■ |   |   |   |    |    |    |    |
| Installation Fender    |         |   |   |   |   |   |   |   |   | ■  |    |    |    |
| Remobilization         |         |   |   |   |   |   |   |   |   |    |    | ■  |    |

Source: JICA Project Team

## 21.3.2 Quality Control

### (1) Construction of Passenger Jetty

Prior to the construction, certificates of quality for all materials shall be submitted to the consultant. The contractor will be able to start fabrication after the approval by the consultant. Laboratory tests for concrete mixtures shall be conducted under the supervision of the consultant.

### (2) Reconstruction of Jetty

Prior to the construction, the certificates of quality for all materials shall be submitted to the consultant. The contractor will be able to start fabrication after the approval by the consultant. Laboratory tests for concrete mixture shall be conducted under the supervision of the consultant.

## 21.4 CONCLUSION

“PT-1 Reconstruction of Jetty at Malakal Port Project” and “PT-5 Construction of Passenger Jetty Project” under the Region-wide Economic Development Strategy were selected for the Urgent Development Project in the water transport sector. This projects aims to reduce transportation costs by improving the loading and unloading efficiency of the port. This will enhance the cargo handling capacity as well as improve the convenience of the passengers, of which the majority is those cross the Nile River to other side.

The T Boat Origin and Destination (OD) Survey revealed that 8,000 passengers a day use boats at Malakal Port. The project includes the components of constructing a cargo jetty of 20 meters by 10 meters, improvement of the apron, construction of four passenger piers and embankment improvement. The rehabilitated port was to be ready for operation by the summer in 2014.

**Table 21.4-1 Contents of Urgent Development Project in Port Sector**

| Item                 | Description   | Remarks                   |
|----------------------|---|---------------------------|
| Jetty for Barges     |   |                           |
| Target               | Malakal River Port  |                           |
| Type                 | Steel sheet pile jetty with four (4) mooring bitts and rubber fenders | 10m x 20m                 |
| Capacity             | Four (4) barges can be moored at the same time                        |                           |
| Jetty for Passengers |   |                           |
| Target               | Malakal River Port  |                           |
| Type                 | Jetty with four (4) mooring bitts                                     | 40m shore protection work |
| Capacity             | Eight (8) boats can be moored at the same time                        |                           |

Source: JICA Project Team

A detailed plan, construction plan, operation and management plan of the Urgent Development Projects was intended to be included in the supplementary report. However, due to the occurrence of the internal war the Urgent Development Project in the port sector was terminated before completion. Consequently no supplementary report will be prepared. The Operation and Management plan are to be prepared by another JICA technical cooperation project, “The Project for Enhancement of Operation and Management Capacity of Inland Waterway in South Sudan<sup>2</sup>”.

<sup>2</sup> It is not known now whether this project will be continued or not.

## **CHAPTER 22 URGENT DEVELOPMENT PROJECT IN ROAD TRANSPORT SECTOR**

In **Chapter 22**, a community road improvement project by using Labour Based Technology (LBT) is described. Three community roads were selected from Northern Malakal, central Malakal and Southern Malakal. This project was to explore the improvement of community roads by residents of the community by means of LBT. Therefore this project can be considered a community participatory project.

### **22.1 OUTLINE OF THE PROJECT<sup>1</sup>**

#### **22.1.1 Selection of the Project**

Minor roads (such as local and/or community roads) are access streets within the residential area, and they are located between the major roads (such as arterials, collectors, distributors). Major roads are the subject of current improvement works by Upper Nile State (UNS). The minor roads however are flooded and/or impassable during the rainy season and will remain so. Under such circumstances, State Ministry of Physical Planning and Rural Development, UNS (MoPI&RD) has requested JICA to improve those minor roads.

Based on the request by MoPI&RD and with an intention to improve the living environment of communities through distributing employment, a Community Roads Improvement Programme with the use of LBT is proposed to be a part of Urgent Development Project for Road and Transport Sector.

Under the Community Roads Improvement Programme, the following points are considered so that this programme may not induce disputes within or between communities due to the selection of the subject area and/or beneficiaries;

1. Careful attention to the relationship between the tribes, not only formal administration but also traditional political structures, such as tribal chieftains
2. In addition to the older local residential area, the area shall cover the newer residential areas and those behind in development.
3. It includes younger aged group and local residents for their job opportunity, and
4. When acquiring sites, use and ownership rights government shall negotiate with community leaders and residents in case where ownership of the land is not determined.

Initially, 14 routes of approximately 3km each were chosen giving 40km in total were selected as candidate routes by UNS for Community Road Construction Project. As a minimal concept, only one ¼ or 10km of the candidate roads will be improved in the next 18 months since work with labourers will be no more than 200m per month with a work team of 40 even if dry season.

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<sup>1</sup> The Urgent Development Support Project in water supply sector was started after signing of MOU dated 11 January 2013 between JICA and counterpart agency. The details are reported in the supplementary report. See Appendix A-13 for the report. In this chapter explanation was made for initial contents proposed by JICA Project Team.

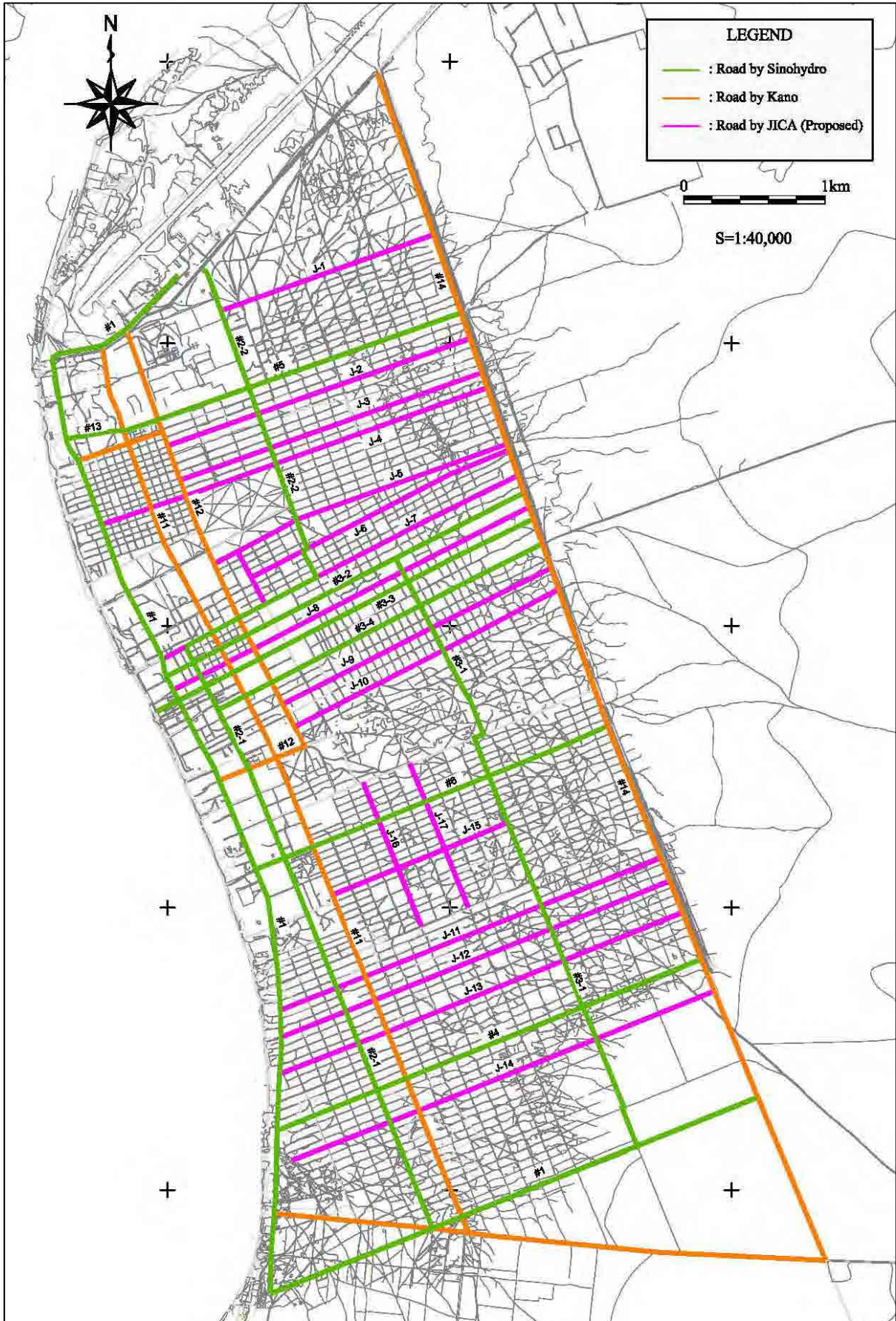
During the course of initial period of the programme, JICA Project Team and MoPI&RD Counterpart (C/P) Team discussed and investigated those candidate routes together at the field level. As a result, both teams have agreed that some sections of the routes could be dropped from the candidate list.

Both teams checked that the candidate routes are evenly located between major roads, and being evenly distributed in the northern, central, and southern districts (payams), respectively. During such works, some initial candidate routes are replaced based on the interval between those subject routes.

Furthermore, three (3) relatively short stretches of the community roads within the particular residential area (Assossa) which are often submerged during the rainy season have been added as the additional candidate routes. After such process of selection, total of seventeen (17) routes with total length of about 38km are selected for the final short list routes as shown in **Figure 22.1-1** and **Table 22.1-1**.

Among those 17 routes, as described in previous section, about one quarter of routes (4 routes with total length of about 9km) from each district are temporally short listed as first priority routes for LBT works, and other routes shall be remained as second priority routes, although still these selections are subject to change based on the discussions with communities and/or concerned authorities, however total length of first priority candidates should not be extended to more than 10km which beyond the capabilities of LBT works.

|                    | <u>1<sup>st</sup> Priority Candidates</u> | <u>2<sup>nd</sup> Priority Candidates</u> |
|--------------------|---|---|
| • Number of Routes | 3   | 13  |
| • Total Length     | Approx. 5.5km                             | Approx. 29.1km                            |



Source: JICA Project Team

**Figure 22.1-1 Candidate List for Community Road Improvement Programme**



**Table 22.1-1 Candidate List for Community Road Improvement Programme**

| Route No. | Geodetic Coordinates (WGS84 <sup>2</sup> ) |             | Length (km) | Approx. Angle | Proposed Method | Remarks |
|-----------|--|-------------|-------------|---------------|-----------------|---------|
|           | From                                       | To          |             |               |                 |         |
| J-01      | E  | 352,391.3   | 353,895.8   | 1.60          | 70.5            | MBT*    |
|           | N  | 1,056,237.2 | 1,056,776.9 |               |                 |         |
| J-02      | E  | 352,012.5   | 354,147.2   | 2.27          | 70.5            | MBT     |
|           | N  | 1,055,279.2 | 1,056,038.1 |               |                 |         |
| J-03      | E  | 352,098.2   | 354,231.0   | 2.26          | 70.5            | LBT     |
|           | N  | 1,055,036.0 | 1,055,795.1 |               |                 |         |
| J-04      | E  | 351,542.9   | 354,269.8   | 2.89          | 70.5            | MBT     |
|           | N  | 1,054,719.4 | 1,055,685.0 |               |                 |         |
| J-05      | E  | 352,337.4   | 354,401.5   | 2.23          | 70.5            | MBT     |
|           | N  | 1,054,441.7 | 1,055,282.0 |               |                 |         |
| J-06      | E  | 352,497.9   | 353,977.0   | 2.07          | 63.0            | LBT     |
|           | N  | 1,054,525.7 | 1,055,130.3 |               |                 |         |
| J-07      | E  | 351,965.0   | 354,496.5   | 1.80          | 63.0            | MBT     |
|           | N  | 1,053,765.3 | 1,055,063.7 |               |                 |         |
| J-08      | E  | 352,432.2   | 354,559.2   | 2.39          | 63.0            | MBT     |
|           | N  | 1,053,743.1 | 1,054,839.0 |               |                 |         |
| J-09      | E  | 352,821.7   | 354,719.1   | 2.13          | 63.0            | MBT     |
|           | N  | 1,053,449.1 | 1,054,418.2 |               |                 |         |
| J-10      | E  | 352,912.4   | 354,777.9   | 2.10          | 63.0            | MBT     |
|           | N  | 1,053,287.9 | 1,054,254.2 |               |                 |         |
| J-11      | E  | 352,796.6   | 355,502.8   | 2.92          | 68.0            | MBT     |
|           | N  | 1,051,275.4 | 1,052,362.8 |               |                 |         |
| J-12      | E  | 352,806.6   | 355,571.3   | 2.98          | 68.0            | MBT     |
|           | N  | 1,051,080.6 | 1,052,195.9 |               |                 |         |
| J-13      | E  | 352,794.1   | 355,661.6   | 3.09          | 68.0            | LBT     |
|           | N  | 1,050,817.5 | 1,051,974.3 |               |                 |         |
| J-14      | E  | 352,912.4   | 355,865.5   | 3.29          | 68.0            | MBT     |
|           | N  | 1,053,287.9 | 1,051,472.6 |               |                 |         |
| J-15      | E  | 353,169.9   | 354,412.8   | 1.34          | 68.0            | MBT     |
|           | N  | 1,052,089.6 | 1,052,599.3 |               |                 |         |
| J-16      | E  | 353,867.2   | 353,386.1   | 1.28          | 158.0           | LBT     |
|           | N  | 1,051,700.5 | 1,052,887.8 |               |                 |         |
| J-17      | E  | 354,201.0   | 353,719.8   | 1.28          | 158.0           | MBT     |
|           | N  | 1,051,835.5 | 1,053,022.8 |               |                 |         |
| Total     |  |             |             | 37.93         |                 |         |

\*MBT: Machine Based Technology

Source: JICA Project Team

<sup>2</sup> The World Geodetic System is a standard for use in cartography, geodesy, and navigation. It comprises a standard coordinate frame for the Earth, a standard spheroidal reference surface (the datum or reference ellipsoid) for raw altitude data, and a gravitational equipotential surface (the geoid) that defines the nominal sea level. The latest revision is WGS 84 (dating from 1984 and last revised in 2004), which was valid up to about 2010, however this standard is still in use by the Global Positioning System (GPS).

