

CHAPTER 6

COMMUNITY-BASED DEVELOPMENT

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6.1 CHARACTERISTICS OF COMMUNITIES IN JUBA TOWN AREA

6.1.1 Current Community Structure in Juba Town Area

Juba Town Area located within Juba County, headed by the Commissioner, consists of three town Payams named Juba Town Payam, Kator Payam, and Munuki Payam. These Payams are headed by executive directors. Under the Payam residential quarter having its chief is a community unit. All the leaders mentioned earlier possess arbitrator role or judicial function. This organizational structure and functions is a legacy of the British rule. Figure 6.1-1 shows the locations of residential areas.

Juba Town Payam embraces old city center, GOSS's and the Central Equatoria State's governmental offices, and major part of riverside of the Nile in the area. As shown in Figure 6.1-1, the area is delineated by the road connecting the bridge crossing the Nile and the road passing in front of currently used Juba University plot going north to Telekeka. Northern delineation is difficult to be identified due to the same reason to the residential area defining. In its western end IDPs from other areas are allotted the land as temporary and permanent residents. Congonese refugees, who have lived four decades and have to go back to their own country, reside certain area within southeastern part of the Payam.

Kator Payam occupies southern part of the area. The Catholic Cathedral which is the largest church in Southern Sudan is located in the center of the Payam. In the upper residential are of the Payam, the Konyokonyo Market is located. This traditional market emerged during the civil war as the merchants who used be based in the old city center of Juba Town Payam relocated there. Southern part of the Payam is basically empty lands except the Lologo Residential Quarter near the Nile. Though current status of IDPs are not certain, it is accommodating IDPs coming from other areas.

Munuki Payam is expanding towards the eastern part of the area which did not use to be regarded as the Town Area before. This area have been accommodating both IDPs from other areas and IDPs returning home, and other people who wish new establishment of their lives in the Juba Town Area. The acceptance is expected to be continued. A newly emerged main market called Custom is located at the end of the Juba – Yei – Uganda Road which is currently the artery road for the physical supply to Juba Town Area.

The organization of Payam offices is shown in Figure 6.1-2.

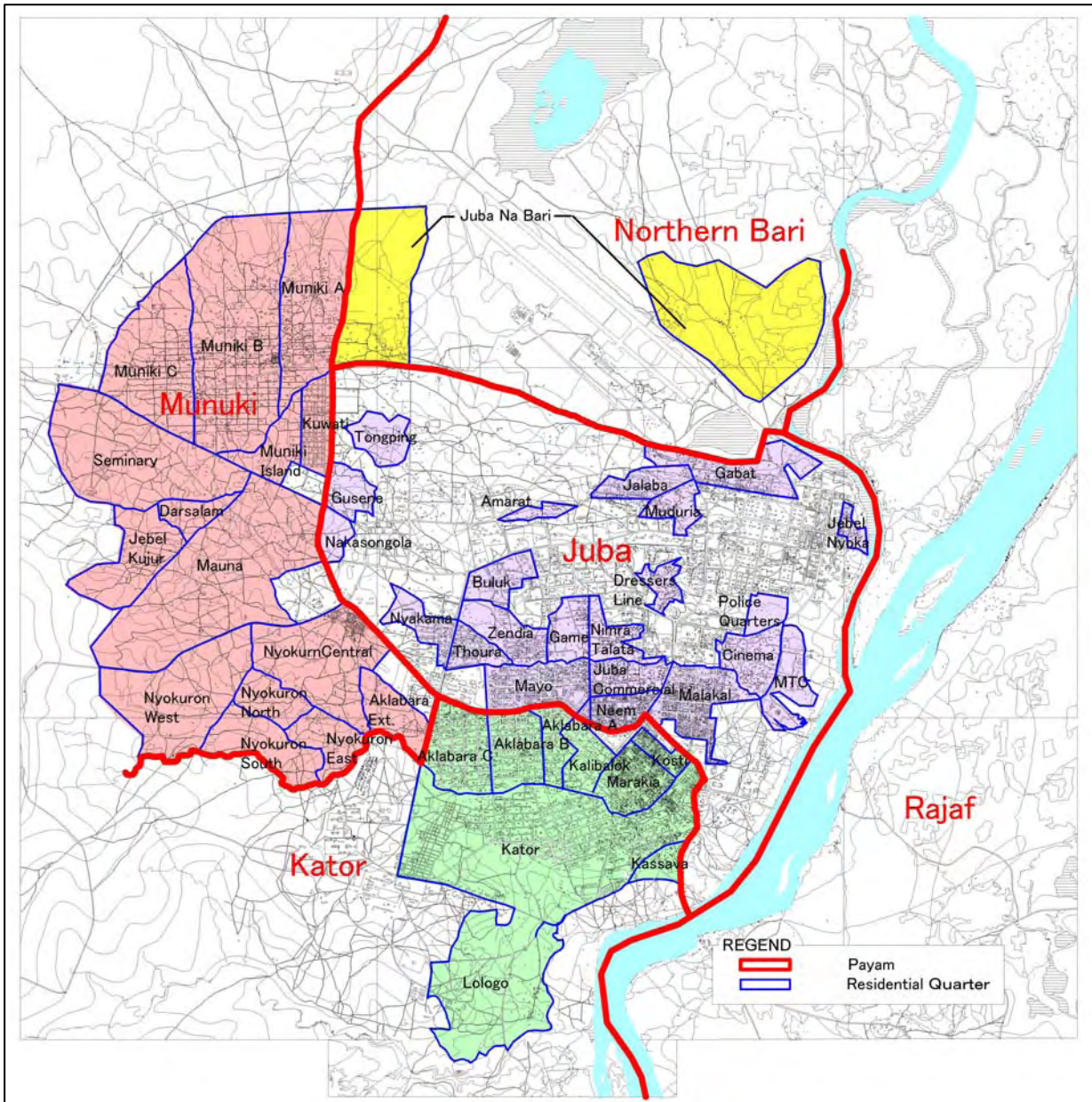
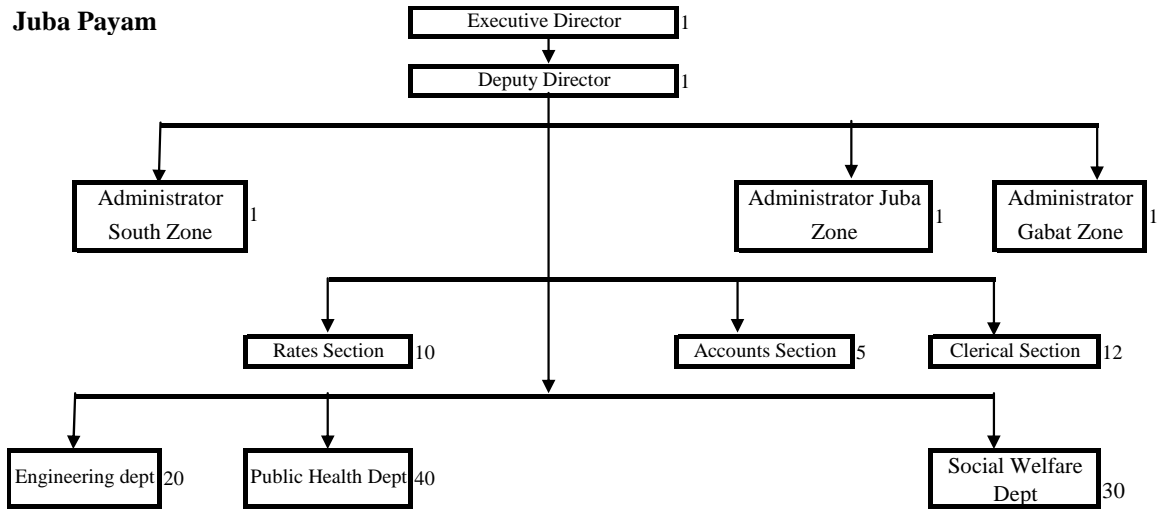


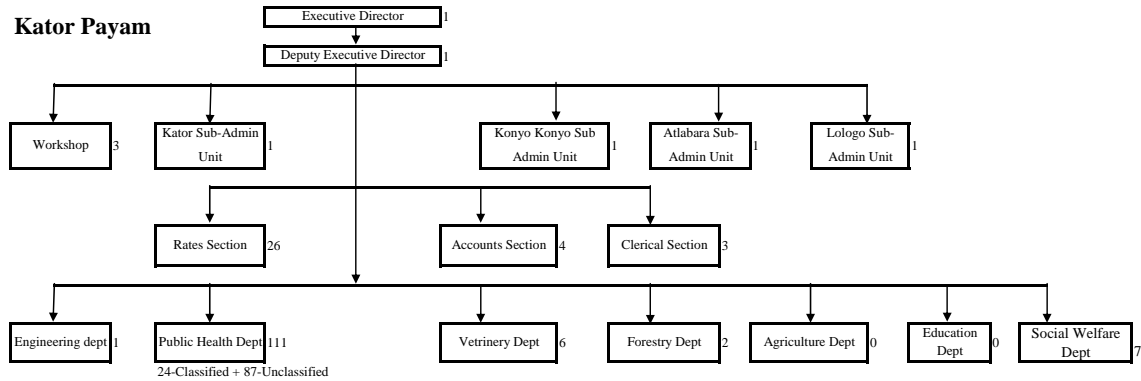
Figure 6.1-1 Location of Residential Area

Juba Payam



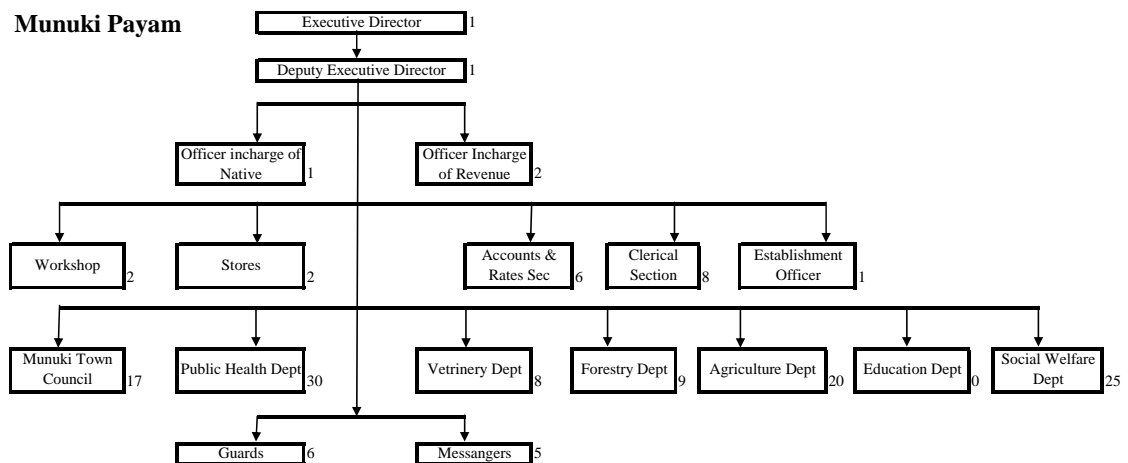
Note : Numbers indicate the number of staff of each position.
 In addition to the above chart, there are 50 casual labourers.
 Total Number of Employees = 172

Kator Payam



Note : Educational Dept is handled directly by State Ministry of Education.
 Numbers indicate the number of staff of each position.
 In addition to the above chart, there are 55 casual labourers.
 Total Number of Employees = 224