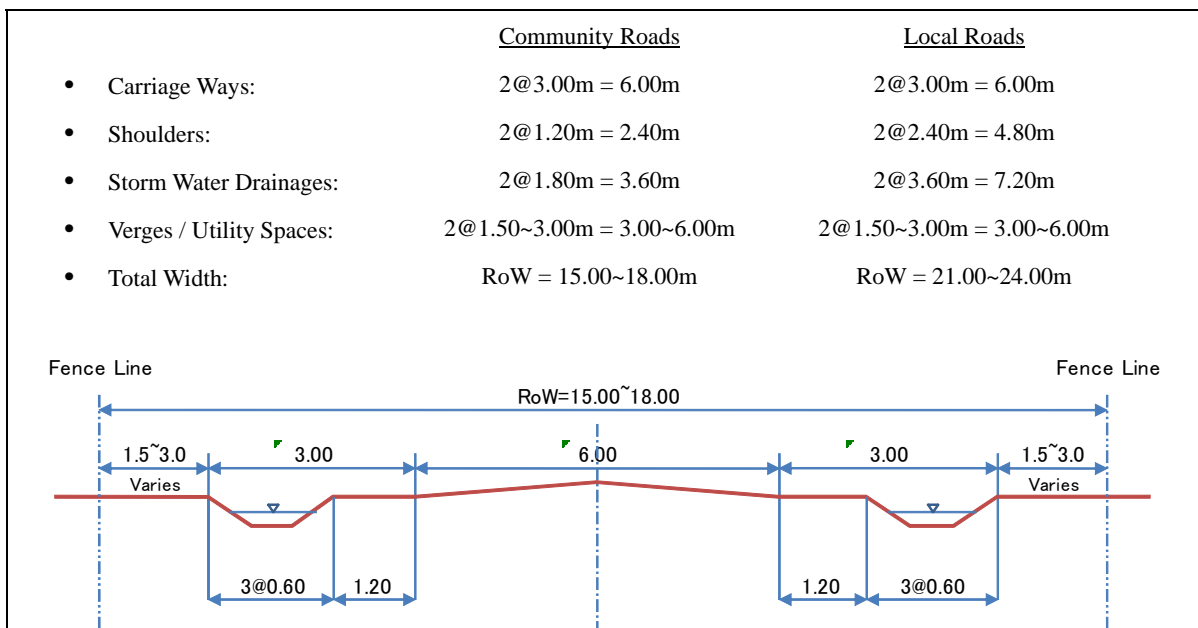
## 22.1.2 Design

### (1) Design Policy

It was identified as a design policy that local and/or community roads<sup>3</sup>, despite being earth roads should be able to bear light vehicle passage during the rainy season and not only NMT (non-motorized transport, such as pedestrian, bicycle, and push/animal cart). Therefore several pavement/treatment types, such as Black Cotton Soil (BCS) only, improved BCS, BCS plus cement or lime treatment and soil bag method, were adapted to LBT works and as pilot works to test durability for general passage during rainy season. The different types of pavement/treatment types were applied to one particular segment along J-13 which close to a LBT section made under a previous USAID project previously, since the community was involved in LBT works at that time and it was thought to be straightforward for both JICA Project Team and MoPI&RD C/P Team to implement another LBT works with same community as trial basis.

### (2) Standard Cross Sections

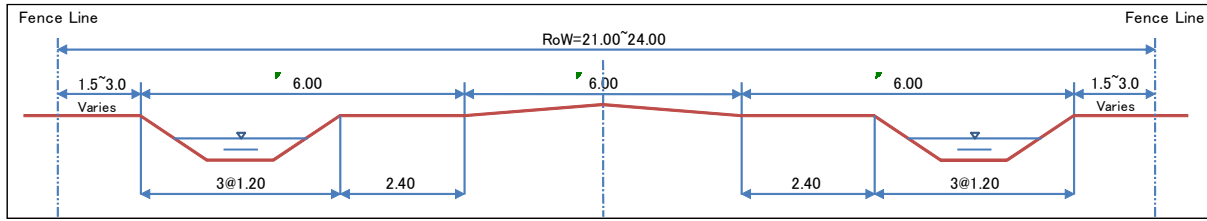
The right of way of existing streets in Malakal Town is mostly between 15m and 20m wide whatever its categories, except trunk and arterial class roads such as Ring Road, Outer Ring Road, and those roads under improvement works. However, based on its proposed categories, JICA Project Team recommends improving community and/or local roads to the following dimensions;



Source: JICA Project Team

**Figure 22.1-2 Standard Cross Section Type-II (Community Roads)**

<sup>3</sup> Surface soil in Malakal Town is basically so-called Black Cotton Soil (BCS) which 2~3m deep is very common in East African Countries, or Vertical in both FAO and USDA Soil Taxonomy, in which there is high content of expansive clay known as montmorillonite that forms deep cracks during the dry season and it becomes very sticky and/or muddy during the rainy season.



Source: JICA Project Team

**Figure 22.1-3 Standard Cross Section Type-I (Local Roads)**

### (3) Soil Investigations

Before implementing the pilot works, BCS samples from candidate routes and Yellow Soil (YS) from borrow pit were collected, and sent to the laboratory to find out their physical characteristics (such as soaked CBR<sup>4</sup> and Swell) together with or without cement and lime treatment. Results of laboratory tests are summarized in **Table 22.1-2, 3, and 4** as well as **Figure 22.1-4, 5, and 6** respectively.

**Table 22.1-2a CBR with Yellow Soil**

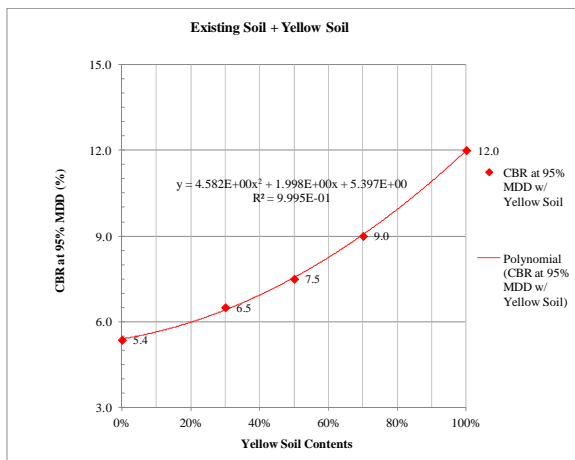
| Report No.    | 1   | 2   | 3   | Ave. | 6   | 5   | 4   | 0    |
|---------------|-----|-----|-----|------|-----|-----|-----|------|
| YS (%)        | 0   | 0   | 0   | 0    | 30  | 50  | 70  | 100  |
| CBR w/ YS (%) | 5.0 | 4.4 | 6.7 | 5.4  | 6.5 | 7.5 | 9.0 | 12.0 |

Source: JICA Project Team

**Table 22.1-2b Swell with Yellow Soil**

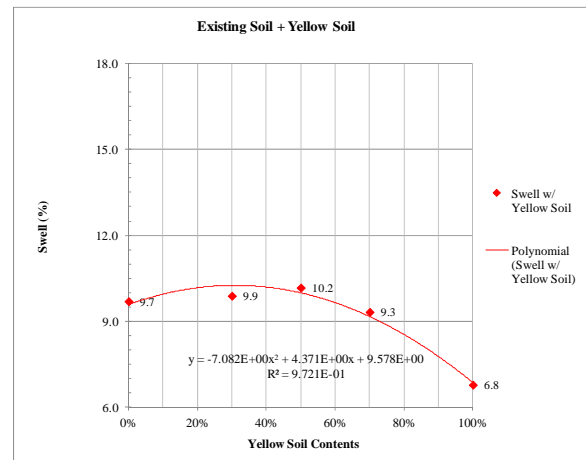
| Report No.      | 1   | 2   | 3   | Ave. | 6   | 5    | 4   | 0   |
|-----------------|-----|-----|-----|------|-----|------|-----|-----|
| YS (%)          | 0   | 0   | 0   | 0    | 30  | 50   | 70  | 100 |
| Swell w/ YS (%) | 9.9 | 9.6 | 9.6 | 9.7  | 9.9 | 10.2 | 9.3 | 6.8 |

Source: JICA Project Team



Source: JICA Project Team

**Figure 22.1-4a CBR with Yellow Soil**



Source: JICA Project Team

**Figure 22.1-4b Swell with Yellow Soil**

#### BCS with Yellow Soil

According to those results, BCS only shows average CBR of 5.4% and average swell of 9.7%, while YS only shows CBR of 12.0% and swell of 6.8%. And CBR will be gradually improved from 5.4% to 12.0% when YS is added to BCS and it depends on YS/BCS ratio. On the other hand, swell will be initially slightly worsened from 9.7% to 10.2%, and then improved from 10.2% to 6.8% based on YS/BCS ratio. A maximum swell of 10.2% is recorded when YS/BCS ratio is 50:50.

<sup>4</sup> CBR (California Bearing Ratio) is a penetration test for evaluation of the mechanical strength of road subgrades and base courses. It was developed by the California Department of Transportation before World War II

From these results, YS can be used for improving CBR and reducing swell of BCS by some amount; however its effects are not that significant.

**Table 22.1-3a CBR with Cement Treatment**

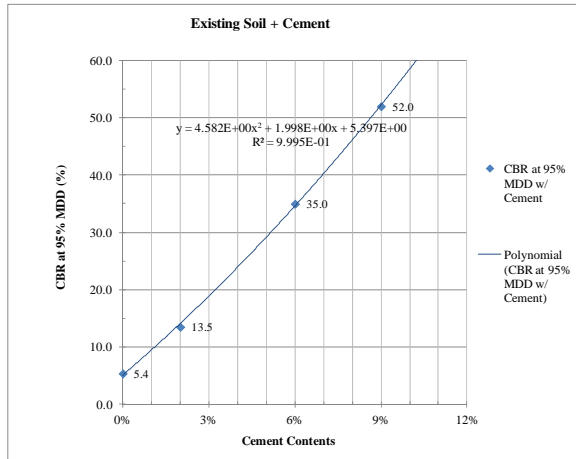
| Report No.           | 1   | 2   | 3   | Ave. | 7    | 8    | 9    |
|----------------------|-----|-----|-----|------|------|------|------|
| Cement (%)           | 0   | 0   | 0   | 0    | 2    | 6    | 9    |
| CBR w/<br>Cement (%) | 5.0 | 4.4 | 6.7 | 5.4  | 13.5 | 35.0 | 52.0 |

Source: JICA Project Team

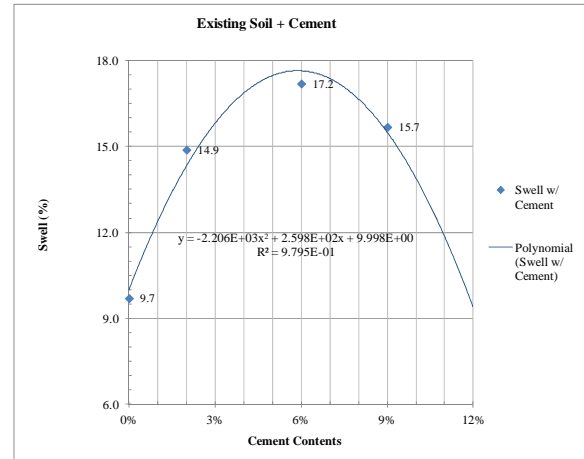
**Table 22.1-3b Swell with Cement Treatment**

| Report No.             | 1   | 2   | 3   | Ave. | 7    | 8    | 9    |
|------------------------|-----|-----|-----|------|------|------|------|
| Cement (%)             | 0   | 0   | 0   | 0    | 2    | 6    | 9    |
| Swell w/<br>Cement (%) | 9.9 | 9.6 | 9.6 | 9.7  | 14.9 | 17.2 | 15.7 |

Source: JICA Project Team



Source: JICA Project Team



Source: JICA Project Team

**Figure 22.1-5a CBR with Cement Treatment Figure 22.1-5b Swell with Cement Treatment**

**BCS with Cement Treatment**

CBR of BCS is expected to be drastically improved from around 5% level without cement to 20% at 3%, 40% at 7%, and 60% at 10% level of cement ratios, respectively. However, swell is expected to be worsened up to around 18% level when cement ratio is around 6%, and then it will be improved again as its ratio is increased. From these results, it is clear cement can be used for improving CBR of BCS very well while special care of swell will be required.

**BCS with Lime Treatment**

CBR of BCS is expected to be moderately improved from around 5% levels without lime to 20% at 5% and 40% at 10% level of lime ratios, respectively. However, swell is expected to be worsened up to around 17% level when lime ratio is around 6%, and then it will be improved again as its ratio is increased. From these results, lime also can be used for improving CBR of BCS well while special care of swell will also be required.

**Table 22.1-4a CBR with Lime Treatment**

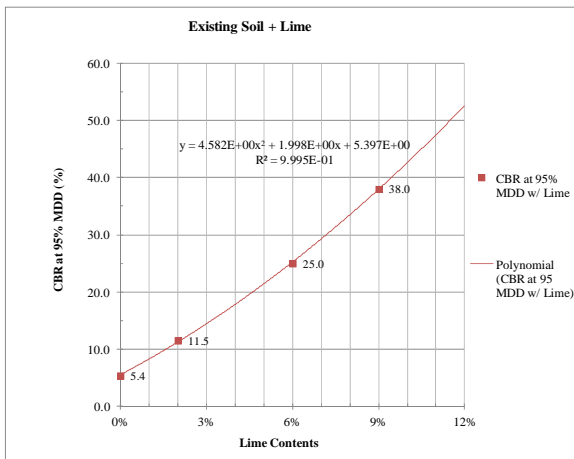
| Report No.         | 1   | 2   | 3   | Ave. | 10   | 11   | 12   |
|--------------------|-----|-----|-----|------|------|------|------|
| Lime (%)           | 0   | 0   | 0   | 0    | 2    | 6    | 9    |
| CBR w/<br>Lime (%) | 5.0 | 4.4 | 6.7 | 5.4  | 11.5 | 25.0 | 38.0 |

Source: JICA Project Team

**Table 22.1-4b Swell with Lime Treatment**

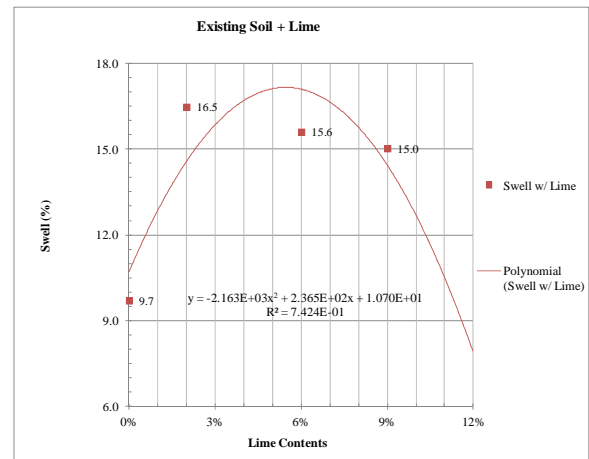
| Report No.           | 1   | 2   | 3   | Ave. | 10   | 11   | 12   |
|----------------------|-----|-----|-----|------|------|------|------|
| Lime (%)             | 0   | 0   | 0   | 0    | 2    | 6    | 9    |
| Swell w/<br>Lime (%) | 9.9 | 9.6 | 9.6 | 9.7  | 16.5 | 15.6 | 15.0 |

Source: JICA Project Team



Source: JICA Project Team

**Figure 22.1-6a CBR with Lime Treatment**



Source: JICA Project Team

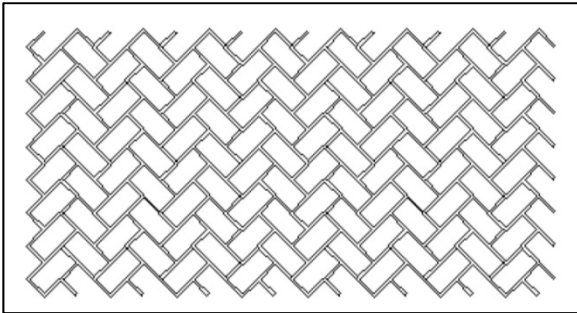
**Figure 22.1-6b Swell with Lime Treatment**

### Further BCS Treatment Idea

Although it might require further laboratory and/or field test, it is clear, cement and/or lime treatment will be good idea to improve CBR rather than replacing all BCS to suitable laterite when such good material is very hard to procure close to the site. However, as shown in the previous sections, swell will be worsened when cement or lime ratio is around 6% so the mixture ratio of those agents is must be increased to than required to meet the level of CBR required. Therefore, adding relatively small amount of yellow soil and/or laterite in line with cement and/or lime treatment might be better solution to improve both CBR and swell at desired level for BCS in Malakal.

### Soil Bag Method

Due to difficulties and therefore it becomes expensive to obtain soil treatment agents, such as cement and lime, or good sub-base material such as laterite, throughout the year in Malakal Town, the soil bag method which is relatively cheaper and easy to handle, is also introduced as very experimental basis based on the similar projects in East African Community, such as Kenya and Uganda, by JICA. In this pilot works, a diagonal herringbone style layout which is the common practice for Inter Locking Block (ILB) is experimentally introduced to make those soil bags inter lock each other.



Source: JICA Project Team

**Figure 22.1-7 Typical Diagonal Herringbone Layout**



Source: JICA Project Team

**Photo 22.1-1 Actual Diagonal Herringbone Layout**

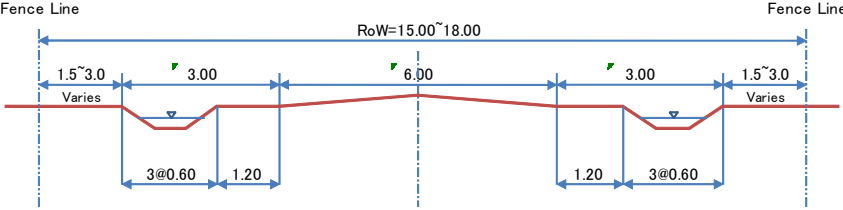
### 22.1.3 Evaluation of Construction Method

Evaluations of the various alternative LBT construction methods for the improvement of BCS soil condition, namely un-improved BCS, cement treatment, lime treatment, and a soil-bag installation, were made. Small pilot sections were made during the dry season and tested during the rainy season.

The pilot construction sections were evaluated against cost, time to build, labour needed and income added, durability and applicability.

**Table 22.1-5, 6, and 7** show the Construction Method Evaluation Matrix for Community Road Improvement Programme. According to the results of the evaluations, the soil bag method is recommended for LBT works mainly in terms of practical application and capacity development of community people, in other words, the possibility of increase of employment, however, considering future further pavement, cement and/or lime treatment methods are also recommended.

Table 22.1-5 Construction Method Evaluation Matrix for Community Road Improvement Programme (1/3)

| Evaluation Conditions  | Descriptions   |
|--|--|
| Objective  | The environmental improvement of community housing area and the distribution of employment by improvement of community roads with involvement of the community   |
| Summary and Policy   | Out of the routes given to the candidates by UNS for Community Road Improvement Project, one route each from the northern, central, and southern district (about 25% of all the candidates) shall be improved with practical use of LBT (labour based technology) during the dry season within next 18 months (in 2012 and 2013).  |
| Issues of Road Transport Sector and Procurement of Materials | <ul style="list-style-type: none"> <li>✓ Whole area of Malakal Town is covered by the darkish colored poor soil so-called Black Cotton Soil (BCS).</li> <li>✓ Community roads are completely in an untouched situation.</li> <li>✓ Poor road traffic system caused by poor storm water drainage system in the whole town area, especially in the housing blocks, many parts become impassable during the rainy season.</li> <li>✓ Defect of road management and maintenance system (both software &amp; hardware)</li> <li>✓ Defect of road traffic management and public traffic management system</li> <li>✓ All road construction materials (main materials, such as good-quality soil, aggregates, bitumen material, cement, etc.) are supplied from domestic but very distant place and/or neighbouring and/or overseas countries.</li> <li>✓ In the present traffic transportation situation, even if the material and equipment are supplied from domestic or within the state, it becomes difficult to operate during the rainy season.</li> </ul> |
| Needs by Counterpart (Road Transport Sector)                 | <ul style="list-style-type: none"> <li>✓ Reservation of Road Traffic during Rainy Season (All Weather Type Road Construction and Improvement)</li> <li>✓ Road Traffic Network Improvement at State Capital Malakal Town</li> <li>✓ Link Roads Construction and Improvement between Malakal and Major Towns in the State</li> <li>✓ Possession of Road Maintenance Machine, and Improvement of Maintenance Management System</li> <li>✓ Capacity Building &amp; Development of Personnel</li> </ul>   |
| Area of the Project  | Entire Malakal Town  |
| Beneficial Population  | Approximately 3,000 households (=9,000m / 120m * 10 plots * 2 blocks * 2 pairs)  |
| Methods  | LBT (with Limited Use of MBT)  |
| Proposed Standard Cross Section for Community Road           |  <p>The diagram illustrates the proposed standard cross-section for a community road. It shows a central road section with a width of 6.00m, flanked by shoulders of 3.00m each. The total Right-of-Way (RoW) is 15.00m to 18.00m. The road is bounded by Fence Lines on both sides. The road width is divided into three lanes of 0.60m each (3@0.60) on both sides of the centerline. The shoulder width is 1.20m on both sides. The road is shown with a slight dip in the center and a slight rise on the shoulders. The diagram also indicates that the shoulder width varies between 1.5m and 3.0m.</p>  |

Source: JICA Project Team

**Table 22.1-6 Construction Method Evaluation Matrix for Community Road Improvement Programme (2/3)**

| Alternative Methods   | Existing BCS   | Yellow Soil Mixture                     | Stabilization                       |                             | Soil Bag                    | Geo-Textile                             | Sub-Grade Replacement                   |  |  |
|---|--|---|-------------------------------------|-----------------------------|-----------------------------|---|---|--|--|
|   |  |   | Cement                              | Lime                        |                             |   |   |  |  |
| Material & Equipment  | Major Material   | In-Situ Soil                            | BCS + Borrow Pit Soil (Yellow Soil) | BCS + Cement                | BCS + Lime                  | BCS + Soil Bags                         | BCS + Geo-Textile                       | Borrow Pit Soil (Maram)  |  |
|   |  | From Site                               | From Malakal Suburb                 | From Neighbouring Countries | From Neighbouring Countries | From Juba and/or Neighbouring Countries | From Developed Countries                | From UNS and/or Neighbouring States  |  |
|   | Equipment  | Manual Labour and/or w/ Small Equipment | Manual Labour w/ Mixer              | Manual Labour w/ Mixer      | Manual Labour w/ Mixer      | Manual Labour                           | Manual Labour and/or w/ Small Equipment | w/ Heavy Equipment   |  |
|   | LBT Application  | Good                                    | Fair                                | Fair                        | Fair                        | Good                                    | Good                                    | Poor   |  |
|   | MBT Application  | Good                                    | Good                                | Good                        | Good                        | Poor                                    | Fair                                    | Good   |  |
| Practical Application of Community People (Possibility of Increase of Employment)         | Fair   | Fair                                    | Fair                                | Fair                        | Good                        | Fair                                    | Poor                                    | Scale of Employment will be 100 people per day for LBT and 30~50 people per day for MBT. LBT with small scale equipment, and MBT with LBT inclusion would be possible. |  |
| Reliability of Quality Control (CBR* Test Results & Estimation from Previous Experiences) | Poor   | Poor                                    | Good                                | Good                        | Fair                        | Good                                    | Good                                    | Good   |  |
|   | CBR = 5  | CBR = 5~12 (depends on the YS Contents) | CBR =23 w/ 4% Cement                | CBR =22 w/ 5% Lime          | Limited Application         | Wide Application                        | Wide Application                        | Wide Application   |  |
| Easiness of Material Procurement  | Good   | Good                                    | Fair                                | Fair                        | Fair                        | Poor                                    | Fair                                    | Fair   |  |
|   | Good; Available from Local, Fair; Available from Domestic and/or Neighbouring Countries, Poor; Available from Third Countries                            |   |                                     |                             |                             |   |   |  |  |
| Speed of Construction Progress  | Good   | Fair                                    | Fair                                | Fair                        | Poor                        | Fair                                    | Fair                                    | Fair   |  |
|   | Standard Progress; Approx. 1km per month for LBT, Approx. 3km per month for MBT<br>In addition, mixing and/or soil bag making & setting will be examined |   |                                     |                             |                             |   |   |  |  |