Munuki Payam



Note : Numbers indicate the number of staff of each position.
 Educational Dept (staffed with 57 Teaching Staff & 56 Support Staff) is handled directly by State Ministry of Education.
 In addition to the above chart, there are 3 more positions (Inspector of Account, Inspector of Rate & Book Keeper), but not occupied.
 Total Number of Employees = 144

Figure 6.1-2 (1/2) Organization Charts of Payam Offices

Northern Bari Payam

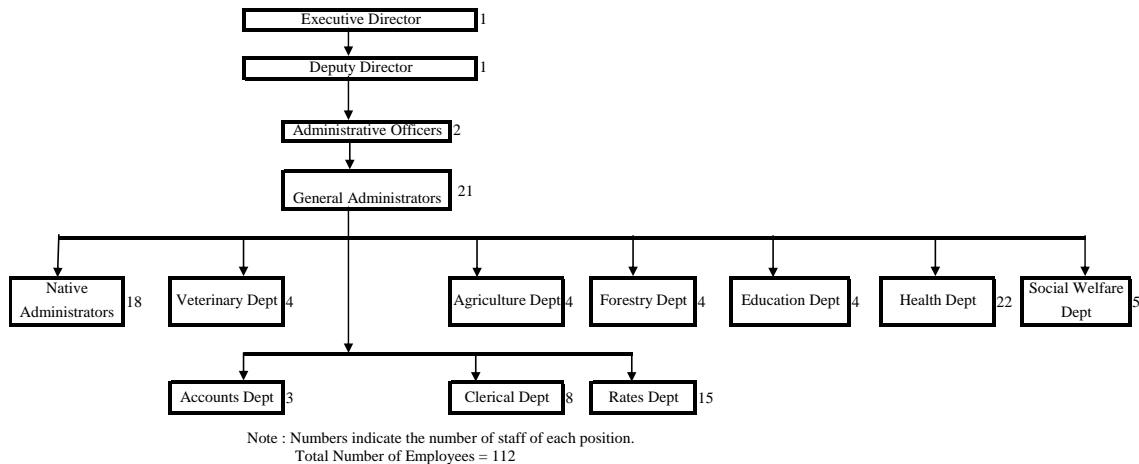


Figure 6.1-2 (2/2) Organization Charts of Payam Offices (Continued)

The basic character of the communities in Juba Town Area is urban. Residents are mixture in terms of religious beliefs, tribe, and occupation with certain degree of segregation among economic levels. Cohesion of the residents is not so strong compared to the rural setting.

Although the majority of people are Christian, a few Moslem people and people who believe traditional African religions characterized by animism are living without segregation in most of the residential areas. The same condition exists in the tribal aspect. While Bari people who are indigenous in the region occupy large segment of population, people originated from other tribes are living in mixture basically. Inter-tribal marriage among them is common. Some areas are occupied by IDPs from specific places while these areas are basically smaller than the residential quarter unit.

The people in Juba are generally poor. Differences in terms of affordability of housing, however, have created natural and slight segregation of residents by the economic level. Large part of the people earn their living by non-urban type activities since job opportunities in the Area are limited and in some cases they possess lands or land use rights in outside the Area. These activities include collection of construction materials including stones, collection of firewood, of fishery, horticulture and agriculture, cattle and goat grazing. Cattle and goat grazing is popular even within the Area.

Residential Organizations

Each residential unit selects and appoints the chief by the decision of the residents themselves according to their tradition. In case there is no adequate person to be the chief in the unit, the chief is selected from vicinity unit’s residents. There are some chiefs serving for two

residential units. These chiefs well grasp conditions of their units including their residents and living environments. The chiefs hold arbitrator role or judicial function as stated in 6.1.1. This community organizational structure was formalized under the British rule.

This self-governing system seems to be working effectively. Most of the communities have been managing their daily lives under this system although living conditions have not been well improved under the severe circumstances. They have been responding to the assistance offers from NGOs and the government's requests. Activities of the international NGOs stated in 6.3 are mainly utilizing the system.

Religious organizations especially Christian missionaries have been playing important role since the British rule in aspects of community lives and education. These churches include those of Moslem. In association with international institutions and NGOs, these religion organizations have been relieving the needy people and providing social services including education and health services in the communities. Also some age and gender-specific organizations are active in the society covering wider spatial area than the residential unit, like the religious organizations.

Aerial coverage of smallest activity units of these organizations is usually smaller than the residential unit. The residential unit in the Juba town area can be regarded as an aggregate of these groups of people headed by the chief.

6.1.2 Profile of Community

(1) General Information

In this Study, residential quarter is considered to be a community unit. Table 6.1-1 shows the general information of residential quarters, mainly based on the information obtained through the interview to Payam Officers.

Table 6.1-1 General Information on Community

Payam	Residential Quarter	Area (Ha.)	2006 Population	Living Level	No. of Schools (1)	No. of Medical Facilities (2)	Habitation History (3)	Area Plotting (4)	IDP Condition		Remarks
									Share (5)	Permanence (6)	
Juba	1 Juba Commercial	8.59	1,567	Poor	3-S		Old	Mixed	Mixed	Mixed	
	2 Dressers Line	21.14	4,378	Poor			Old	Unplotted	Mixed	Mixed	
	3 Gabat	15.77	1,486	Poor		1-HC	Old	Plotted	Mixed	Mixed	Juba Market
	4 Malakal	44.51	4,872	Better	1-P		Old	Plotted	Few	-	
	5 Cinema	33.11	4,463	Better	3-P	1-Ho, 1-HC	Old	Unplotted	Many	Mixed	Church
	6 Nimra Talata	25.63	5,145	Better			Old	Unplotted	Mixed	Mixed	
	7 Neem	17.19	3,134	Poor	1-P, 1-T		Old	Plotted	Few	-	
	8 MTC	19.25	1,516	Poor		1-HC	Old	Unplotted	Many	Mixed	Juba Studium, MTC
	9 Amarat	16.13	1,259	Better			Old	Plotted	Few	-	
	10 Police Quarters	8.79	620	Poor			Old	Plotted	Few	-	
	11 Buluk	19.87	2,769	Poor	1-P, 1-T	1-Ho	Old	Unplotted	Mixed	Mixed	
	12 Jalaba	21.32	1,976	Better	1-P		Old	Plotted	Few	-	
	13 Tongping	35.00	3,725	Poor	2-P	2-HC	New	Unplotted	Many	Temporary	
	14 Zenda	21.73	2,968	Poor	2-P	1-Ho	Old	Plotted	Mixed	Mixed	
	15 Nyakama	25.02	1,971	Poor			Old	Plotted	Mixed	Mixed	
	16 Jebel Nyoka	7.25	676	Very poor			Old	Unplotted	Many	-	
	17 Thoura	12.98	2,602	Poor	2-P	1-Ho	Old	Plotted	Few	-	
	18 Mayo	39.06	5,631	Poor			Old	Plotted	Few	-	
	19 Muduria	17.28	1,766				Old	Unplotted	Mixed	Mixed	
	20 Gusene	35.00	3,725		2-P		New	Unplotted	Few	Permanent	
	21 Nakasongola	10.55	1,950				New	Unplotted	Many	Permanent	
	22 Game	22.43	4,002	Poor		1-Ho	Old	Unplotted	Mixed	Mixed	
Kator	1 Lologo	82.53	7,175	Poor		1-Dp	New	Unplotted	Mixed	Mixed	
	2 Marakia	43.74	10,199	Average	3-P	1-HC	Old	Plotted	Few	-	
	3 Kosti	15.68	4,107	Average			Old	Plotted	Few	-	
	4 Aklabara A	13.57	1,720	Better	Total 4-P	1-Dp	Old	Plotted	Few	-	
	5 Aklabara B	29.86	4,963	Better			Old	Plotted	Few	-	
	6 Aklabara C	38.91	6,209	Better			Old	Plotted	Few	-	
	7 Kator	208.39	24,386	Better	6-P, 1-S	1-HC, 1-Dp	Old	Plotted	Few	-	Konya Konya Market, Church
	8 Kalibalok	15.27	1,935				Old	Plotted	Few	-	
	9 Kassava	13.13	1,311	Poor			New	Unplotted	Mixed	Mixed	
Munuki	1 Munuki A	103.42	6,637				New	Plotted	Mixed	Permanent	
	2 Munuki B	228.70	9,368		3-P	1-HC	New	Plotted	Mixed	Permanent	Munuki Market
	3 Munuki C	168.60	6,107		2-P		New	Plotted	Mixed	Permanent	
	4 Seminary	124.30	7,576				New	Unplotted	Mixed	Mixed	Seminary
	5 Darsalam	24.66	2,494	Poor			New	Unplotted	Mixed	Mixed	
	6 Jebel Kujur	12.33	1,247	Poor		1-HC	New	Unplotted	Mixed	Mixed	
	7 Mauna	123.33	13,953		1-P	1-HC	New	Unplotted	Mixed	Mixed	
	8 Nyokuron West	85.05	3,504	Poor	1-P		New	Unplotted	Mixed	Mixed	
	9 Nyokuron South	24.92	3,335	Poor			New	Unplotted	Mixed	Mixed	
	10 Nyokuron East	20.99	2,808	Poor			New	Unplotted	Mixed	Mixed	
	11 Nyokuron North	19.68	2,633	Poor			New	Unplotted	Mixed	Mixed	
	12 Kuwati	19.67	2,239	Better	1-P	1-HC	New	Plotted	Few	-	
	13 Munuki Island	17.60	1,927				New	Unplotted	Mixed	Mixed	
	14 Nyokuron Central	66.47	9,681	Poor			New	Unplotted	Few	-	Custom Market
	15 Aklabara Ext.	31.88	4,263	Poor			New	Unplotted	Few	-	
Northern Bari	1 Juba Na Bari	25.20	3,436	Poor		1-HC	New	Unplotted	Few	-	

Note :

- (1) P:Primary school, S:Secondary school, T:Technical school
- (2) Ho:Hospital, HC:Health Center, Dp:Dispensary
- (3) Old:Old town, New:New town(newly inhabited)
- (4) Plotted:Divided into plots, Unplotted:Not divided into plots, Mixed:Plotted and unplotted mixed
- (5) Many:Many IDPs, Few:Few IDPs(mainly original dwellers), Mixed:IDPs and original dwellers mixed
- (6) Permanent:Mainly settling, Temporary:Mainly temporary dwelling, Mixed:Settling and temporary mixed

Source :

- Area, Population : Estimated by Study Team
 Others : Hearing at Payam Offices supplemented by the Community Survey conducted by Study Team

(2) Classification of Community

Residential quarters are classified in order to distinguish the characteristics of the community, as shown in Table 6.1-2, according to the following four factors :

- Habitation history : Either the area formed as a residential area since long time ago (“Old Town”), or the area inhabited lately (“New Town”).
- Area plotting : Either the area divided into residential plots (“Divided into plots”), or not (“Not divided into plots”), or both mixed (“Plotted/unplotted mixed”).

- Share of IDPs : Share of IDPs is relatively high (“Mainly IDPs”), or small (“Mainly original dwellers”), or IDPs and original dwellers mixed (“IDPs/original dwellers mixed”).
- Permanence of IDP dwelling : Most IDPs intend to settle permanently (“Mainly settling”), or dwell temporarily (“Mainly temporary dwelling), or both mixed (“Settling/temporary mixed”).

Table 6.1-2 Classification of Community

Habitat History Area Plotting IDPs Share & Dwelling Pattern		Old Town			New Town		
		Divided into plots	Plotted/unplotted mixed	Not divided into plots	Divided into plots	Plotted/unplotted mixed	Not divided into plots
Mainly IDPs	Mainly Settling					(J) Nakasongola	
	Mainly Temporary Dwelling					(J) Tongping	
	Settling/Temporary Mixed			(J) Cinema (J) MTC			
	Unknown			(J) Jebel Nyoka			
Mainly Original Dwellers	Mainly Settling	(J) Malakal (J) Neem (J) Amarat (J) Police Quarters (J) Jalaba (J) Thoura (J) Mayo (K) Marakia (K) Kosti (K) Aklabara A (K) Aklabara B (K) Aklabara C (K) Kator (K) Kalibalok			(M) Kuwati	(J) Gusene (M) Nyokuron Central (M) Aklabara Ext. (B) Juba Na Bari	
	Mainly Temporary Dwelling						
	Settling/Temporary Mixed						
	Unknown						
IDPs/ Original Dwellers Mixed	Mainly Settling				(M) Munuki A (M) Munuki B (M) Munuki C		
	Mainly Temporary Dwelling						
	Settling/Temporary Mixed	(J) Gabat (J) Zendia (J) Nyakama	(J) Juba Commercial	(J) Nimra Talata (J) Buluk (J) Muduria (J) Game		(K) Lologo (K) Kassava (M) Seminary (M) Darsalam (M) Jebel Kujur (M) Mauna (M) Nyokuron West (M) Nyokuron South (M) Nyokuron East (M) Nyokuron North (M) Munuki Island	
	Unknown			(J) Dressers Line			

(J) : Juba Payam

(K) : Kator Payam

(M) : Munuki Payam

(B) : Northern Bari Payam

□ : Residential quarters selected for the community survey

(3) Community Survey

For the residential quarters selected as the “representative” of each category in the classification, the survey on their characteristics was conducted through the interview with the chiefs of respective quarters. The residential quarters selected for the survey are shown in Table 6.1-2. The survey items are as follows :

- Population and average family size
- Tribe and religion

- Information on IDPs, including :
 - Percentage of existing IDPs coming from other places and their will to return to the place of origin
 - Resettlement of expected returnees presently evacuated to other places and their acceptability
- Existing social facilities
- Present condition of water and electricity supply
- Means of earning livelihood of inhabitants
- Existing community organization
- Performer of social activities
- Development needs for improvement of living condition of inhabitants based on desire of community

The results of the community survey are summarized in Table 6.1-3.

Table 6.1-3 (1/2) Summary of Community Survey

Payam		Juba					
Residential Quarter		Cinema	Tongping	Zendia	Thoura	Gusene	Game
General Characteristics (according to Payam officers)	Habitation History	Old Town	New Town	Old Town	Old Town	New Town	Old town
	Area Plotting	Not divided into plots	Not divided into plots	Divided into plots	Divided into plots	Not divided into plots	Not divided into plots
	IDP/Original Dweller Ratio	Mainly IDPs	Mainly IDPs	IDPs/original dwellers mixed	Mainly original dwellers	Mainly original dwellers	IDPs/original dwellers mixed
	Permanence of IDPs	Settling/temporary mixed	Mainly temporary dwelling	Settling/temporary mixed	Mainly settling	Mainly settling	Settling/temporary mixed
Population		4,000	5,000	2,000	3,000	3,000	4,500
Average Family Size (persons/family)		12	22	15	16	21	24
Tribe		Bari(70%), Acholi(20%), Lokoyami(10%)	Moros(70%), Jur(20%), Zande(10%)	Nuer(40%), Dinka(30%), Mondari(30%)	Lotuko(40%), Pojulu(30%), Lokoro(30%)	Nyangwara(40%), Bari(30%), Acholi(20%)	Lokoro(30%), Lotuko(30%), Acholi(10%)
Religion		Christian(90%), Muslim(10%)	Christian(95%), Muslim(5%)	Christian(80%), Muslim(15%), Others(5%)	Christian(90%), Muslim(10%)	Christian(80%), Muslim(20%)	Christian(95%), Muslim(5%)
Existing IDPs Coming from Other Places	Percentage of Total Population	50%	90%	Few	Few	Few	Less than half
	Place of Origin	Katigir, Kassava, Neighbouring countries	Mundri, Miridi, Yambio, Tomba	Kenya, Uganda, Congo, Khartoum	Katigir, Khartoum	Kenya, Uganda, Khartoum	Katigir, Khartoum
	Will to Return	Yes	Yes	Yes	Yes	Partly yes, partly no	Partly yes, partly no
Expected Returnees from Other Places	Expected Number	?	?	?	?	750	-
	Present Domicile	Katigir, Kassava, Neighbouring countries	?	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	-
	Community's Policy on Acceptance of Returnees	Totally acceptable	Totally acceptable	Totally acceptable	Totally acceptable	Totally acceptable	Not acceptable (due to wildlife soldiers)
Existing Social Facilities		3-Primary School, 1-Hospital, 1-Health Center	2-Primary School, 2-Health Center	2-Primary school, 1-Hospital	2-Primary school, 1-Hospital	2-Primary school	1-Hospital
Means of Getting Water		Buying	Common well(90%), Others(10%)	Common well(80%), Buying(20%)	Common well(80%), Buying(20%)	Common well(80%), Piped water(15%), Buying(5%)	Buying(100%)
Condition of Electricity Supply		None	None	None	None	None	None
Means of Earning Livelihood		Employment of Gove., Small scale manufacturing	Agriculture, Employment of Gove.	Livestock, Employment of Gov.	Livestock, Employment of Gov.	Employment of Gov.	Employment of Gov.
Existing Community Organization		None	Women's union	None	None	Youth union, women's union	None
Performer of Social Activities	Cleaning of Public Places	Payam	Community	Payam	Payam	Community	Payam
	Ditch Cleaning	Community	Community	Payam	Payam	Community	Community
	Minor Repair of Roads	Payam	Payam	Payam	Payam	Payam	Community
Needs for Improvement of Living Condition, Desired by Community	Infrastructure	Road, Electricity, Waste management, School, Public toilet	No need because of temporary living area	Road, Water, Electricity, Waste management, Public toilet	Road, Water, Electricity, Waste management, Public toilet	Road, Water, Electricity, Waste management, Public toilet	Road, Water, Electricity, Waste management, School, Public toilet
	Vocational Training	-	-	-	-	-	-
	Empowerment of Community Organization	-	-	-	-	-	-
	Others	-	-	-	-	-	-
Remarks							

Table 6.1-3 (2/2) Summary of Community Survey

Payam		Kator		Munuki		Northern Bari	
Residential Quarter		Lologo	Kator	Munuki B	Mauna	Kuwati	Juba na Bari
General Characteristics (according to Payam officers)	Habitation History	New Town	Old Town	New Town	New Town	New Town	New Town
	Area Plotting	Not divided into plots	Divided into plots	Divided into plots	Not divided into plots	Divided into plots	Not divided into plots
	IDP/Original Dweller Ratio	IDPs/original dwellers mixed	Mainly original dwellers	IDPs/original dwellers mixed	IDPs/original dwellers mixed	Mainly original dwellers	Mainly original dwellers
	Permanence of IDPs	Settling/temporary mixed	Mainly settling	Mainly settling	Settling/temporary mixed	Mainly settling	Mainly settling
Population		4,500	2,987	4,000	8,000	3,500	7,500
Average Family Size (persons/family)		15	16	24	24	17	23
Tribe		Letuka(70%), Dinka(20%), Others(10%)	Bari(40%), Zande(40%), Pujulu(20%)	Bari(80%), Nyangwara(15%), Zande(5%)	Bari(45%), Kakua(35%), Mondari(20%)	Mundari(70%), Bari(10%), Others(20%)	Bari(80%), Lotukas(10%), Moros(10%)
Religion		Christian(90%), Muslim(5%), Others(5%)	Christian(80%), Muslim(20%)	Christian(90%), Muslim(5%), Others(5%)	Christian(75%), Muslim(25%), Others(5%)	Christian(90%), Muslim(5%), Others(5%)	Christian(90%), Muslim(5%), Others(5%)
Existing IDPs Coming from Other Places	Percentage of Total Population	Few	Few	Few	Few	Few	Few
	Place of Origin	Kenya, Uganda, Khartoum	Kenya, Uganda, Khartoum	Neighboring tribes & countries, Khartoum	Neighboring tribes & countries, Khartoum	Neighboring tribes & countries, Khartoum	Eastern Equatoria, Kajo Keji, Khartoum
	Will to Return	Partly yes, partly no	Yes	Partly yes, partly no	Yes	Partly yes, partly no	Yes
Expected Returnees from Other Places	Expected Number	?	?	?	?	?	?
	Present Domicile	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	Kenya, Uganda, Congo, Khartoum	Eastern Equatoria, Kajo Keji, Khartoum
	Community's Policy on Acceptance of Returnees	Totally acceptable	Totally acceptable	Totally acceptable	Totally acceptable	Totally acceptable	Totally acceptable
Existing Social Facilities		1-dispensary	4-Primary School, 1-Secondary school, 1-Hospital	2-Primary school, 1-Hospital, 1-Public toilet	1-Primary school, 1-Health Center	1-Primary school, 1-Health Center	1-Health Center
Means of Getting Water		River water(100%)	Common well(80%), Buying(10%), River(10%)	Common well(90%), Buying(20%),	Common well(90%), Buying(10%)	Common well(90%), Buying(5%), River(5%)	Common well(20%), River(80%)
Condition of Electricity Supply		None	None	None	None	None	None
Means of Earning Livelihood		Employment of Gove.	Employment of Gove.	Labor, Employment of Gov., Vendor	Livestock, Fishery, Labor, Employment of private & Gov., Manufacturing, Vendor	Employment of Gov.	Employment of Gov.
Existing Community Organization		None	Youth union, women's union	None	Youth union, women's union	None	Youth union, women's union
Performer of Social Activities	Cleaning of Public Places	Payam	Nobody	Community	Payam	Community	Community
	Ditch Cleaning	Nobody	Payam	Community	Community	Community	Community
	Minor Repair of Roads	Nobody	Payam	Payam	Community	Payam	Payam
Needs for Improvement of Living Condition, Desired by Community	Infrastructure	Road, Water, Electricity, School, Public toilet	Road, Water, Electricity, School, Public toilet	Road, Water, Electricity, Waste management, School, Public toilet	Road, Water, Electricity, Public toilet	Road, Water, Electricity, Waste management, School, Public toilet	Road, Water, Electricity, Waste management, School, Public toilet
	Vocational Training	-	-	-	-	-	-
	Empowerment of Community Organization	-	-	-	-	-	-
	Others	-	-	-	-	-	-
Remarks							

(4) Characteristics of Community

Based on the information from Payam officers and the community survey, the communities in the Study Area are characterized as follows :

Population and Family Size

Population and its density of each residential quarter are shown in Figure 6.1-3. The range and average by Payam are summarized in Table 6.1-3.