\*CBR: California Bearing Ratio  
Source: JICA Project Team



**Table 22.1-7 Construction Method Evaluation Matrix for Community Road Improvement Programme (3/3)**

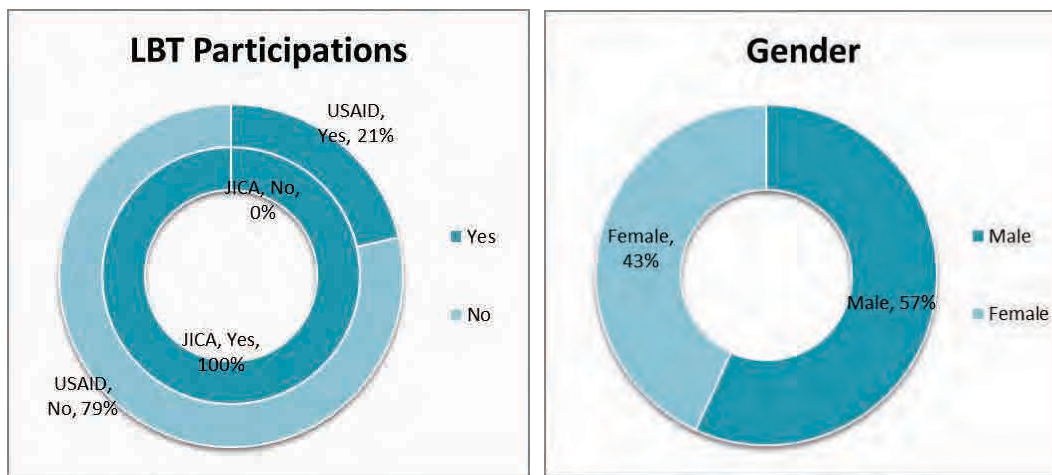
| Alternative Methods | Existing BCS  | Yellow Soil Mixture  | Stabilization   |   | Soil Bag  | Geo-Textile  | Sub-Grade Replacement   |      |
|---------------------|---|--|---|---|---|--|---|------|
|                     |   |  | Cement  | Lime  |   |  |   |      |
| Additional Comments | Based on the USAID experiment, ordinary vehicle is passable during the dry season. With proper surface treatment and storm water drainage, NMT and light vehicles would be passable during the rainy season | Yellow soil is also sticky when it gets wet, therefore, improvement effect would be minimum  | With 4% mixture, standard sub-grade CBR = 20 is achievable, therefore light vehicle would be passable during the rainy season. However, proper surface treatment might be required. | With 5% mixture, standard sub-grade CBR = 20 is achievable, therefore light vehicle would be passable during the rainy season. However, proper surface treatment might be required. | Based on the JICA experiment, ordinal vehicle is passable during the dry season. With proper surface treatment and storm water drainage, NMT and light vehicles would be passable during the rainy season | Based on the common practice, ordinary vehicle is passable during the dry season. With proper surface treatment and storm water drainage, NMT and light vehicles would be passable during the rainy season | Based on the common practice, ordinal vehicle is passable during the dry season. With proper surface treatment and storm water drainage, NMT and light vehicles would be passable during the rainy season |      |
| Overall Evaluations | LBT   | Fair   | Poor  | Fair  | Fair  | Good   | Fair  | Poor |
|                     | MBT   | Fair   | Poor  | Good  | Good  | Poor   | Fair  | Good |
|                     | Notes   | First of all, from the point of view of applicability and cost of equipment and material, LBT and MBT are evaluated. In addition, following three points (employment, quality control, difficulties of procurement) are evaluated, then overall evaluation is finalized. Moreover, considering stage constructions (especially for MBT), possibility of future paving is also evaluated. Based on the results of overall evaluations:<br>For LBT, soil bag method is recommended, however, considering future pavement, cement and/or lime treatment methods are also recommended.<br>For MBT, replacement of subgrade is recommended, however, as alternative solutions, cement and/or lime treatment methods are also recommended. |   |   |   |  |   |      |

Source: JICA Project Team

## 22.2 RECOMMENDATION ON CONFLICT PREVENTION

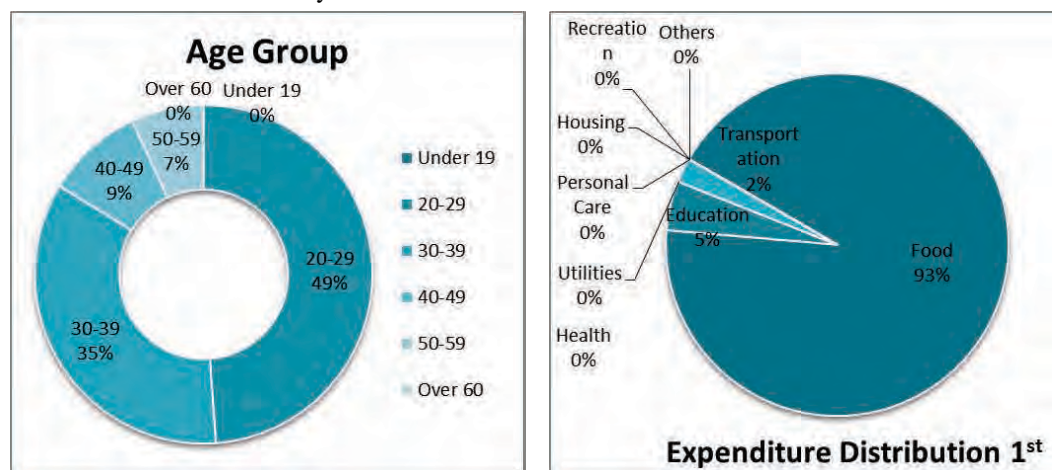
The soil of Malakal Town, is type known as “black cotton soil”. It is vulnerable to rain, and the roads are not equipped with a proper drainage ditch, so a small amount of rain can result in a large flood. It is a hindrance to everyday life not to mention the access to water, schools for children, and the sanitary problem it causes.

After carrying out research on the structure and material of the road, the construction of the three (3) roads (Goni, Jallaba, Terawa) has been implemented by the LBT (labour based technology) approach from the year 2012 to 2013. The LBT offered the community residents a chance, albeit temporarily, to take part in an economic activity. In interviews, almost everyone said they purchased food and clothes (or only food) with the wage they earned. It has provided small additional income to the households who find it difficult to purchase sufficient daily food.



About 1/5 of interviewees had participated former LBT Works done by USAID as well.

Male compositions becomes 3/5



About 1/2 of them is 20's, followed by 30's, 40's, and 50's.

Food composition reaches over 90%.

Note: Only the results of interview survey to those who live along LBT Pilot Works Corridors and/or participated LBT Pilot Works in 2012 by JICA.

Source: JICA Project Team

**Figure 22.2-1 Results of Reconnaissance Interview Survey on Pilot Works by LBT**

The basic principle of the LBT is to invite the local residents to the community project, but some participants were found to come from other communities, invited by the relatives who live in the project site, and/or job seekers who take an opportunity of daily employment wherever the recruitment takes place in Malakal Town. Due to a lack of work opportunities in Malakal Town, people see the LBT as a chance for some short-term employment.

While the LBT supports the use of local resources, to prevent the start of conflict, the project team has agreed to work on the employment guideline prioritizing who should be employed to the LBT project. The guideline should be agreed and respected by both the community leaders and the contractors.

Experience of LBT showed that the people were employed under fair conditions. In the gender balance, there were even more female participants than male participants. Many of them were young unemployed persons in their twenties. The ethnic balance was also confirmed at all the sites. It was considered to be a good example for all that the local people worked together regardless of ethnicity and religion.

This payment gave the participants were used to invest for school or make payment for the hospital bills, and so on. However, since the employment by the road project is only short term, a long term support to facilitate the people's livelihood and to vitalize the economy will be absolutely necessary.



The road condition deteriorates easily after rain.  
Source: JICA Project Team

**Photo 22.2-1 Assossa in Southern Payam**



LBT participants. Women participants occupied more than a half.  
Source: JICA Project Team

**Photo 22.2-2 Construction Work Jallaba**

## **22.3 CONSTRUCTION**

### **22.3.1 Work Plan & Progress**

#### **(1) General Implementation Plan**

The General Implementation Schedule of Community Road Improvement Programme is shown in **Table 22.3-1**.

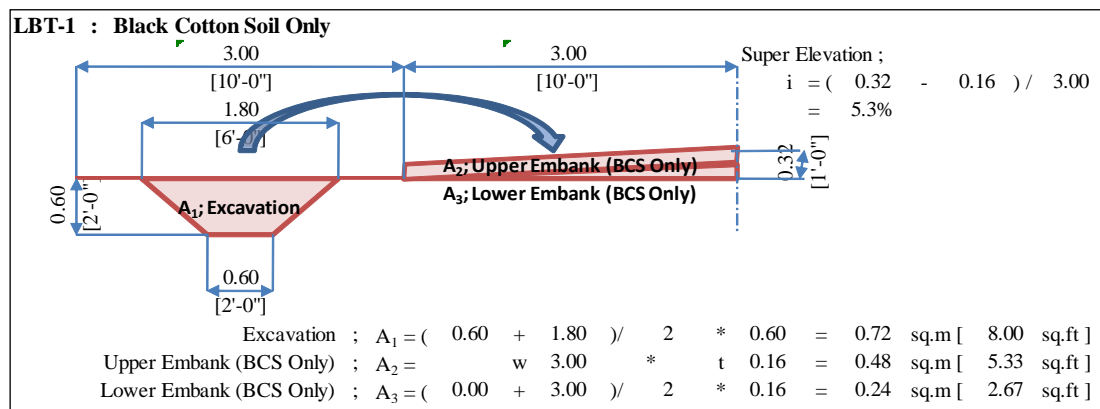


also started, and Kano and/or Sino-Hydro who supposed to supply yellow soil had remobilized their excavators and tippers from nearby borrow pit in Malakal Town to the other sites according to their own schedule.

- \*\* Small excavator from Egyptian Irrigation for digging storm water drainage was not mobilized due to lack of fuel during the pilot works, and manual labour was introduced.
- \*\*\* Tractor & prowl for Vocational Training Centre for scarifying the top soil and mixing other treatment material, such as cement and lime, was not mobilized since pilot works covered only relatively short stretch, and manual labour was introduced instead.

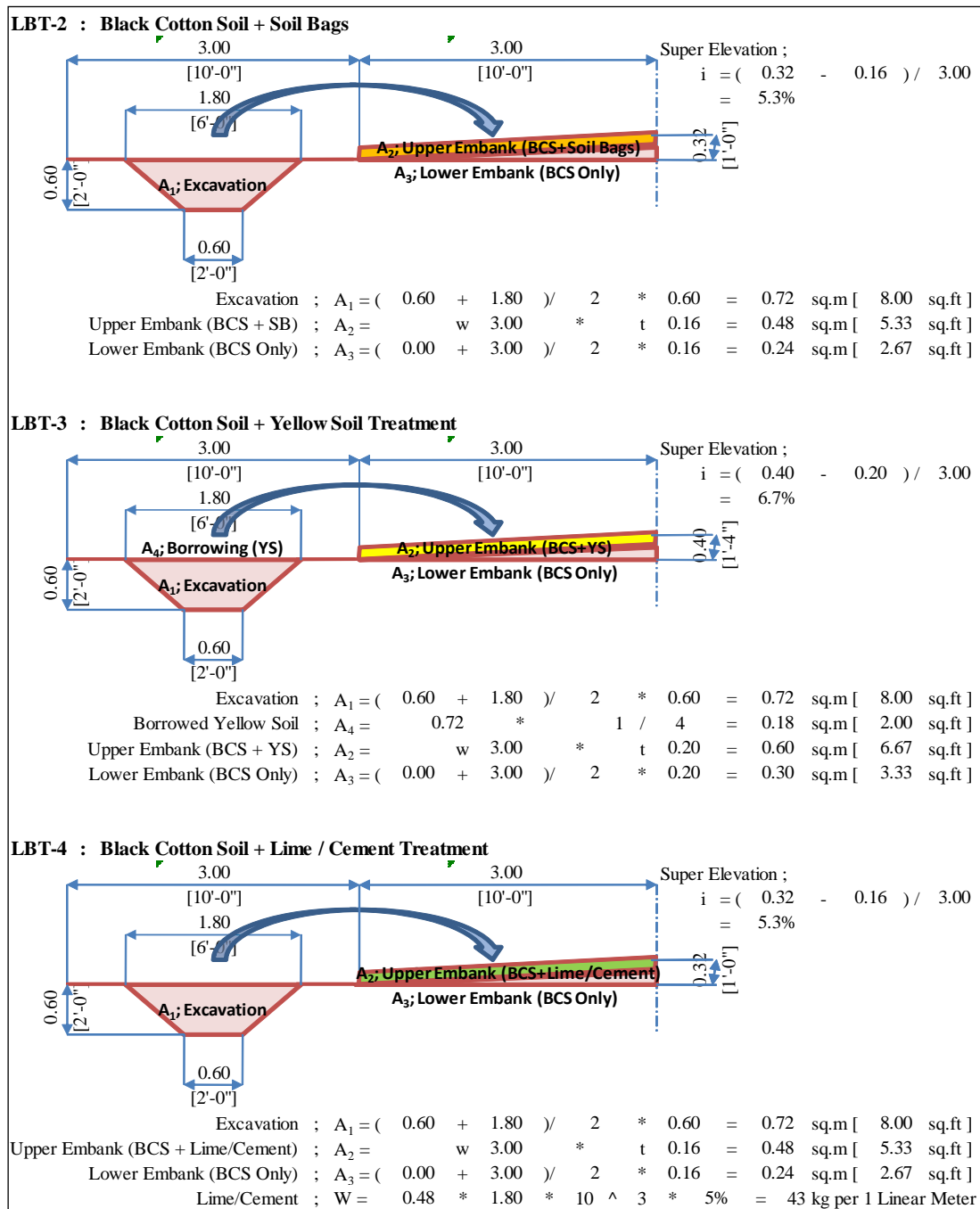
### (3) Working Plan

Since LBT should be implemented within the range of the community area as much as possible due to the limited capacity of manual labourers, a side borrow pit type cut & fill working plan was introduced as shown in **Figure 22.3-1**. With this working plan, no additional soil except yellow soil and/or laterite is required, however treatment agents, such as cement and/or lime, and soil bags are required to procure from the local markets either in Malakal or Juba, and they were temporary stored in the secured storage before starting actual works. Such tools and material were basically easy to transport by a-half-ton pick-up truck with small number of labour force within the LBT unit.