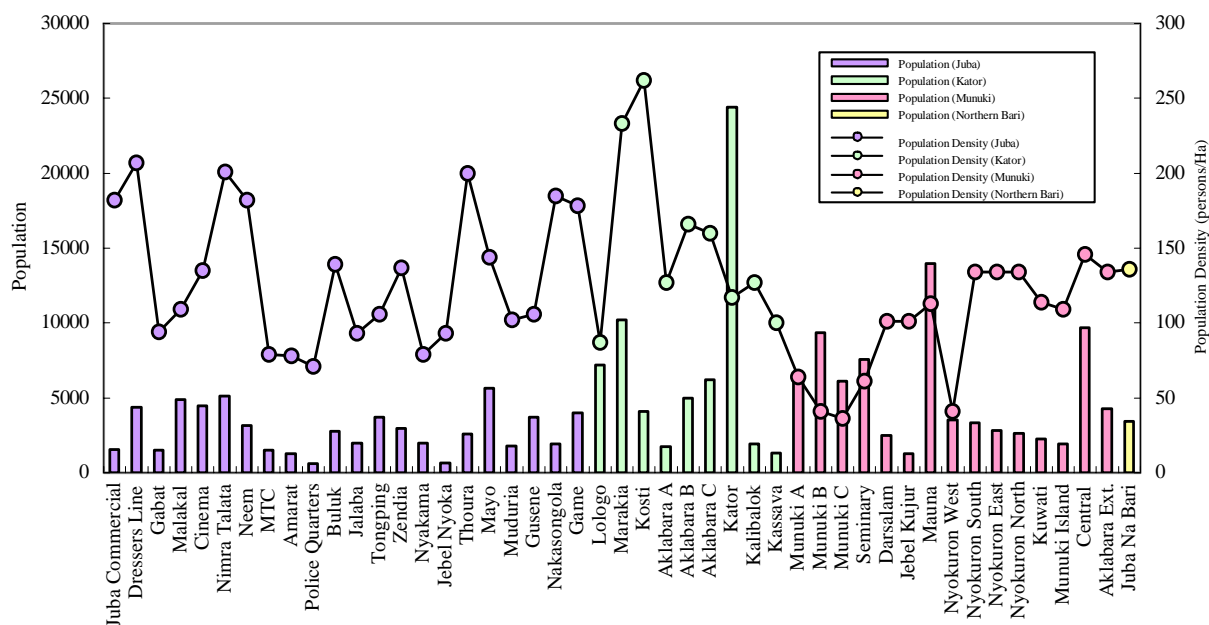


Figure 6.1-3 Population and Population Density

Table 6.1-4 Range and Average of Population and Population Density

Payam	Population		Population Density (persons/Ha)	
	Range	Average	Range	Average
Juba	620 – 5,631	2,827	71 – 207	130
Kator	1,311 – 24,386	6,890	87 – 262	134
Munuki	1,247 – 13,953	5,185	36 – 146	73
Northern Bari	3,436 – 3,436	3,436	136 – 136	136
Total	620 – 24,386	4,370	36 - 262	101

The population size per quarter in Juba Payam is much smaller than those in Kator and Munuki Payams, while the population density in Munuki Payam is much smaller than those in other three Payams.

Average family size varies from 12 to 24 persons, composed of husband and wife, 2 grand parents, 7 children and 7 relatives on average.

Tribe

There are a wide variety of tribes, 14 tribes in the 12 sample residential quarters. Several tribes live in mixture in each quarter. The largest tribe is Bari accounting for 35 % of total population of the 12 quarters, followed by Lotuko with 11 %.

Religion

The majority are Christians accounting for 87 %, while Muslims account for 11 %. Both believers live in mixture in each quarter.

Information on IDPs/Refugees

According to the information from Payam officers, residential quarters where many IDPs/refugees reside are five in Juba Payam out of 47 quarters. In the 12 sample quarters, IDPs/refugees population is not so many though not zero, except for Tongping, Cinema and Game where IDPs/refugee population accounts for about 90%, 50% and nearly 50%, respectively, of the total population. They came from various areas : adjacent areas in the Southern Sudan, Khartoum and neighboring countries such as Kenya, Uganda and Congo. Many of them want to return to the places of origin.

As for the returnees from other places, almost all quarters stated that they will accept the returnees though their expected numbers are practically not known.

School and Medical Facilities

In the sample quarters, there are 1.6 primary schools and one hospital/health center/dispensary per quarter on average.

Means of Getting Water

55% of people get water from common wells, 23 % buy untreated water carried by water tank truck and 22% get water directly from the River Nile. In Lologo, all people rely on the river water and 80% in Juba Na Bari do the same.

Electricity Supply

No people in the 12 sample quarters is supplied with electric power.

Means of Earning Livelihood

One of main means of earning livelihood is the employment by the government in all the sample quarters. Other main means are livestock, small scale manufacturing, labor, vendor and agriculture.

Community Organization

5 quarters out of 12 organize youth unions / women's unions and remaining 7 quarters have no community organization.

Social Activity

According to Payam Offices, they take charge of cleaning of public places including roads and minor repair of roads but ditch cleaning is left without being done. According to some residential quarters, those activities are being done by inhabitants themselves.

Needs for Improvement of Living Condition

Except Tongping in Juba Payam which stated that the improvement of infrastructure is not needed because it is a temporary living area, other 11 residential quarters desire the basic infrastructure to be constructed/improved. Out of these 11 quarters, the following number of quarters stated that the following infrastructures are needed to be very urgently constructed/improved :

- Road : 11 quarters
- Electricity supply : 11 quarters
- Public toilet : 11 quarters
- Water supply : 10 quarters
- Waste management : 7 quarters
- School : 7 quarters

All residential quarters showed few interests in other fields than infrastructure, such as vocational training, empowerment of community organization, etc. They seem not to be aware of the importance of such fields.

6.1.3 Living Conditions of the Communities

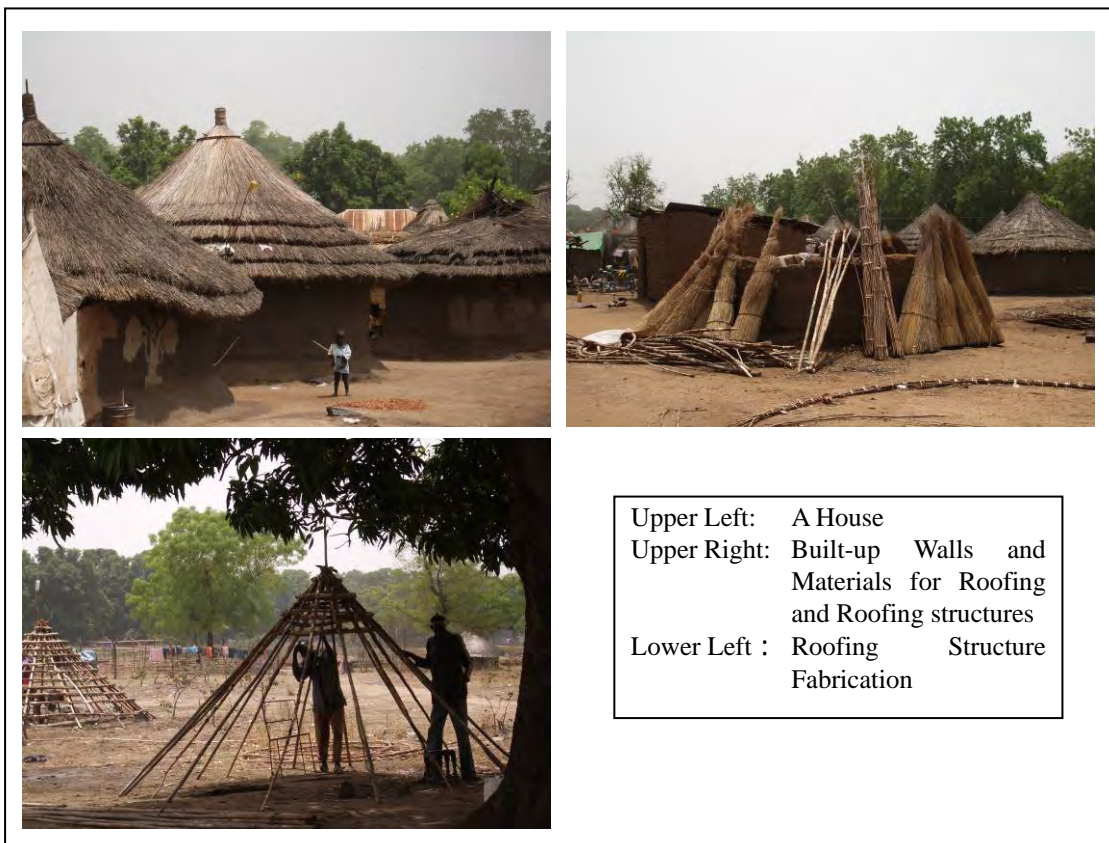
As already stated in the previous Chapters, almost all the social and infrastructural services are inadequate all over the communities in Juba Town Area. Health, education, sanitation, water supply, and electricity are under-served to the community except for public security. Improvement of their livelihood is indispensable.

Number of health center, which is supported by a church or an international NGO, is not enough to cover the entire communities. Schools also heavily rely on churches and international NGOs. There are many out-of-school school-age children and adults who did not receive primary education.

Sanitation and water supply are underserved. The Area lacks sewerage system while installation of latrine is very limited. Lack of waste collection and disposal system for the Area makes its sanitary condition worse. People fairly obtain water by a limited piped water system, hand pumps and rivers though the use of the unprocessed Nile water by the residents nearby the Nile causing outbreak of cholera in the specific area. Electricity supply covers limited areas with insufficient capacity.

Since job opportunities are very limited in the Area as stated in 6.1.1, people are basically poor. There are many families headed by woman due to the civil war. Many people are earning cash by collecting firewood and house building materials, and catching fish. People living in town area go to vicinity areas for horticulture, and cattle and goat grazing. It is common to carry out these activities even in the Town Area. People without education and job skills can get only simple laboring jobs. Trainings and education contributing to people's earning capabilities in the urban setting are necessary for their sustainable livelihood improvement.

Prevailing housing in the town for new comers are shown in the pictures below. These traditional houses are simple and made by themselves which are usually seen in rural setting. Sunburned bricks are used for walls buildup with plastering. Roofing is completed by thatches on a wooden structure. Quality of houses building is very poor.



6.2 BASIC NEEDS FOR COMMUNITY DEVELOPMENT

6.2.1 Community-Based Development Aspects

Community-based development deals with multifaceted aspects of people's needs. The followings are the typical aspects:

- Water Supply and Sanitation which stand for supplying potable water and sewerage system or latrine provision,
- Power Supply which includes electricity and gas as energy source for light, heat, and driving force,
- Living Physical Environment Improvement in housing, feeder road, drainage, solid waste management,
- Health Service and Education to provide medical and health facility and services in association with health education,
- Formal and Informal Education for school-age children and adults,
- Community Organizing to promote community-based activities with broader participation of community members, and
- Income Generation contributing to improve livelihood improvement of community members.

Water supply and sanitation, power supply, physical living environment improvement, health service and education, and formal and informal education are rather straightforward aspects in terms of visibility while community organizing and income generation involve certain ambiguity. In this report following definitions are applied for these two:

- Community Organizing aspect includes activities to enhance community members involvement for development of their own community such as mobilizing and/or organizing community people for any kind of community development activities in their community, and
- Income Generation aspect includes activities such as any kind of skills training aiming for earning money i.e. skills and knowledge regarding carpentry, masonry, mechanic, electricity wiring, car maintenance and repair, sewing, hairdressing, agriculture, livestock, beekeeping, merchandizing, any kind of service provision, and so on.