Source: JICA Project Team

**Figure 22.3-1 Various Soil Balance Chart (Side Borrow Type Cut & Fill) for LBT (1/2)**



Source: JICA Project Team

**Figure 22.3-2 Various Soil Balance Chart (Side Borrow Type Cut & Fill) for LBT (2/2)**

#### (4) Work Progress

So far work progress is almost on-schedule, and the team keeps monitoring while extending the improvement section by the soil bag and cement or lime treatment method. A daily based detailed schedule of the Pilot Works is shown in **Table 22.3-2**. However, there were some issues at each stage and they are summarized as follows:

**Table 22.3-2 Daily Based Detailed Schedule for Pilot Works**

|                               | May |    |    |    |    |    |    | June |    |    |    |   |   |   |   |   |   |   |   |   |    | July |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|-------------------------------|-----|----|----|----|----|----|----|------|----|----|----|---|---|---|---|---|---|---|---|---|----|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|                               | 21  | 22 | 23 | 24 | 25 | 26 | 27 | 28   | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|                               | M   | T  | W  | T  | F  | S  | S  | M    | T  | W  | T  | F | S | S | M | T | W | T | F | S | S  | M    | T  | W  | T  | F  | S  | S  | M  | T  | W  | T  | F  | S  | S  | M  | T  | W  | T  | F  | S  | S | M | T | W | T | F | S | S |   |    |    |    |    |    |    |
| Preparation Stage             |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Material & Tool Procurement   | ■   | ■  | ■  | ■  | ■  | ■  | ■  | ■    | ■  | ■  | ■  | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■  | ■    | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■  | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■  | ■  | ■  | ■  |    |    |
| Site Reconnaissance           |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Recruiting Labours            |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Survey & Staking              |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Implementation Stage          |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Side Ditch Excavation         |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Carriageway Scraping          |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Soil Bag Preparation          |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Soil Bag Installation         |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Soil Bag Covering             |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Lime Stabilization            |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Cement Stabilization          |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Monitoring & Evaluation Stage |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Monitoring                    |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| Evaluation                    |     |    |    |    |    |    |    |      |    |    |    |   |   |   |   |   |   |   |   |   |    |      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

Source: JICA Project Team

### Preparation Stage

1. The procurement of materials, such as cement, soil bag, and broken bricks, was done within Malakal Town, however that of lime was done in Juba since it was not available in local market in Malakal. The lime was shipped from Juba to Malakal by speed boat along the Nile River. Therefore, lime may cost more even its unit cost is cheaper than that of cement for stabilization, unless both are always available in Malakal.
2. Procurement of hand tools, such as spades (shovels), rakes, pick-axes, and wheel barrows, have been done within Malakal Town for only available numbers between a half dozen to one dozen. However, they are not enough for one party with 30 labours, therefore additional number of hand tools are procured from Juba and air lifted with other items necessary for the project. However, air lift is not always best choice in terms of cost when other transportation means are available. Therefore, procurement arrangement in advance is recommended.
3. Recruiting labours from those former enumerators for traffic counts survey initially failed, since they have demanded higher wage rate than that of traffic counts based on the possible hard manual labour of the work. However, since traffic counts required at least secondary school graduate level, on the other hand, manual labour does not require such educational background basically. Therefore, the wage level of LBT works has been set and remained relatively lower level than that of traffic counts, despite the strong demands from those former enumerators. As a result, most of them, especially relatively younger aged group have left the site within a half day after receiving a half day wage and lunch fee, unfortunately. To avoid this kind of misunderstanding between employees and employer a briefing session shall be provided before employment for further works.

### Implementation Stage

1. After these incidents, remaining former enumerators who are relatively older aged (although they are still middle aged) group and community residents who are basically housewives have joined the pilot works for the relatively reasonable wage level with lunch fee. At this point, they have requested LBT Implementation Unit consists from LBT Coordinators and JICA and MoPI&RD Project Teams, that lunch fee should be paid on a daily basis and for the wage to be

- paid on weekly basis, and those requests are granted.
2. The community and recruited labours have been working hard not only under proper supervisory work by LBT coordinators but also in a self-motivated and self-improved way by themselves. These kinds of motivations and self-improving skills are very good sign for further works and should be accelerated.
  3. Once work was under way, one recruited labour who is relatively younger aged man was selected and promoted to be as an Assistant LBT Coordinator based on his hard working attitude and smarter way of approach to the works and his workmates, including housewife group.
  4. During the course of the LBT works, leather gloves were distributed to all labourers for the daily hand labour work, and medical masks are also distributed when they have dealt with cement and/or lime treatment works. Also due to very hard work under the sun, to avoid dehydration, SI's or JICA Compound's treated water in Jerri-cans is provided for them.
  5. Most of hand tools are kept in nearby house yard which owner has offered the team for the space to keep tools and some material and night watch, other material such as cement and lime are kept in store room in JICA Malakal Compound to avoid possible damage by rain water.
  6. Soil bags filled with BCS were left along the site; however, just in case, two night watches were hired temporarily base to keep eyes on them from possible theft.

#### Monitoring and Evaluation Stage

1. Other than heavy rain which started mid-June, there are not many issues so far, however, as described in the following sections, formation of further LBT works shall be discussed and set up accordingly before dry season started.



Day 0 <Thursday 31 May 2012>



Day 1 <Friday 01 June 2012>



Day 2 <Saturday 02 June 2012>



Day 3 <Monday 04 June 2012>



Day 4 <Tuesday 05 June 2012>



Day 5 <Wednesday 06 June 2012>

Source: JICA Project Team

**Photo 22.3-1 Progress of LBT Pilot Works (1/2)**





Day 6 <Thursday 07 June 2012>



Day 7 <Friday 08 June 2012>



Day 8 <Saturday 09 June 2012>



Day 9 <Monday 11 June 2012>



Day 10 <Tuesday 12 June 2012>



Day 11 <Wednesday 12 June 2012>

Source: JICA Project Team

**Photo 22.3-2 Progress of LBT Pilot Works (2/2)**

### (5) Monitoring of LBT Works

After the pilot works, in-situ DCPT tests have been carried out and an interview survey of the community will be also carried out, and most appropriate pavement/treatment type will be chosen for further LBT works.

#### 22.3.2 Quality Control

Quality Control Standard Code (QCSC) will be set up for the purpose of achieving trafficability by light vehicles during the rainy season as a community road to be use by community residents. As QCSC, the periodical CBR value observation by DCPT (Direct Corn Penetration Test) shall be utilized since it is relatively cheap and easy to carry out by even non-qualified local staff. However, underlying soil conditions change by segment by segment, therefore, when the route is changed, further laboratory tests also need to be carried out. In addition such QCSC should be applied not only JICA project but also to other on-going project by UNS to control quality and consistency of road projects in Malakal and UNS.

#### Quality Control Standard Code (Draft)

- |                    |   |
|--------------------|---|
| • Field Test:      | 3 set of DCPT at Every 120m, Every Month                              |
| • Laboratory Test: | 3 set of CBR & Swell Test at Every 480m when Subject Route is changed |
| • In Situ Test:    | Cement and Lime Stabilization with 3%, 6%, and 9% case                |



Source: JICA Project Team

**Photo 22.3-3 Quality Control Activities**

### **22.3.3 Equipment and Materials Procurement Plan**

#### Selection of Equipment

Major roads in Malakal Town are currently under improvement works by two contractors as described in previous section. They have mobilized a fleet of heavy duty equipment, such as excavators, motor graders, bulldozers, tippers (dump trucks), etc., while MoPI&RD possessed only a wheel loader. However, minor roads improvement works do not require such large scale heavy duty equipment to implement, even if it will be done by using MBT (mechanical based technology). So MBT works will most likely be contracted out to local contractors. Therefore, MoPI&RD owning very heavy duty equipment like those that the private contractors are using will not be wise choice at this moment.

On the other hand, although LBT works are mainly handled by manual labourers, support by the use of small scale heavy duty equipment, such as mini-compact or a mini-backhoe, will be very helpful. It was demonstrated in the pilot works when a small compactor possessed by a local contractor was brought in for compaction of the soil bags, and for the compaction of stabilised cement/lime mix and the non-stabilized BCS at the site.

Therefore, under the Urgent Development Programme for Road and Transport Sector, procurement of such small scale heavy duty equipment for MoPI&RD and/or VTC is recommended to support and enhance the LBT works being handled by local communities.

#### Selection of Material

It is not confirmed yet which stabilization method is best for the minor roads improvement works. Locally available material, such as cement, lime, soil bags, broken bricks, shall be utilized as much as possible, since laterite, aggregate, including fine sand, and the asphalt used for major roads improvement works are very difficult or very expensive to obtain in Malakal Town. Using the same level of technical specifications used for major roads and applying them to minor roads improvement works are not a wise choice and would delay the widespread improvement of damaged infrastructure.

#### Procurement Plan

Most of the equipment and materials necessary for the road improvement project have to be

procured from outside of Malakal Town and transported to the project site because they are not available locally.

Based on the local market conditions in Malakal Town, the equipment procurement list is made according to the following principles;

1. The materials should be procurable in the market in Malakal Town or Juba even if they are in fact imported materials. Hand tools for manual labour such as spade (shovel), pick-axe, rake, wheel barrow, etc. are available however, almost no heavy duty equipment is available in Malakal Town and it is sometimes difficult to procure even in Juba.
2. The equipment and materials which are can be procured in capitals of neighbouring countries, such as Nairobi and/or Kampala, are procured there, except in the following cases;
  - i. Their quality/performance are not satisfactory
  - ii. The available quantities and/or the time of supply are not confirmed

Based on those assumptions and principles, the equipment procurement list shown in **Table 22.3-3** is proposed for MoPI&RD and/or Vocational Training Centre (VTC);

**Table 22.3-3 Equipment Procurement List**

| No.       | Items             | Standard Specifications   | Q'ty | Unit | Unit Value ('000 JP ¥) | Total Value ('000 JP ¥) |
|-----------|-------------------|---------------------------|------|------|------------------------|-------------------------|
| 1         | Compaction Roller | 0.8-1.1t, Hand Guide      | 2    | set  | 1,200                  | 2,400                   |
| 2         | Compaction Ramer  | 60kg                      | 4    | set  | 200                    | 800                     |
| 3         | Compaction Plate  | 40kg                      | 4    | set  | 150                    | 600                     |
| 4         | Small Excavator   | 0.08cu.m, 21kw, 0.8t lift | 1    | set  | 4,500                  | 4,500                   |
| 5         | Small Generator   | 17-20kva                  | 2    | set  | 1,500                  | 3,000                   |
| 6         | Water Pump        | Ø50mm, 0.8kw              | 4    | set  | 50                     | 200                     |
| 7         | Engine Pump       | Ø50mm                     | 4    | set  | 75                     | 300                     |
| Sub Total |                   |                           |      |      |                        | 11,800                  |
| 8         | Spare Parts       |                           | 25   | %    |                        | 2,950                   |
| Total     |                   |                           |      |      |                        | 14,750                  |

Source: JICA Project Team

## 22.4 OPERATION AND MAINTENANCE PLAN

### 22.4.1 Organization

#### Directorate

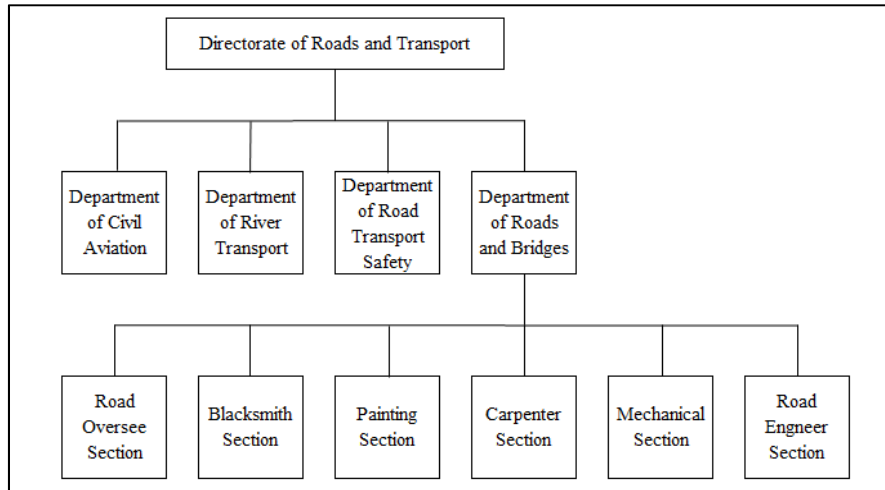
The Directorate of Roads and Transport consist of Department of Roads and Bridges, Department of Road Transport Safety, Department of River Transport and Department of Civil Aviation/Malakal Airport.