Combined implementation of several aspects as one program or one project is common or natural. A water supply project as in community development context may associate community organizing type of activities to formulate and to functioning community organization for operations, management, and maintenance of the installed facility for the water supply itself. It is same for power supply and health service. Education in association with community organizing and income generation is typical.

6.2.2 Assessment of the Community-Based Development Needs for the Current Communities

Needs of community-based development for the current residential areas are assessed from the following viewpoints:

- Needs of the community people,
- Adequateness of the aspect to be dealt with community based development approach in Juba Town Area’s community setting or in the Capital Town setting,
- Degree of emergency of need, and
- Relevance with the community structure in Juba Town Area.

Although “Adequateness” with the Juba Town setting and the “Relevance” with the community structure describe two side of the issue to certain degree, it is judged that articulation of issues by these double-sided, similar facets are still of same significance with other criteria. In some way all these are also inter-related.

As shown in the Table 6.2-1 needs for the community-based development is high in the Income Generation aspect or the livelihood improvement. Aspects of Water Supply and Sanitation and Power Supply are not adequate to be implemented by community-based approach considering the capital urban setting of Juba though improvement of these aspects is obviously needed. Needs for other aspects of Living Physical Environment Improvement, Health Service and Education, Formal and Informal Education, and Community Organizing are apparent while involvements of the public sector and/ or NGOs are indispensable for implementation. Details of the assessments follow.

Table 6.2-1 Comparison of Community-Based Development Aspects

ASPECTS	Needs	Adequateness	Emergency	Relevance
Water Supply and Sanitation	O	X	X	Δ
Power Supply	O	X	X	Δ
Living Physical Environment Improvement	O	O	Δ	Δ
Health Service and Education	O	Δ	Δ	Δ
Formal and Informal Education	O	Δ	Δ	Δ
Community Organizing	Δ	Δ	X	Δ
Income Generation	O	O	O	O

O: High Δ: Medium X: Low

(1) Water Supply and Sanitation

- Although the needs of the community people in this aspects are high, services responding to the needs have to be provided as part of public services in the urban setting of Juba.

- Town Area by piped water supply systems, sewerage and drainage systems, and waste disposal systems.
- In terms of emergency, only “water supply need” pertains to this aspect. Condition of water supply in Juba Town Area, however, is fairly sufficient.
- Self-help type community service provision is basically not relevant to the urban community. Complementing activities like organized community activities for living environmental cleaning and for cooperation to the waste collection is relevant or required.

(2) Power Supply

- Desired needs for power supply to the community have to be satisfied by an electric power distribution system under public control and a certain public system for other energy supply for the Juba Town Area.
- Degree of emergency for this aspect is low at least for the community level in which people have been managing this issue to some extent.
- Self-help type community service provision is basically not relevant with the capital city although cooperative approach may be effective to certain degree.

(3) Living Physical Environment Improvement

- The very needs for this aspect are suitable to be achieved by community-based development approach while the government’s initiative is indispensable for favorable development of the Juba Town Area. Prior to embark upon this aspect rehabilitation of roads under the governments has to be implemented. Provision of proper services for waste management by public sector is essential to attain intended clean living environment in addition to community’s own efforts for cleaning.
- Considering the above stated situations degree of emergency of this aspect is low although these needs are in higher demand.
- Self-help type community-based development approach is categorically relevant.

(4) Health Service and Education

- Currently this aspect with large needs is dealt mainly by international NGOs with community-based approach due to insufficient public service delivery system.
- Since the above stated activities cover the Area fairly well, degree of emergency is not so high in general.
- Involvement of the public sector in this aspect is more desirable for the Area than ordinary rural setting and/or rural town setting.

(5) Formal and Informal Education

- Immense needs in this aspect are underserved seriously though efforts of community, public, and NGOs with help of international organizations are on-going.

- While it is ideal for this sector to be served by the government sector from the long term point of view, contribution of NGOs by community-based development approach with international organizations assistance is imperative for a decade of time.
- Appropriateness of the community-based development approach in this aspect is proved by existence of basically community-based ones supported with faith-based organization's assistance or leadership in the communities. This may be a reflection of higher awareness of the importance of education by people of Southern Sudan which is easily recognized.

(6) Community Organizing

- People have been organized with current residential quarter system headed by a chief selected by them, who is an arbitrator in nature. Their organized level is basically enough to conduct community cleaning activities, to form water committee for hand pump stations, to form a committee for latrine installation necessary to coordinate with NGOs, to form a self supportive entity for health center building and operations with health education to attain NGOs assistance, and so on. All of these activities are observed in the Area though some areas may lack these capabilities. Actual capacities of the above mentioned community organizations are not certain.
- This community organization factor may contribute to materialization of current good security condition in Juba Town Area in which people had to fight against the intruders and had been suffering from fighting, displacements, massacres, and other war related tragedies.
- Even in the urban setting a community has to be organized to some degree. Current state of community organization conditions in the Area, however, is enough for the urban setting in basic though capacity issue is a little controversial as already stated.
- Since the communities are organized in certain manner and degree, degree of emergency is low.
- An urban community does not need to be as cohesive as a rural community is required since public services are to cover major part of services required for people's lives. As stated earlier current status of the communities in this Aspect is enough to meet the requirement for the urban communities.

(7) Income Generation

- People are poor and their livelihoods are earned by non-urban type of activities. Envisaging that explosive urbanization is expected to start soon, people in the Area are exactly in need to have urban type income generation means.
- Since many of people are earning from non-urban type activities, implementation of income generation projects or programs tailored to urban setting is quite adequate.
- The explosive urbanization of the Area is expected to occur soon with implementation of

the governmental rehabilitation projects undergoing now in the Area. In this circumstance the people's opportunities to obtain urban type of income generation skills and knowledge are very limited. This Aspect's degree of emergency and relevance to the community structure are, therefore, high.

6.2.3 Community-Based Development Needs for the Increasing Population

(1) Population Expansion and Community Formulation

As Juba Town is supposed to absorb additional 260,000 people consisting of influx and of increase from current population by year 2015, communities have to be developed newly. Systematic expansion of residential area in association with orderly community formulation is required for the desirable form of growth of Juba Town Area.

Since the current community arrangement in the Area seems to fit in the society, it might be better to formulate communities with same general characteristics as current ones which are mixed in religious, tribal, income and other social qualities. One residential unit is better not to be occupied by a group of people from one specific area or village.

(2) Community-based Development Needs

Community-based development needs for the new population are basically same as the ones for the current population as stated in 6.2.2. Basic infrastructure and public service facilities necessary for residential areas including water supply and sewerage, electricity supply, roads, health centers, and schools are recommended to be prepared in advance to allocating the particular residential areas to the new residents.

Assuming the recommendations be carried out against the new residential area development, specific needs for community-based development are the following:

- Community Organizing to formulate orderly residential community which shall be the base for any community-based development activity and for good security in social life, and
- Income Generation for urban livelihood.

Income generation is crucial for the new residents since current job opportunities in Juba are very limited for common people. Most of people have to earn their livelihoods by primary activities like collecting raw materials, fishing, horticulture, and cattle and goat grazing of which opportunities are anticipated to be reduced in the course of the urbanization of the Area. Other sources of income are only basic tertiary industries and construction industry which are in emerging stage.

This livelihood earning aspect can be a hindrance or constraints for the population increase.

(3) Administrative Consideration

There are basically two realistic scenarios, which shall be combined in materialization in long term, to absorb the increased population in relation with administration:

- Accommodating all the increased population into the areas under the current town Payams i.e. Juba Town Payam, Kator Payam, and Munuki Payam, and
- Accommodating part of the increased population in the 3 town Payams and other Payam(s).

For both cases, capacity development of the local authorities is indispensable for guiding new residents to formulate orderly communities which play important roles in development of the communities as basis for proper social and economic development of Juba as stated in the previous section. In the latter case, institutional arrangement for the non-town Payams under Juba County accommodating new urban population is required in addition to the capacity development of the local authorities.

Since establishment of standardized activities for the town Payams to play the above mentioned role regarding accommodation of new residents is one of major subjects to be dealt with, the accommodation is recommended to be commenced from the areas under current town Payams considering the efficiency in developing capacity of Payam offices as well as the infrastructure and public service provision.

6.2.4 Issues Regarding the Local Authorities

The local governmental authorities for the Area are Juba County Office and three Town Payam Offices under the County Office, namely, Juba Town Payam Office, Kator Payam Office, and Munuki Payam Office, as stated in 6.1.1. These offices are expected to be major players, which are directly dealing with community people among the public sector organizations, in public service provision and local administration as well as their judicial functions. The public services and the administrative functions include solid waste management, environmental sanitation management, education management, residential population management, land use management and so on.

These offices, however, are not functioning mainly due to inappropriate resource allocation in every aspect and absence of clear definitions for their required activities in association with inevitable phenomenon caused by the civil war and its aftermath that the officials currently serving are mostly inexperienced and untrained. They are important organizations for guiding development of the communities toward appropriate direction with both direct and indirect interventions, but currently possess limited capabilities.

6.3 ACTIVITIES OF FOREIGN ASSISTANCE FOR COMMUNITY-BASED DEVELOPMENT IN THE AREA

At the time of the field survey conducted during March 2006, there were not so many international NGOs and international organizations active in Juba Town Area while many of these were vigorously conducting their activities in other parts of Southern Sudan. This trend has basically been continued. Most of the organizations which have experiences in this field such as GTZ (Gesellschaft für Technische Zusammenarbeit), NPA (Norwegian People Aid), and NCA (Norwegian Church Aid) were then establishing their bases in Juba mobilizing from Khartoum, from Nairobi, or from their countries of origin.

The followings were the representative organizations conducting their community development activities with available funds from donor countries and international organizations in Juba Town Area then:

- ACF-USA: Action Contre le Faim - United States of America
- ADRA: Adventist Development and Relief Agency
- CRS: Catholic Relief Services
- SFM: Swedish Free Mission
- ACORD: Agency for Co-operation and Research in Development
- Skills for Southern Sudan

In addition to the above, international organizations and NGOs may conduct their activities in Juba Town Area as a part of national or Southern Sudan program. Local NGOs' activities exist in certain fields like education with assistance from the foreign organizations; e.g. SCC (Sudanese Council of Churches) are conducting education related activities supported by NCA.

Their activities are listed below:

- Water supply basically using borehole with hand pump (most of the possible areas in need are covered) and its repairing works (ACF-USA, SFM, ADRA)
- Installation of latrines and sanitary activities and education (ADRA, ACF-USA)
- Health center/dispensary establishment and operational support, and health education (ACF-USA, SFM, ADRA, CRS)
- Construction of abattoir (ADRA)
- Education of school teachers and support for school establishment and operations
- Income generation activities for the most vulnerable people with skill training and basic education for small business with initial support in such areas including bakery, cooking for catering, charcoal making, farming, fishing, becoming sellers of vegetable/ grains/ dry foods, guest house operation and so on. (ACF-USA, ACORD, Skills for Southern Sudan)

- Development education to nurture a mind set or way of thinking required for the development of the society. (SFM, Skills for Southern Sudan)

In general most of the organizations having capacity for community development are busy for providing their services to the entire Southern Sudan with their limited resources for the people's basic needs. The people of Juba Town Area as a whole are outside of their scope since their main concerns are responding to minimum human basic needs in other areas especially rural areas accommodating returning IDPs.