Of which, the Department of Roads and Bridges has the following responsibilities:

1. To prepare transport and roads network master plan for Malakal Town and other major towns in UNS
2. To construct and upkeep the State's feeder roads and bridges

3. To assist in grading, design and implementation of all state towns' roads and bridges
  4. To ensure expansion of access roads for side-walk, small vehicles and other modes of transports
- And Department of Road Transport Safety has the following responsibilities;

1. To manage government vehicles (registration, numbering, insuring, maintenance, condemnation, etc.)
2. To enforce road transport safety regulation

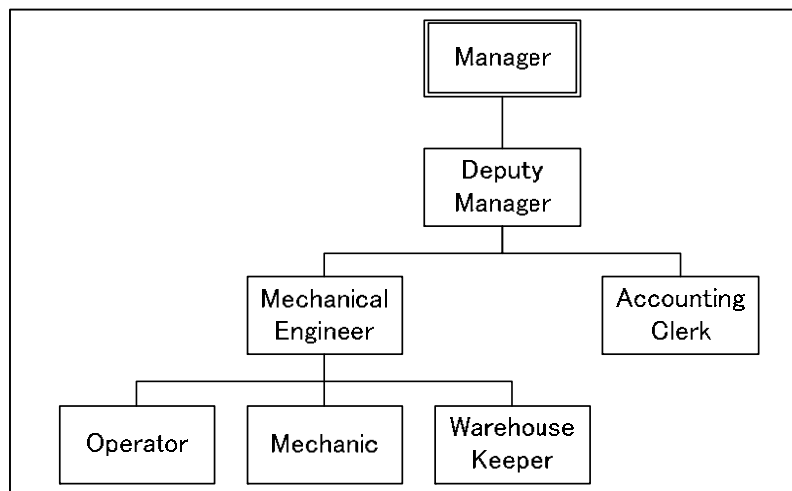


Source: MoPI&RD

**Figure 22.4-1 Organization Chart of Directorate of Roads and Transport, MoPI&RD**

#### Operation & Maintenance

A proposed organization chart for the Operation and Maintenance section (hereinafter called O&M section) is shown in **Figure 22.4-2**. The O&M section shall be organized under Department of Roads and Bridges, Directorate of Roads and Transport. When O&M section is established, a part of staff of Road Engineer Section and Mechanical Section under Department of Roads and Bridges shall be in charge of the O&M duty and could join in O&M Training Project of JICA with VTC.



Source: JICA Project Team

**Figure 22.4-2 Proposed Organization Chart of Operation & Maintenance Section**

### 22.4.2 LBT Implementation Unit

Basically LBT Implementation Unit consists from 1 Senior LBT Coordinator, 2 Assistant LBT Coordinators, and 30 Community and/or Recruited Labours, and depends on the work progress, 2 Securities are sometimes attached.

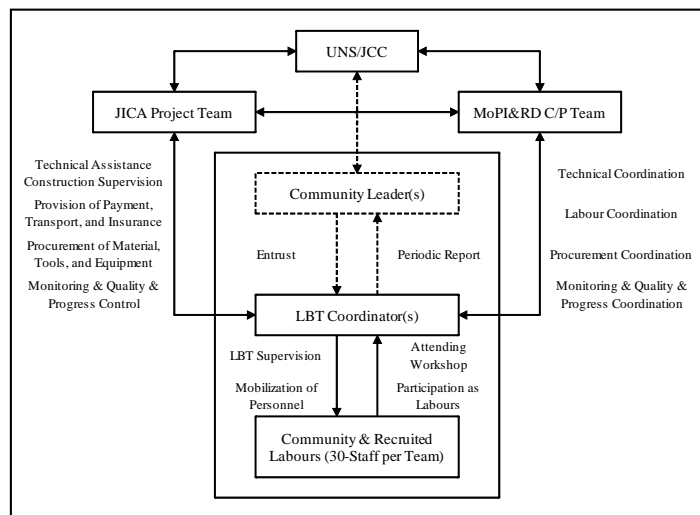
To supervise and/or assist them, 1 Senior Engineer, 1 Assistant Engineer, 2 Liaison Staff, 1 Secretary and 2 Drivers from JICA Project Team and 3 Senior Engineers (1 Director, 1 Deputy Director, and 1 Assistant Director) and 1 Driver from MoPI&RD were involved in the pilot works.

Labourers come from two groups. The first group is men who mostly have former experiences as casual labours during the past and don't live within the community. The second group is women who mostly do not have former experiences as casual labourers however they might have some kinds of experience like farming works during the past and live within the community.

Based on the experience gained in the pilot works, four (4) alternative formations (including the one used in the pilot works formation) can be proposed to implement the LBT works in a more efficient way as shown in **Figure 22.4-3, 4, 5, and 6**, respectively.

#### Alternative-1

This unit formation is basically the one used for on-going pilot works. However, this has a tendency for too much JICA Project Team (JPT) involvement, since all provision and procurement works are done by the JPT including payments to individual community & recruited labours for lunch fees every day and wages every weekend. Therefore cannot be expanded to cover more than one site. This is only recommendable for relatively short period works such as the aforementioned pilot works, although its flexibility to meet any requirement or experimental trial are an advantage of this formation above other alternatives.



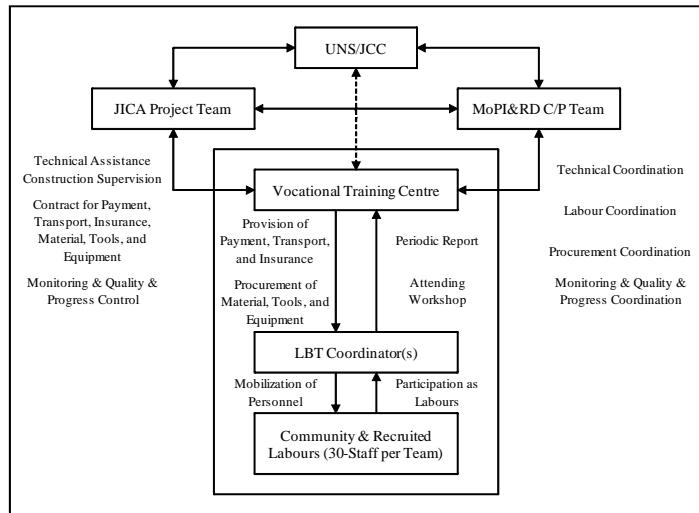
Source: JICA Project Team

**Figure 22.4-3 LBT Implementation Unit Type-I**

Source: JICA Project Team

Alternative-2

Unique point of this unit formation is the tie-up with VTC as an organization to connect between the community and both JICA Project Team and MoPI&RD C/P Team. In this case, LBT Coordinator should be one of the VTC's instructors and/or a newly recruited either permanent or temporary staff that should have civil engineering background. With this formation, JPT can reduce its



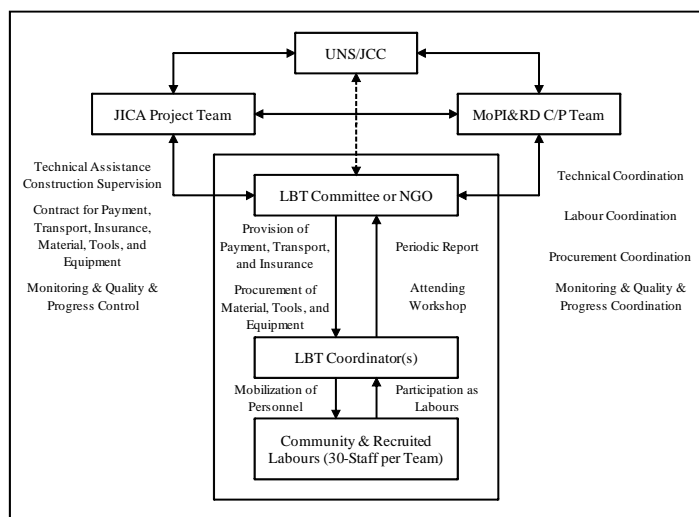
Source: JICA Project Team

**Figure 22.4-4 LBT Implementation Unit Type-II**

workloads and cover two or three sites at once since LBT becomes contract works between JICA and VTC. Furthermore after completion of this Urgent Development Project, UNS will be able to continue similar LBT works through VTC, and those participated community and/or recruited labours can be certified to finish newly establish LBT course within VTC which leads their further job opportunities. In this case, JICA supplied equipment and tools can be shared between MoPI&RD and VTC for further routine maintenance works for not only community and/or local roads, but also arterial, collector, and distributor roads within their jurisdictions, and which also create further job opportunities, not only for those community and/or recruited labours but also newly graduated or enrolled students and/or trainees.

Alternative-3

This unit formation is similar to Alternative-2, however instead of a tie-up with VTC, a LBT Committee or NGO shall be established or appointed as an organization to connect between the community and both JICA Project Team and MoPI&RD C/P Team. In case of LBT Committee, it should be established within the governmental body however not at state level but at city or district



Source: JICA Project Team

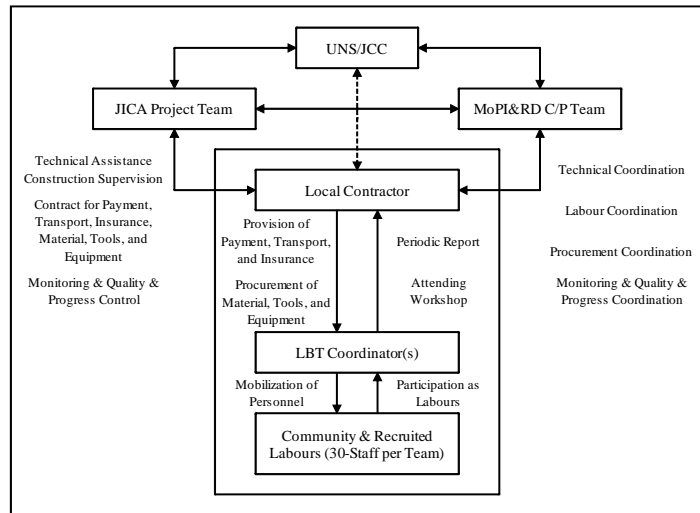
**Figure 22.4-5 LBT Implementation Unit Type-III**

level, and either local leader(s) or city/district officer(s) and his/her staff shall be involved. Nevertheless, they are required to have either accounting, procurement, logistics or engineering background. In case of an NGO, it should be well experienced either internationally and/or a local

NGO with working experiences in UNS and/or South Sudan. However, either case, if they do not have staffs that have civil engineering background, they have to hire LBT coordinators with civil engineering background under their own responsibilities. With this formation, JICA Project Team and MoPI&RD C/P Teams can also reduce their workloads slightly and cover other locations at same time. However, both teams might need much more involvement on supervisory works than for Alternative-2 formation. In this case, JICA supplied equipment and tools shall be under MoPI&RD's possessions basically for further routine maintenance works for not only community and/or local roads, but also arterial, collector, and distributor roads.

#### Alternative-4

This unit formation is based on simply contracting LBT works out to local contractor(s) and letting them handle further works. With this formation, even the introduction of a competition based contract, interest parties might be limited and therefore it would not be always be a least cost solution and those extra costs might not be affordable to communities. In this case, JICA supplied equipment and



Source: JICA Project Team

**Figure 22.4-6 LBT Implementation Unit Type-IV**

tools can be leased out to such local contractor, however the O&M Section of MoPI&RD should retain them well for further routine maintenance works for not only community and/or local roads, but also arterial, collector, and distributor roads within their jurisdictions.

#### Evaluation

After evaluations of above described four (4) alternative formations, based on the criteria set forth below, Alternative-2 is recommended for further LBT works in Malakal Town as shown in **Table 22.4-1** below, however further discussions and coordination works among the stakeholders, such as MoPI&RD, VTC, and JICA, is required to apply this formation in practice in the field.

**Table 22.4-1 Evaluation Matrix for LBT Implementation Unit**

| No. | Criteria                               | Alt.-1    | Alt.-2    | Alt.-3    | Alt.-4   |
|-----|--|-----------|-----------|-----------|----------|
| 1   | Quality Control                        | Good / 3  | Good / 3  | Fair / 2  | Fair / 2 |
| 2   | Capacity Development of Officials      | Fair / 2  | Good / 3  | Good / 3  | Poor / 1 |
| 3   | Capacity Development of Communities    | Fair / 2  | Good / 3  | Fair / 2  | Fair / 2 |
| 4   | Cash Disbursements to Communities      | Fair / 2  | Good / 3  | Good / 3  | Fair / 2 |
| 5   | Tool & Equipment Damage Prevention     | Good / 3  | Good / 3  | Fair / 2  | Poor / 1 |
| 6   | Flexibility to meet In-Situ Conditions | Good / 3  | Fair / 2  | Fair / 2  | Poor / 1 |
|     | Overall Evaluation                     | Fair / 15 | Good / 17 | Fair / 14 | Poor / 9 |

Source: JICA Project Team

### 22.4.3 Operation and Management Plan

During the Urgent Development Project for Road and Transport Sector, construction supervising engineer(s) from the JICA Project Team will be attached, however, some qualified and motivated engineers from the Road Engineer Section, Department of Roads and Bridges, MoPI&RD, shall also be attached.

The Community Roads Improvement Programme will be contracted out to VTC or an NGO or local contractor(s) and performed by the LBT technique, using equipment possessed by VTC or NGO or the local contractor and/or the proposed equipment supplied by JICA can be also utilized during the course of the works.

Under this programme, a main objective is to provide for employment of local residents to provide direct cash income in line with capacity building and development for those labourers, staff of MoPI&RD and/or local contractor(s).

The Department of Roads and Bridges shall act as the primary responsible section to maintain and manage the equipment supplied by JICA.

Therefore, it is also necessary to set up an O&M section inside DRB / MoPI&RD as soon as possible in line with the Urgent Development Project for Road and Transport Sector (Community Roads Improvement Project and Maintenance Equipment Procurement Programme).

### 22.4.4 O&M Cost

Once the equipment has been supplied to MoPI&RD an annual budget shall be provided to cover all expenses concerned with equipment usages such as operation, maintenance and repair costs.

The required amount of budget shall be assumed to be based on the estimated operational days which will be given for reference by applying annual standard operation days prescribed in the Japanese Estimation Standard such as “*Estimation Standard for Civil Engineering Works 2011*”, Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan. In the calculation, the depreciation cost is excluded; however the prevailing price of fuel is applied as shown in **Table 22.4-2** and **22.4-3**.

#### (1) Operation Cost

**Table 22.4-2 Operation Cost per Day**

(unit: South Sudan Pounds: SSP)

| Items             | Fuel   | Unit  | Litre | Unit Cost | Fuel Cost | Operator (day) | Total | Remarks                                      |
|-------------------|--------|-------|-------|-----------|-----------|----------------|-------|--|
| Compaction Roller | diesel | litre | 65.8  | 20        | 1,316     | -              | 1,316 |  |
| Compaction Rammer | petrol | litre | 23.1  | 20        | 462       | -              | 462   | *assume<br>6.6 hr<br>operation<br>per<br>day |
| Compaction Plate  | petrol | litre | 8.1   | 20        | 162       | -              | 162   |  |
| Small Excavator   | diesel | litre | 27.7  | 20        | 554       | 35             | 589   |  |
| Small Generator   | diesel | litre | 29.1  | 20        | 582       | -              | 582   |  |
| Engine Pump       | petrol | litre | 6.9   | 20        | 138       | -              | 138   |  |
| Depreciation      |        |       |       | 0         | 0         | 0              | 0     |  |

Source: JICA Project Team



**Table 22.4-3 Annual Operation Cost**

(unit: SSP)

| Items               | Unit Cost (per day) | Annual Standard Operation Days | Annual Operation Cost |
|---------------------|---------------------|--------------------------------|-----------------------|
| Compaction Roller   | 1,316               | 80                             | 105,280               |
| Compaction Rammer   | 462                 | 80                             | 36,960                |
| Compaction Plate    | 162                 | 80                             | 12,960                |
| Small Excavator     | 589                 | 100                            | 58,900                |
| Small Generator     | 582                 | 110                            | 64,020                |
| Water Pump (Ø50mm)  | 0                   | 100                            | 0                     |
| Engine Pump (Ø50mm) | 138                 | 100                            | 13,800                |

Source: JICA Project Team

## (2) Annual Maintenance and Repair Cost

Annual maintenance and repair cost for the equipment is shown in **Table 22.4-4**.

Maintenance & Repair Costs per Year

= Basic Value x Rate of Maintenance & Repair Cost / Standard Years of Service

Basic value of the equipment refers to “*Estimation for Depreciation Cost of Construction Equipment 2010*” by MLIT, which is generally used for the calculation of equipment expenses in Japan.

**Table 22.4-4 Annual Maintenance and Repair Cost**

| Items   | Basic Value ('000 JP¥) | Standard Year of Service (Year) | Maintenance & Repair Cost Rate (%) | Annual Maintenance & Repair Cost |       |
|---|------------------------|---------------------------------|------------------------------------|----------------------------------|-------|
|   |                        |                                 |                                    | JP¥                              | SSP   |
| Compaction Roller (0.8-1.1 ton, Hand Guide)       | 1,200                  | 13.0                            | 30                                 | 27,692                           | 1,043 |
| Compaction Rammer (60kg)                          | 200                    | 6.0                             | 40                                 | 13,333                           | 502   |
| Compaction Plate (40kg)                           | 150                    | 6.0                             | 40                                 | 10,000                           | 377   |
| Small Excavator (0.08m <sup>3</sup> , 21kw, 0.8t) | 4,500                  | 9.0                             | 40                                 | 200,000                          | 7,536 |
| Small Generator (17-20 Kilovolts Amperes :KVA)    | 1,500                  | 10.0                            | 40                                 | 60,000                           | 2,260 |
| Water Pump (Ø50mm, 0.8kw)                         | 50                     | 10.5                            | 125                                | 5,952                            | 224   |
| Engine Pump (Ø50mm)                               | 75                     | 8.5                             | 65                                 | 5,735                            | 216   |

Source: JICA Project Team

## (3) Total Cost for O&M Section

The staff (operators, mechanics and warehouse keepers) salaries shall be disbursed as expenses incurred by O&M cost. However their salaries are always included in the annual budget for all staffs of MoPI&RD

**Table 22.4-5 Total Annual Cost**

(unit: SSP)

| Items   | Unit  | Annual Operation Cost | Annual Maintenance Cost | Unit Cost | No. | Total   |
|---|-------|-----------------------|-------------------------|-----------|-----|---------|
| Compaction Roller (0.8-1.1 ton, Hand Guide)       | Year  | 105,280               | 1,108                   | 106,388   | 2   | 212,776 |
| Compaction Rammer (60kg)                          | Year  | 36,960                | 533                     | 37,493    | 4   | 149,972 |
| Compaction Plate (40kg)                           | Year  | 12,960                | 400                     | 13,360    | 4   | 53,440  |
| Small Excavator (0.08m <sup>3</sup> , 21kw, 0.8t) | Year  | 58,900                | 8,000                   | 66,900    | 1   | 66,900  |
| Small Generator (17-20 KVA)                       | Year  | 64,020                | 2,400                   | 66,420    | 2   | 132,840 |
| Water Pump (Ø50mm, 0.8kw)                         | Year  | 0                     | 238                     | 238       | 4   | 952     |
| Engine Pump (Ø50mm)                               | Year  | 13,800                | 229                     | 14,029    | 4   | 56,116  |
| Operator  | Month | -                     | -                       | 1,000     | 12  | 12,000  |
| Mechanic  | Month | -                     | -                       | 1,000     | 12  | 12,000  |
| Warehouse Keeper                                  | Month | -                     | -                       | 750       | 12  | 9,000   |
| Improvement of Workshop                           | L.S.  | -                     | -                       | 2,000     | 1   | 2,000   |
| Total   |       |                       |                         |           |     | 707,996 |

\*Total annual cost includes improvement of workshop for the 1<sup>st</sup> year.

Source: JICA Project Team

Therefore, management cost per day will be:

SSP707,996 / 365 days = SSP1,940 per day

## 22.5 CONCLUSION

According to the Town Profile survey results, about two thirds of the people are dissatisfied with the present road condition, citing the muddy condition during the rainy season as the problem. “RT-1 Community Road Construction Project (LBT)” was implemented within this Project. The target community roads are J-06 for 2,067 meters, J-13 for 2,150 meters and J-16 for 1,280 meters with the total length of 5.5km. The unique characteristic of this project is the application of labour-based-technology (LBT) on a pilot basis. The initial endeavours in applying LBT method is to reveal the cost advantage of the LBT compared with the machine-based technology (MBT) and the economic impacts on the local economy through payment of wages to the labourers. Technical transfer by the JICA Project Team was under way so that the Department of Roads and Bridges will be able to undertake road works applying LBT on their own in the future.

**Table 22.5-1 Contents of Urgent Development Project in Road Transport Sector**

| Item                                  | Description  | Remarks  |
|---------------------------------------|--|--|
| Target                                | Community Roads in Malakal Town  |  |
| Length                                | Up to 5.5km in total   |  |
| Width                                 | 6.0 m-wide carriageway at middle of right of way with 1.8m-wide side ditch at both sides   | RoW=15-18m   |
| Construction Method                   | Labour Based Technology (LBT)  |  |
| Improvement Type / Pavement Structure | Resurfacing with;<br>- Binder course of soil sacks filled up with black cotton soil (BCS) in-situ<br>- Wearing surface of BCS with lime treatment<br>- Top surface with crushed bricks | 2 layers resurfacing and covered by crushed bricks |

Source: JICA Project Team

The project started from March 2013 directly funded and managed by JPT. In February 2014, LBT-III Lot was already completed. However LBT-1 Lot and LBT-II Lot were terminated with 1.8km remaining.

**< PART VI >**

**RECOMMENDATIONS**

## CHAPTER 23 RECOMMENDATIONS

In this chapter, recommendations are made for the formation of a social economic infrastructure plan and the management of the Urgent Development Projects in the planning, implementation and operation and management phases.

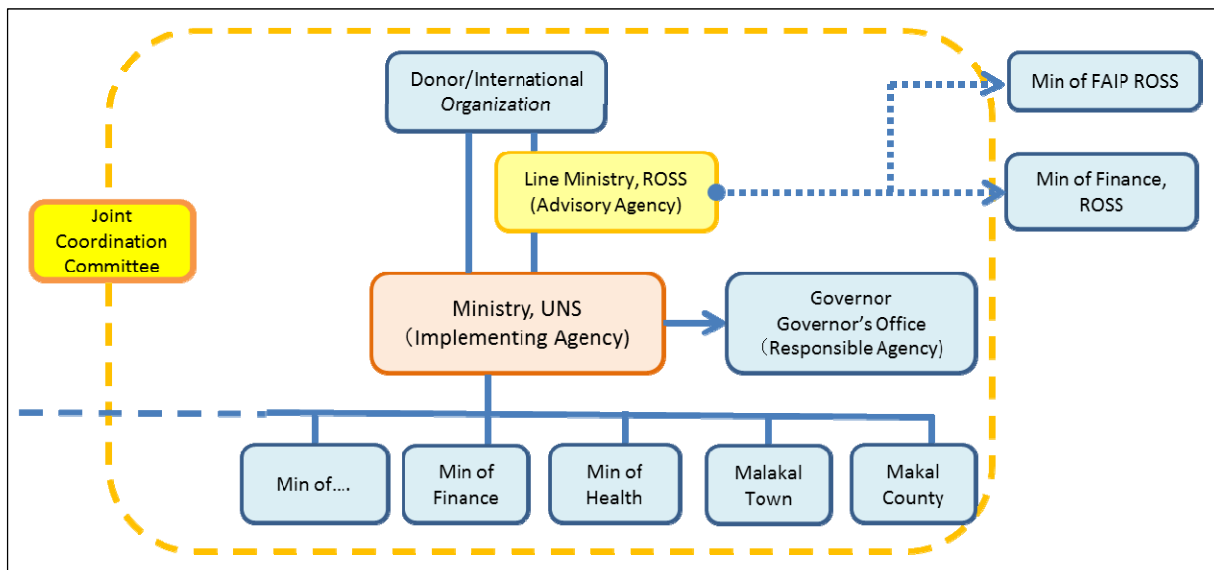
### 23.1 PLANNING SYSTEM

#### 23.1.1 Formation of all Relevant Organizations/Agencies for the Comprehensive Plan

Comprehensive plans in the areas of urban planning, infrastructure and economic development are not simply made from a compilation of plans at the sector level. In order to allocate budgets effectively and make the mutual adjustments in timing that will allow the overall objectives and vision to be realised it is necessary to have coordination and consensus. It is therefore vital for agencies to understand and be part of a comprehensive technical planning approach.

In this Project, a working group comprising State Ministry of Labour, Public Services and Human Resource Development (MoPI&RD) staff and relevant organizations was established. It is recommended that a similar working group, formed of members from across departments and agencies with responsibility for comprehensive planning is given a legal basis. It is expected that ownership of the overall comprehensive plan by each sector organisation will be enhanced by this process.

An example of the formation of a group for comprehensive planning at state level is shown in **Figure 23.1-1**. Each relevant agency is expected to second sufficient personnel so that it can be positively involved in the Comprehensive Plan formulation, and progress with the plan is not delayed. An organizational procedure within each relevant agency to promptly discuss the contents and progress of the Comprehensive Plan formation reported by staff on the working group is also indispensable.



**Figure 23.1-1 Formation of Relevant Organization (Example)**

### **23.1.2 Authorization of the Comprehensive Plan and Incorporation into National/Regional Development Plan**

In order to encourage the reconstruction and development of Malakal Town in a direction suited to its function as the core town of the Greater Upper Nile Region it is essential that the economic and infrastructure comprehensive plan formulated under this Project is approved for the short and medium term up to the year 2022.

Before authorisation of the comprehensive plan the necessary assessments of social and environmental effects; and financial and economic evaluations should take place. The comprehensive plan should be made in consultation with stakeholders and efforts made to reach consensus. The need for consensus in comprehensive planning is not legislated for in South Sudan law. In this Project, workshops and household surveys via the Town Profile Survey were adopted instead of stakeholder meetings. Whatever method is adopted, care should be taken that strong opposition against the comprehensive plan has been reduced.

The projects in the social economic plan should be included in the National and Regional Development Plans to ensure that budgets are allocated.

The authorized development plan comprising of projects and land use zoning shall have the power to guide all development activities and investments by not only by public sectors but also the private sectors. The development plan not only includes the infrastructure projects but requires the control of construction activities to meet the plans objectives.

### **23.1.3 Amendment of the Plan as Situation Changes**

The Comprehensive Plan is based on assumptions about the future social and economic conditions including population, extent of urbanized area, economic activities, urban structure, land use, etc. The plan shall be reviewed on occasions and adjusted according to the future change in social and economic conditions.

A serious change of social and economic conditions confronting to this Comprehensive Plan is the one caused by the internal strife from December 2013. Malakal Town became a battle field and many refugees were created. Much social economic infrastructure was supposed to be damaged, but this is not confirmed yet. Much change to the required amount of social economic infrastructure restoration and reconstruction and on the socio-economic framework as the base for the Comprehensive Plan have no doubt occurred, however, this Comprehensive Plan cannot account for theme.

This Comprehensive Plan was formulated to focus on restoration and reconstruction with a short to medium term horizon and this underlying stance doesn't need to change. It can be regarded that the proposed future vision of Malakal Town and planning objectives are still effective.

However, the contents and scales of the proposed projects need to be revised according to the extent of damages on the social economic infrastructure and change in the socio-economic condition. Also the project programme schedule for peace building and food security needs to be revised.