6.4 PROJECT/PROGRAMS FOR COMMUNITY-BASED DEVELOPMENT

6.4.1 Major Projects/ Programs for Community-Based Development: General

(1) Considerations on Role and Function of Community

As stated in 6.1.1, Juba Town consists of three Payams and residential areas in Payams are divided into residential quarters headed by chiefs who are elected by the residents of residential quarters. This Study considers the residential quarter to be a community unit.

The role and function of the community should be clarified distinguishing them from those of governments (national, provincial, county and Payam levels). From this point of view, the following matters are premised in discussing major projects/programs for community-based development.

- Considering that the basic character of the communities in the Study Area is urban, the governments should play the principal roles in development of basic physical and social infrastructures based on the urban development plan to be formulated by the governments. Within and in accordance with the frame of the governments' plan, communities will do their own activities.
- However, the governments' system is not adequately developed yet at present and the communities face the special situation that the IDP returnees shall be accommodated urgently. Under such circumstances, communities will have to play the wider role for community development. For example, NSP (National Solidarity Program) in Afghanistan and KDP (Kecamatan Development Project) in Indonesia are being implemented by communities themselves using the Governments' budgets including improvement of physical and social infrastructures.
- There is room for community to participate in the development of basic physical and social infrastructures to be basically implemented by the governments, such as operation and maintenance of the facilities and in many cases, such participation is desirable and necessary.

From the above standpoint, the community development plan is viewed in this study as follows:

(2) Major Projects/Programs

The following projects/programs are in general considered as major projects to be implemented by community itself or with the lead of community:

- Institutional/managerial development to improve the living conditions and enhance the community's capacity in achieving the community's role and function such as :

- enhancement of local authorities,
- establishment/reinforcement of community organizations for improvement of living conditions,
- establishment of organizations for operation and maintenance of infrastructures by community,
- development of micro-finance system,
- capacity development of residents.
- Livelihood improvement
- Construction and management of facilities for community such as community centers, assembly halls, parks, public lavatories, markets, etc.
- Participation in infrastructure projects to be implemented mainly by the governments and their operation/maintenance, for example:
- Participation in construction of local roads and their operation/maintenance (Construction/operation/maintenance of trunk roads will be done by the governments.)
- Operation and maintenance of water supply system and power supply system to be constructed by the governments

Among the above projects/programs, two typical community-based development projects, i.e. 1) local authority capacity building and community formulation/enhancement, and 2) urban livelihood improvement are discussed in detail below.

6.4.2 Local Authority Capacity Building and Community Formulation/ Enhancement

(1) Project for Institutional Development and Clerical Capacity Building for Local Authorities

At present very limited activities required for local authorities which are under the State Ministry of the Local Government to perform as the norm are practiced in the Area and other urban areas in the nation as stated in 6.2.4. Heads and staff of the local authorities seem to be confused in the muddled situation in the Area. They may need clearly stated job requirements and adequate resources for them to conduct their duties. Their responsible jobs have to be figured out by assessing needs of community people, and current and targeted capacities of related public sector organizations in association with the local authorities' capacities.

Their offices are under-equipped for carrying out necessary documentation and processing issues efficiently. Enhancement of basic capacity for execution of efficient clerical works, which is the base for an administrative office, is indispensable for the local authorities to function properly. The enhancement includes establishment of the standardized procedure for decision making and execution.

The project may consist of the following components:

- Community needs assessment,
- Assessment of current and future capacities of relevant public organizations and the local authorities,
- Institutional development of standard urban local authority function including job description with basic resource allocation arrangement, and
- Capacity building of the local authorities for efficient clerical works and decision making process including provision of office equipment and users' training.

(2) Project of Capacity Building for Public Administration and Community Formulation

The local authorities have to be the main bodies to conduct resident registration. They are expected to play leading and guiding roles for residential communities to be orderly and harmonized one to promote desirable society. They have to be ready for guiding residents to organize themselves conforming to the local administrative structure.

The project may have the following components:

- Capacity building of the local authorities for the resident registration,
- Preparation of standard residential community organizations structure and roles which include an organizer of community groups, a community needs informer, a self problem solver, and a community service provider and/or providing supporter, and
- Capacity building of the local authorities for leading and guiding residents for community organizing.

(3) Project of Capacity Building for Public Service Provision and Community Activity Enhancement

Based on the institutional defining, the local authorities have to attain capabilities to provide required public services such as solid waste management, living environment clean up, public space and facility management and maintenance, community social and economic development promotion, and so on. There must be strategy for the service provision in terms of kind of services to be provided and respective service providers. Possible service providers include the local authorities themselves, public sector organizations such as electricity, and water and sewerage corporations, and NGOs. Community people can be supportive players and/or providers by themselves depending on the kind of services.

The project may comprise the following elements:

- Preparation of service providing strategy,
- Capacity building of the local authorities as service providers which includes part for equipping them,

- Capacity building of the local authorities as organizer for service provision, and
- Clarification of required community activities and mobilization of community people for the activities.

6.4.3 Urban Livelihood Improvement

As shown in Table 6.2-1, the Aspect of Income Generation for urban livelihood improvement is most advantageous for Community-Based Development. Although close coordination with the relevant authorities for the skills training, and commercial and industrial development is needed, Skills Training and Small Scale Business Venturing are two possible aspect to be dealt as community-based development project/program.

(1) Skills Training Project

As described in 6.2, current income generation projects/programs are focused on to the most vulnerable people within the population and skills being trained are very basic ones including bakery, cooking for catering, charcoal making, farming, fishing, becoming sellers of vegetable/grains/dry foods, guest house operation and so on. These schemes are conducted in small scale and impact to the entire society is minimal.

On the other hand the Area embraces a huge number of ordinary people with rural type livelihood earning skills and knowledge who are in risk of alienation in rapid modernized urbanization process which is anticipated to happen in very near future. They are in unforeseeable risk of isolation and falling down to worse lives in prosperity of Juba Town Area.

Condition of skill training provision in Juba Town Area is very poor. At present there is no sizeable skill training activity in Juba Town Area while many operations are observed in outside Juba especially in Yei. MTC is yet to be in normal operation and its target people must be in regional context but not for Juba Town Area.

For the skill demand side, significant needs are already obvious for a) construction related skill such as carpentry, masonry, painting, plumbing, electricity wiring, welding, b) vehicle maintenance and repair, and mechanical works, c) electric appliance repair, d) woodworks, and so on. Furthermore major emergency rehabilitation projects for building and roads commence within this year and are followed by further rehabilitation and development projects for the Capital Town. Reconstruction of prevailing rural type housing to appropriate ones in the urban setting will be materialized in the long run. There will be continuous and huge demand for the skilled construction labors including machine operators.

At the same time as the Capital Town, desk works involving computer operations will be increased in exploding speed while most of people, even most of the government officials, have no exposure to computer use. Already computer trainings for GOSS and State level officials have been launched. There is almost no opportunity for ordinary people to get familiar with the use of computer.

The programs are to be designed to let the trainee earn their own revenue by utilizing their training activities which means program operators receive contracts for building and/or maintenance and repairing and utilize them for the practices of participants in case of construction related skills. Revenue earned from these activities are to be utilized as revolving fund and/or subsidiary support for the participants' venturing.

Additional benefit to Southern Sudan of this capacity building is to increase triple down effect of investment by its own people to earn money from foreign and domestic investment schemes through their skills. It also results in minimizing economic leakage from the territory.

In basic this line of activities contribute in a) poverty alleviation and reducing risk of alienation from rapid urbanization, b) provision of domestic skilled labor force in rehabilitation and development, c) maximizing investment effect in domestic economy.

These are totally relevant to the policy of GOSS.

The Project may comprise;

- Organizational development,
- Identification of skills to be trained,
- Preparation of training programs,
- Preparation of training facilities,
- Recruit of trainers and trainees, and
- Implementation of the training programs.

It is better to be associated with small scale venturing assisting program for the relevant businesses with the training programs.

This Project selected Skills Training as one of the subjects for its Pilot Projects and implementing one training project. Details of the Pilot Project and its progress are shown in Chapter 9.

Other than the above mentioned special needs skills training programs for service related skills including hair cutting, tailoring, cooking, retailing, driving, lodging and so on are expected to be viable as the Town develops.

(2) Small Scale Business Venturing Promotion Program

In the same situation as stated in the above Small Scale Business Venturing Promotion Program is essential for Livelihood Improvement of the community people.

The program may include the following modules:

- Identification of prospective businesses,
- Development of standardized procedure for business venturing for identified businesses,
- Basic management skills training with core technical skills training if necessary,
- Financing assistance programs for business venturing.

6.4.4 Considerations on Implementation of the Above Projects

Implementation timing of the projects for Local Authority Capacity Building and Community Formulation/Enhancement is in urgency since the local authorities have to be ready for accommodating IDPs to their jurisdiction before major influx of IDPs is commenced. The Project for Institutional Development and Clerical Capacity Building for Local Authorities is suitable for study oriented scheme, while other two projects are basically capacity development projects in nature.

The projects have to be directed to materialize better community involvements in the aspects including the following as their effects:

- Planning of infrastructure provision projects,
- Operation & maintenance and management of particular public facilities, and
- Community activities for improving education, health, living environment, and social life.

Consideration for equal involvement of all the segments of the community residents is required for realizing the desirable society.

Implementation of schemes for Urban Livelihood Improvement is also in urgency although the effect of its delay may appear in later than the delay of the project implementation of the above one of which consequence may come out as chaotic situation in accepting IDPs. Mobilizing NGOs for these projects/programs are recommended. Role of the local authorities in this aspect has to be figured out in the above projects.

Consideration for equal opportunities in terms of gender and special consideration for socially vulnerable people such as disabled and orphans, which are part of the national policy, have to be provided in project designs for bolstering the entire society.

6.5 RECOMMENDATIONS IN IMPLEMENTATION OF PROJECTS/PROGRAMS

(1) Formulation of Own Community Development Plan

Government should establish definitely the policy and strategy for community development and it is desirable for each residential quarter to prepare its own community development plan along the government's basic policy. For the detailed discussion (refer to Chapter 10.4 14)).

(2) Coordination with Governments in Implementation of Community Development

The community should coordinate with governments in implementation of the community development plan. For the detailed discussion (refer to Chapter 10.4 15)).

(3) Consideration to Gender

Women tend to be placed at vulnerable positions in the society. Sometimes women shoulder hard work such as getting and carrying water. The community development projects/programs should be planned and implemented with a thought for women, respecting and reflecting the women's opinions. To provide women with more opportunities of manifesting the opinions, organizations for women such as women's union are desired to be established.

(4) Community's Participation in Government Projects

The community should actively participate in the government-lead projects related to the community development. For the detailed discussion (refer to Chapter 10.4 16)).

Recommendations for Local Authority Capacity Building and Community Formulation/ Enhancement, and Urban Livelihood Improvement (refer to 6.4.4).

CHAPTER 7

PILOT PROJECT IN TRANSPORT SECTOR

CHAPTER 7 PILOT PROJECT IN TRANSPORT SECTOR

7.1 OUTLINE OF PROJECT

7.1.1 Selection of Project

As per the “Minutes of Meeting on Scope of Work for Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas in Southern Sudan Agreed upon between the Government of Southern Sudan and Japan International Cooperation Agency” dated on November 24, 2005, Juba Port Improvement Project is selected as a pilot project in the transport sector.