Malakal Town is expected to develop beyond its boundary and become a core town in the Upper Nile Region. In this regard, it is desirable for social economic infrastructure plan for Malakal Town to cover surrounding areas especially the western bank of the Nile River opposite. In this Project development concept of the western bank of the Nile River including close transport connection of both banks and social/economic service provision to the western bank of the Nile River were referred to. In case circumstances allow, the Comprehensive Plan including western bank of the Nile River shall be formed.

### **23.1.4 Promotion of Capacity Building**

In this Project, capacity building training courses for staff of MoPI&RD and relevant agencies were implemented. Those were ArcGIS (GIS: Geographic Information System)/AutoCAD, English Documentation/Information Technology (IT), Accounting and Project Management trainings that are considered immediately necessary. In future same continuous capacity building training of government staff is recommended. Trainees are required to practice what they had learned in the capacity building to master the skills and knowledge acquired in the training course. Furthermore, the skills acquired shall be passed to the section or department by the graduates playing the role of trainer.

The local government should work out an efficient system for training skills and dissemination knowledge.

On the job training (OJT) the other main capacity building method should be also pursued from the beginning of planning, implementation/construction of planned projects and operation and management of the infrastructure/system. Possible OJTs are management of accounting in water supply sector, management of process control of projects, preparation of land zoning as an institutional base for physical planning, identification of land ownership boundary, etc.

Currently not much planning of social economic infrastructure projects or operation and management of the projects take place due to budget limitations. In such difficult situations government personnel have a limited opportunity to participate in planning, implementation and operation and maintenance. However, recently some projects in the social economic sector have been funded by donors and international organizations. It is recommended that government staff participates in these donor/international organization funded projects to enhance their capacities.

In this Project the OJT method was designed in the inception stage and practiced through planning, implementation of the Urgent Development Projects. Experienced trainees are also required to disseminate their knowhow to others.

For such purpose local government should consider utilizing trainees after OJT as trainers.

It should be stressed that important capacity building that has not been carried out in this Project is the controlling or restriction and inducement of private activities in social economic infrastructure rehabilitation/reconstruction/ development in line with the Comprehensive Plan.

As for the controlling of private sector activities that is regarded as one of the major means of future vision realization, capacity building of personnel and department, it was not historically performed. More positive approach to realize capacity building project concerning controlling of private sector activities is recommended. In this regard, capacity building for urban system management to reinforce controlling of land use and building activities should be enforced.

#### **23.1.5 Timely Conduct of Feasibility Studies**

Although the Comprehensive Plan is formulated to give the detailed projects, some projects remain at only concept level or outline level. The details of the projects shall be determined by a feasibility study or basic design, including the project scope, construction method and schedule, cost, and if necessary, technical/economical/financial/environmental analyses. To complete the proposed projects as scheduled, feasibility study or basic design shall be conducted in advance.

The internal war revealed the weakness of Malakal Town in terms of self-sustainability. No commodities were sold at market and no food supply logistics functioned, and it became an urgent need to secure food for living. Such situations increase the urgency of the projects for the emergency medical service improvement and self-supportive food supply system improvement. Formulation of such projects should be detailed in F/S and promoted.

As such the projects, Project for Improving Support System for Emergency Medical Services, and Construction of New Port Project aiming at stable food supply are proposed in this Comprehensive Plan.

As for the Construction of New Port Project, the location and facility are not detailed as yet.

Strategic improvement of the transport network of river and road is crucial for not only for commodity price reduction and stability but also more essentially for securing foods and access improvement of emergency medical services.



## **23.2 IMPLEMENTATION**

### **23.2.1 Securing/Raising of Funds**

Realization of the social economic infrastructure plan requires a huge amount of money. Presently overseas development assistance and oil revenue are the major sources of the government for project implementation. The prospects of overseas development assistance after the reconstruction period is, however, unclear. Also not much is expected to come from the private sector investment under the present environment. As a result, the government might have to bear most of the budgetary burden for realization of the development plan.

Various measures for securing/raising funds shall be examined and introduced including finding of donor and international organization fund, promotion of private sector investment, increase in tax revenue based on the beneficiary-pay principle, utilization of communities' resources, and so on.

In South Sudan, local areas are not often selected for foreign assistance by donor and international organizations due to geographical condition. Local government should positively announce the needs for economic social infrastructure together with making effort on social stabilization and improvement the environment for investment.

To promote the private sector investment in the form of Public Private Partnership (PPP) or similar schemes and sole private sector participation for the projects expected to gain revenue such as power supply, water supply and sewerage service, improvement of environment for investment is vital, including market development, taxation preference policy, development of related infrastructure, and so on.

Policies such as beneficiary-pay and pay for damage and wear, and refurbishment of fare and taxation systems for public services are worthwhile to examine and introduce, especially to secure funds for operation, management and maintenance. Since in Malakal Town, people are not well aware of the beneficiary-pay principle for public services due to the past customary access, the beneficiary-pay principle should be carefully introduced because it is apt to be against the interest of low income groups to pay to use basic public services and against social redistribution of wealth.

As stated later, it is recommended to effectively utilize the communities' resources. This is effective in saving the expenditure and restraining the outward flow of funds as well as in redistributing wealth.

### **23.2.2 Adoption of Labour-based Construction for Job Creation**

Since presently in Malakal, job opportunities are very limited except government employment. The creation of job opportunities is of vital importance, especially for returnees who are expected to increase in number. One of the practical ways is to absorb unemployed population in the construction industry. A way of increasing job opportunities in the construction project is to introduce the labour-based construction method that was adopted in the urgent development project

in the road sector in this Project. In general, the labour-based construction method is more applicable to small scaled projects. It is recommended to take measures to encourage the adoption of the labour-based construction method to the projects suitable for this method, such as stipulating in the conditions of contract that the use of equipment be restricted.

**Table 23.2-1** shows the characteristics of the labour-based construction method as compared with other methods.

**Table 23.2-1 Comparison of Construction Methods**

| Item                              | Labour-intensive Construction Method                                 | Labour-based Construction Method  | Mechanized Construction Method                       |
|-----------------------------------|--|-----------------------------------|--|
| Composition of Labour & Equipment | Mainly labourers with tools  | Labourers with minimum equipment  | Mainly equipment with labourers                      |
| Quality                           | Not high in general  | Finished by equipment if required | High in general                                      |
| Required Time                     | Long   | Medium                            | Short  |
| Cost                              | Not inexpensive in many cases  | Relatively inexpensive            | Economical in case of large scaled construction      |
| Example of Suitable Work          | Low class road construction/maintenance, Low cost house construction |                                   | Large scaled project like highway, bridge, dam, etc. |

Source: JICA Project Team

### 23.2.3 Promotion of Local Construction Industries

Encouragement of local construction industry is important for the social and economic development of the area, resulting in many effects such as activation of the local economy and creation of employment opportunities.

The following types of construction industries are possible to be developed:

1. Consulting engineering company (undertaking consulting services such as feasibility study, detailed engineering design, construction supervision, etc., solely or jointly with foreign consultants)
2. Construction company (contracting to carry out construction works, solely or jointly with foreign construction companies)
3. Construction material supplier (supplying crushed aggregate, cement, pre-mixed concrete, pre-cast concrete product, pre-mixed asphalt concrete, etc.)
4. Engineering survey company (contracting to carry out topographic survey, geotechnical investigation, material quality/strength tests, etc.)
5. Educational service company (rendering educational services such as skill training on construction equipment operation, etc.)
6. Construction supporting industry (treating construction supporting services such as equipment lease, bond/insurance, financing/banking, etc.)

Present situation of local construction industry is as follows:

1. Equipment owned: Scarce

2. Construction/management technique: Scarce
3. Financial capacity: No operation money borrowed from bank
4. Credibility: No guarantee by bank

As a result, almost all money for construction related activities is going to foreign companies that are registered in Republic of South Sudan (ROSS). To improve this situation to develop local construction industry, the following government interventions are desirable:

1. To establish a construction equipment lease market system
2. To provide bond facilities to locally based enterprises of small to medium size
3. To establish a financing system for locally based enterprises
4. To conduct skill trainings and establish an official qualification system for special technicians, mechanics, equipment operators, etc.
5. To introduce tenders giving preference or limiting to locally based enterprises (or joint ventures with foreign firms)

It is a practical way to form joint ventures with foreign firms at first, and then gradually increase the role of local firms, as shown in **Table 23.2-2**.

**Table 23.2-2 Target Market Share in Construction Industry**

| Category                                     | Nature of Work  | Example of Work                                  |
|--|---|--|
| Solely Foreign Firm                          | Large scaled projects,<br>Projects needing high technique | Dam construction,<br>Bridge construction         |
| Foreign Firm and<br>Local Firm Joint Venture | Conventional Projects                                     | Highway construction,<br>Class A/B/C road const. |
| Solely Local Firm                            | Low mechanized construction method<br>applicable projects | Class D road const.,<br>Road maintenance         |

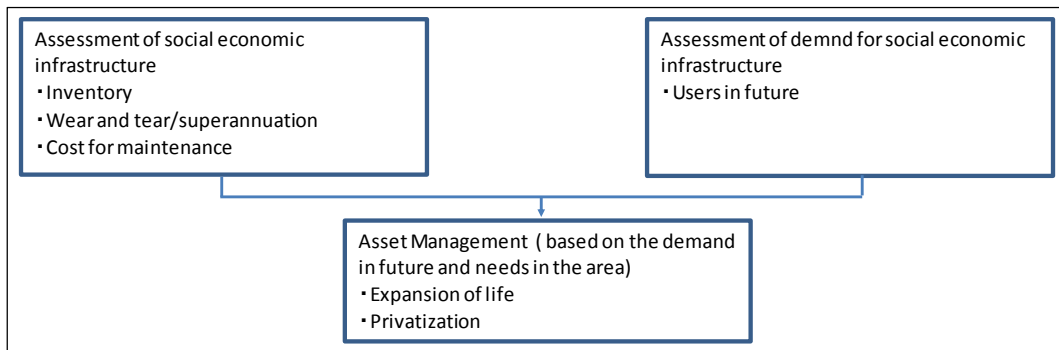
Source: JICA Project Team

### **23.3 OPERATION AND MANAGEMENT**

#### **23.3.1 Execution of Adequate Maintenance**

Investment on the economic social infrastructure is prioritized over the maintenance budget but in the developing country, adequate maintenance is very important. In Malakal Town, reconstruction cost of Malakal Port and rehabilitation cost are estimated at almost equivalent amount to the new construction cost.

Comprehensive and strategic management of social economic infrastructure shall be pursued and formulated even under the constrained budgetary situation. Degradation of social economic infrastructure over time shall be correctly assessed and an appropriate maintenance plan shall be formulated and implemented to maximize the benefit from social economic infrastructure.



Source: JICA Project Team

**Figure 23.3-1 Asset Management**

### 23.3.2 Discreet Encouragement of Private Sector Participation

Operation, maintenance and even management of social economic infrastructure can be entrusted to the private sector including non-governmental organization (NGO) and non-profit organization (NPO), communities and individual citizens. In the Foreword of “South Sudan Development Plan 2011-13”, it is recommended to work together to combine the comparative strengths of the public and private sectors, communities and individual citizens in order to realize what the Plan was envisaged to achieve.

However, private sector participation in operation, maintenance and management of social economic sector encounter following difficulties

1. The government without sufficient experience and knowledge in the sector, cannot give proper judgment and guiding of operation, maintenance and management;
2. Private sector has scarce experience and knowledge to operate, maintenance and manage social economic infrastructure; and
3. Proper legal framework is not prepared as yet

Therefore discreet steps for the introduction of private sector participation shall be taken project by project.

## 23.4 CONCLUSION

Recommendations were summarised below.

### a. Planning System

#### Authorization of the Comprehensive Plan and Incorporation into National/Regional Development Plan

It is essential for the social and economic infrastructure plan formulated under this Project to be authorized as a comprehensive plan for short and medium terms up to the year 2022, in order to systematically encourage the reconstruction and development of Malakal Town.

#### Amendment of the Plan According to Changing Situation

The plan shall be reviewed on occasions and adjusted according to the future change in social and

economic condition. Especially occurrence of internal war causes a drastic change of social and economic condition of Malakal Town. Revision of the Comprehensive Plan is required periodically.

#### Promotion of Capacity Building

It is recommended that government staffs positively participate in donor/international organization funded projects to enhance their capacities. A more positive approach to realize capacity building projects concerning controlling of private sector activities are recommended.

#### Timely Conduct of Feasibility Studies

To complete the proposed projects as scheduled, feasibility study or basic design shall be conducted in time.

### b. Implementation

#### Securing/Raising of Funds

Various measures for raising funds shall be examined and introduced including promotion of private sector investment, increase in tax revenue based on the beneficiary-pay principle, utilization of communities' resources, and so on.

#### Adoption of Labour-based Construction for Job Creation

One of the practical ways is to absorb unemployment population in the construction industry in Malakal. It is recommended to take measures to encourage the adoption of the labour-based construction method.

#### Promotion of Local Construction Industries

Encouragement of local construction industry is important for the social and economic development of the area, resulting in many effects such as activation of the local economy and creation of employment opportunities.

#### Utilization of Trainees in the Capacity Building Courses

Skills learnt during capacity building training should be passed on to departments by the graduates of such course acting as trainers.

### c. Operation and Management

#### Execution of Adequate Maintenance

Adequate maintenance is very important to keep the facilities in good operational condition and to minimize the life cycle cost of the facilities.

#### Discreet Encouragement of Private Sector Participation

Discreet steps for the introduction of private sector participation shall be taken project by project as guided in the Foreword of "South Sudan Development Plan 2011-13".