This project is considered to be a short-term-project in the infrastructure development plan in the river transport sector.

7.1.2 Design Policy

(1) Location

There are three alternative locations; present port, old port and another new location. Their applicability is evaluated as follows:

- Old Port : Earth has been deposited on the place where 11 barges had sunken, causing the change in river channel to make the stream a tributary of the White Nile River having insufficient width and water depth for navigation. Under such situation, the rehabilitation of the old port is not appropriate for the pilot project which needs to be urgently implemented.
- Present Port: Vessels land alongside the riverbank directly in about 370m long section. The present port area is suitable place for construction of new port facilities since it is possible to construct the new facilities without suspending the operation of the present port and there exists an access road to the arterial road network in Juba Town.
- New Location: There are two candidate locations: one is the point about 20 kilometers south of the urban area of Juba and another is the riverbank area on the east side of the river. Since either location has no access road connecting to the urban area at present, the construction of new port therein is not appropriate for the pilot project.

Considering the above, the present port area is selected as the location of the pilot project.

(2) Scale of Port Facilities

Factors in Deciding the Scale of Port

The major factors to decide the scale of the port are as follows:

Size of Vessels: Major vessels utilizing the port are barges with the following dimensions:

- Tonnage : 500 D.T.
- Length : 35 meters
- Width : 10 meters
- Height : 2.7 meters

Full Load Draft : 2.1 meters

Transport Demand:

As mentioned in 5.2.1.2, the river transport demand in year 2015 is estimated at 7,400 to 9,000 tons/month (7,100-8,600 tons/month of incoming cargo and 300-400 tons/month of outgoing cargo)

Cargo Handling Capacity

Considering the size of the barges, length of the berthing facility and cargo handling yard is set at a multiple number of 35 in meter. In four cases : combined two cases of length of berth (35 and 70 meters) and two cases of loading/unloading means (manpower and overhead rail-crane), cargo handling capacities are estimated as shown in Table 7.1-1, which is summarized in Table 7.1-2.

Table 7.1-1 Estimate of Cargo Handling Capacity

		In case of Loading/Unloading by Manpower		In case of Loading/Unloading with Gantry Crane	
Assumptions	Workable Hours for Loading/Unloading	25 days/month, 10 hours/day in case of 35 m berth 12 hours/day in case of 70 m berth		25 days/month, 10 hours/day in case of 35 m berth 12 hours/day in case of 70 m berth	
	Handling Rate	Number of Workers = 60 Handling Volume per Worker= 250 kg/hour (50kg x 5times/hour) Total Handling Volume per Hour = 15,000kg (250kg/worker x 60workers)		Loading/Unloading Cycle = 3 minutes (1-minute hoisting+1-minute traversing +1-minute rolling down) Loading Volume per Wire Basket = 1,500kg (50kg/bag x 30bags) Handling Volume per Hour = 30,000 kg (1,500kg / 3minutes x 60minutes)	
Cargo Handling Capacity per Month		35 m Berth	70 m Berth	35 m Berth	70 m Berth
		15tons/hour x 10hours/day x 25days/month = 3,750tons/month	15tons/hour x 12hours/day x 25days/month = 4,500tons/month	30tons/hour x 10hours/day x 25days/month = 7,500tons/month	30tons/hour x 12hours/day x 25days/month = 9,000tons/month

Table 7.1-2 Summary of Estimated Cargo Handling Capacity

Unit: tons/month

	In case of 35 meters berth	In case of 70 meters berth
Loading/unloading by manpower	3,750	4,500
Loading/unloading with overhead rail-crane	7,500	9,000

Scale of Port

A 35-meter berth with a crane will meet the low estimated demand in 2015 (7,400 tons/month) but not enough for the high estimated demand in 2015 (9,000 tons/month). Therefore, a 70 meters berth equipped with gantry crane is desirable to be constructed as soon as possible, at least well ahead of year 2015. For the pilot project, however, 35 meters berth with a crane is proposed as an urgent measure, expecting that the berth will be extended in near future.

(3) Design Condition

Design Vessels:

Major vessels utilizing the port are taken as design vessels, which are barges with tonnage of 500 DT, length of 35 meters, width of 10 meters, height of 2.7 meters and full load draft of 2.1meters.

Length of Berthing Facility:

Based on the discussion stated in (2) above, length of the berthing facility is set at 35 meters.

Water Depth :

Based on the full load draft of the design vessels, the minimum water depth is 2.2 meters.

Area of Cargo Handling Yard:

Length : 35 meters in accordance with the length of the berthing facility.

Width : 30 meters, for accommodating an gantry crane and allowing trucks to turn.

Design Load : Tractive load to bollard: 25 tons

Vehicle Load : 25 tons

Geometric Design of Access Road:

Cross Sectional Element : Carriageway = 3.5m/lane x 2 lanes, Shoulder = 1.5m x 2

Horizontal Alignment : Minimum Radius = 30 meters

Vertical Alignment : Maximum Grade = 2.0 %

(4) Scope of the Project

The project includes the following items:

1) Construction of Berthing Facility (Jetty)

Since the water depth near the riverbank is not enough in dry season, a piled pier is constructed up to the place where the required water depth is secured. The size of the pier is 35 meters long (based on the length of barge) and 16 meters wide (to secure the required water depth in dry season).

2) Provision of Cargo Handling Yard

A flat area of 35 meters in length and 30 meters in width is provided for the cargo handling yard, including the 16 meters wide pier area and excavating the shore behind the pier for the remaining width of 14 meters. The shore portion is paved with cement-treated base (CTB) and double bituminous surface treatment (DBST).

3) Installation of Pier Facility

A gantry crane equipped with generator is installed for the use of loading/unloading operation.

4) Installation of Mooring Facility

Two bollards are installed.

5) Construction of Storage Facility

A fuel storehouse and a tools storehouse of 4 meters x 4 meters each in size are constructed adjacent to the cargo handling yard.

6) Improvement of Access Road

The access road from the cargo handling yard to the arterial road network of the town with a length of about 645 meters is improved with pavement and drainage. The road width is 10 meters composed of 7 meters carriageway and 1.5 meters shoulders on both sides. The road is paved with cement-treated base (CTB) and double bituminous surface treatment (DBST).

(5) Issue of Land

The shore area is the properties of the State Government and the riverside strip with a width of about 150 to 200 meters are leased to private persons, divided into several lots with various lengths, each of which is called by the Garden Number. The conditions of the lease are as follows:

- The purpose of using the land is limited to gardening.
- The Government has a right to cancel the lease agreement at any time when the land is necessary for public use.
- It is not allowed to sublease the land.

Despite the above conditions, many gardens are presently subleased to developers and surrounded by fences. Many of them are developed for the other purposes than the gardening such as hotel accommodation, restaurants, inland port terminal and so on. Garden No. 24, one of these fenced lots, where the piled pier in the pilot project is initially planned to be located, is subleased to SDV Transami, a Ugandan branch of logistics company group based on France, for the purpose of construction of an inland port terminal in Juba. This plan was reported in Daily Nation, a Kenyan newspaper on 9 May 2006. Houses have already been built and materials and equipment have been stocked inside the fence. Such fenced gardens have been rapidly increasing since around April 2006 and open places are decreasing accordingly.

For the land for the pilot project to be made for public use officially, a state decree was issued by the Governor of Central Equatorial State on 28 September 2006 and announced through radio on 9 October 2006, decreeing the withdrawal of ownership of the Gardens No. 23 to No. 27 from each owner. Thus, the Government's actions to clear the land for the site of the project has been started.

However, it is highly expected that it would take long time to reach agreement with the lease holder and developer and for the land to be completely cleared, removing all houses, materials and equipment from the site. Therefore, the pilot project which was initially planned to be located in Garden No.24 is shifted to Garden No.25 where presently vacant. The access road is planned to be located at the west end of Garden No.24, expecting that the west side of the fence is removed or set back by the time of construction of the last section of the access road. However, if no progress of land clearance is made until the time of construction of the access road and it is difficult for the contractor to enter the inside of the fence, the location of the access road might be forced to be changed to the route passing the outside of the fence.

The location of the project is shown in Figure 7.1-1.

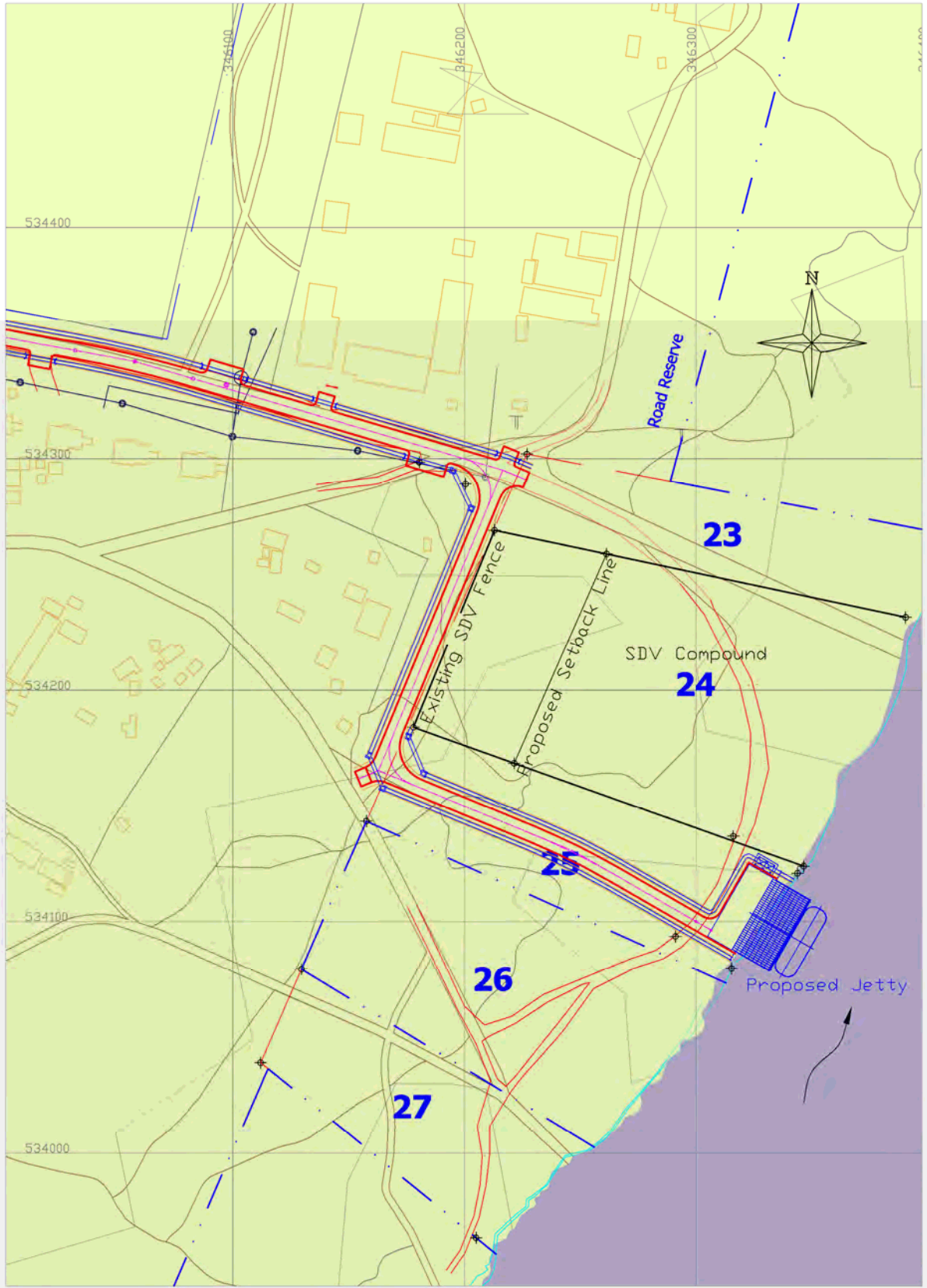


Figure 7.1-1 Location of the Project

7.1.3 Design

(1) Berthing Facility

The piled pier, having a floor system on piles, is adopted for berthing facility. Main reasons for selecting this type are as follows:

- Construction is easy.
- Construction period is short.
- Vessels land easily having less effect of wave compared with wall type pier.

The structure of the pier is shown in Figure 7.1-2.

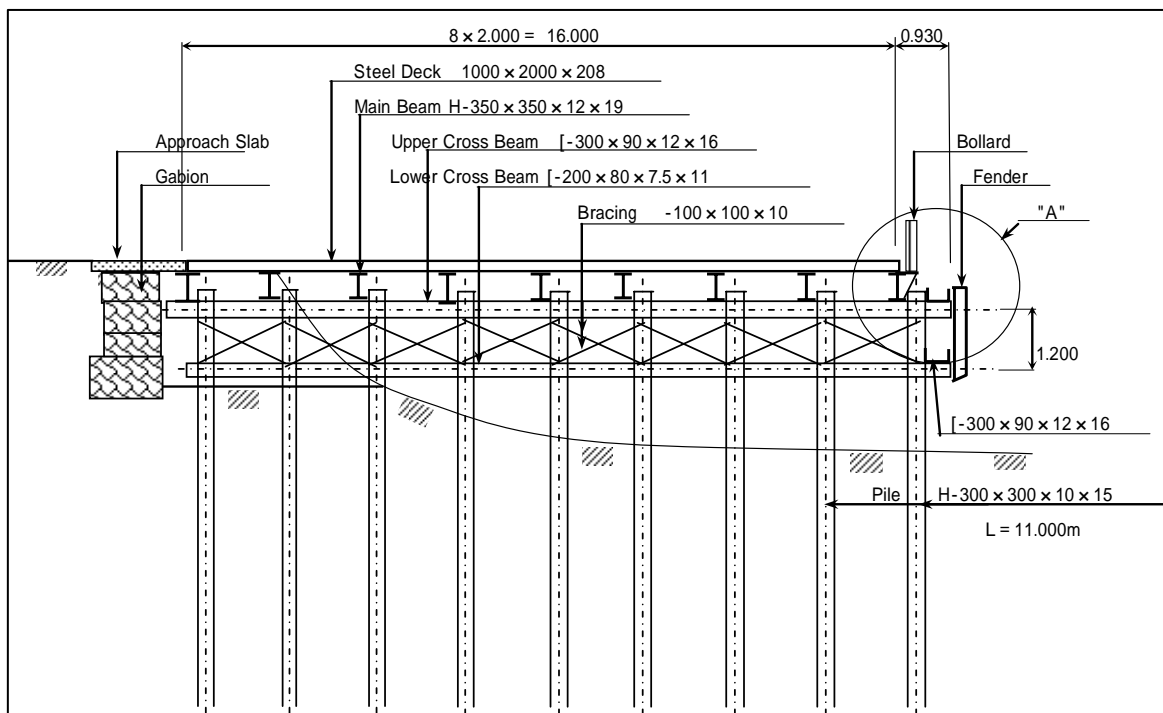


Figure 7.1-2 Structure of Piled Pier

(2) Cargo Handling Yard

Size of the cargo handling yard is as follows:

- Length : 35m
- Width : 30m at the minimum

The riverbank portion behind the pier is paved with 25cm thick cement-treated base (CTB) and double bituminous surface treatment (DBST).

Cargo handling yard is shown in Figure 7.1-3.

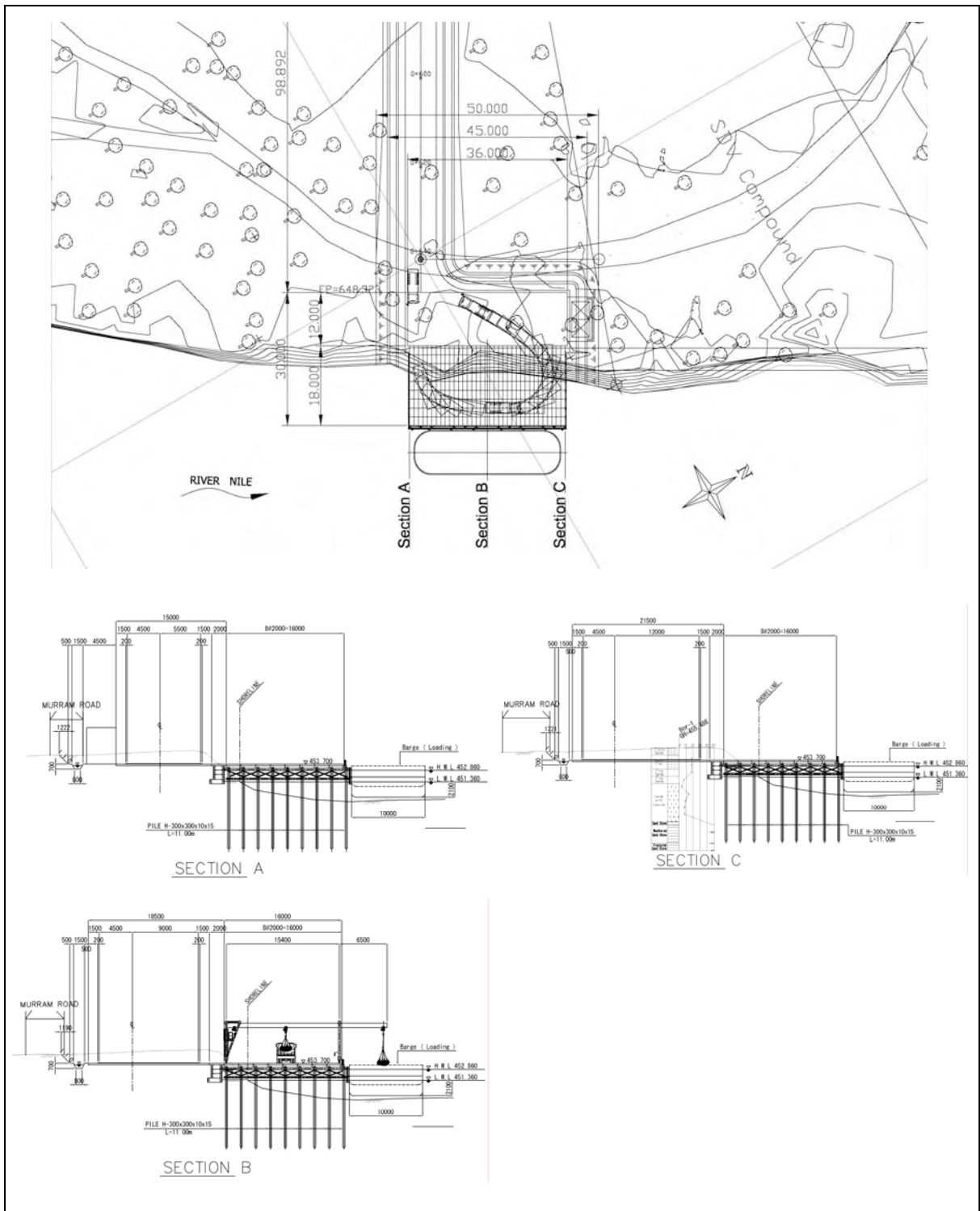


Figure 7.1-3 Cargo Handling Yard

(3) Gantry Crane

Specifications of the crane are as follows:

- Rated Load : 1.5 ton
- Span : 15.4 meters
- Lift : 4.0 meters
- Cantilever Length : 6.5 meters (effective length : 6.0 meters to reach the center of barges)

The crane is shown in Figure 7.1-4.

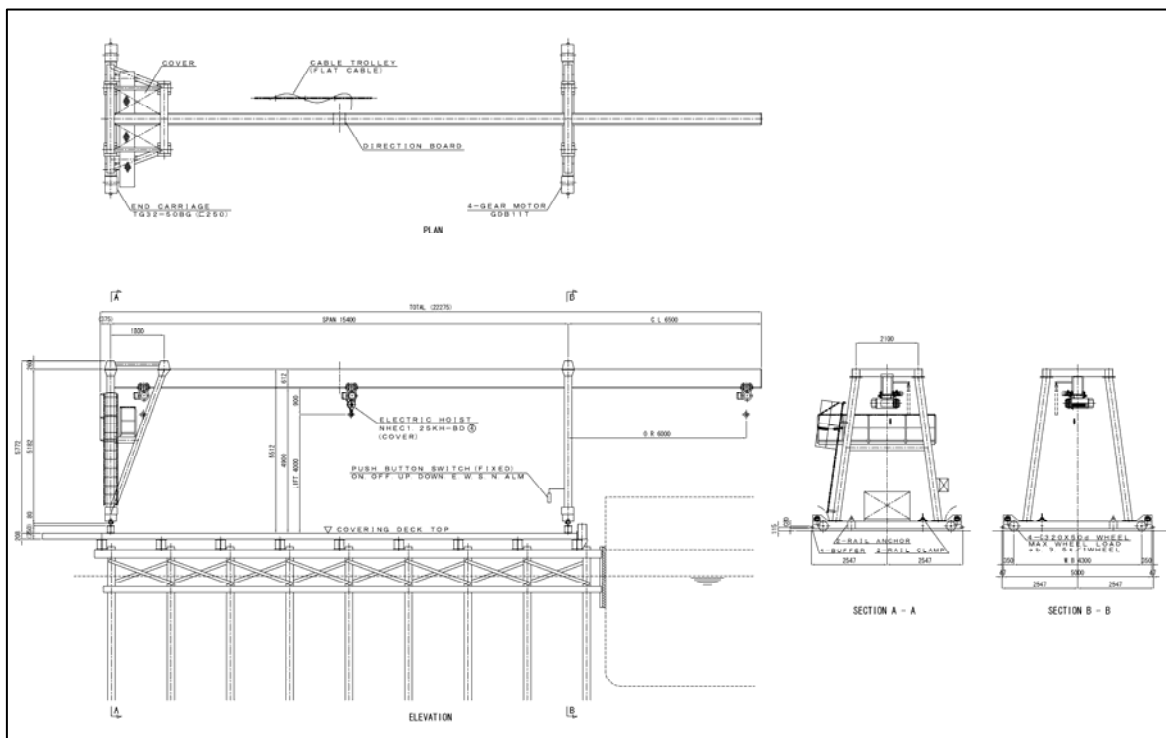


Figure 7.1-4 Gantry Crane

(4) Access Road

The access road is paved with 25cm thick cement-treated base (CTB) and double bituminous surface treatment (DBST).

Plan and typical cross section of the access road are shown in Figure 7.1-5 and Figure 7.1-6.

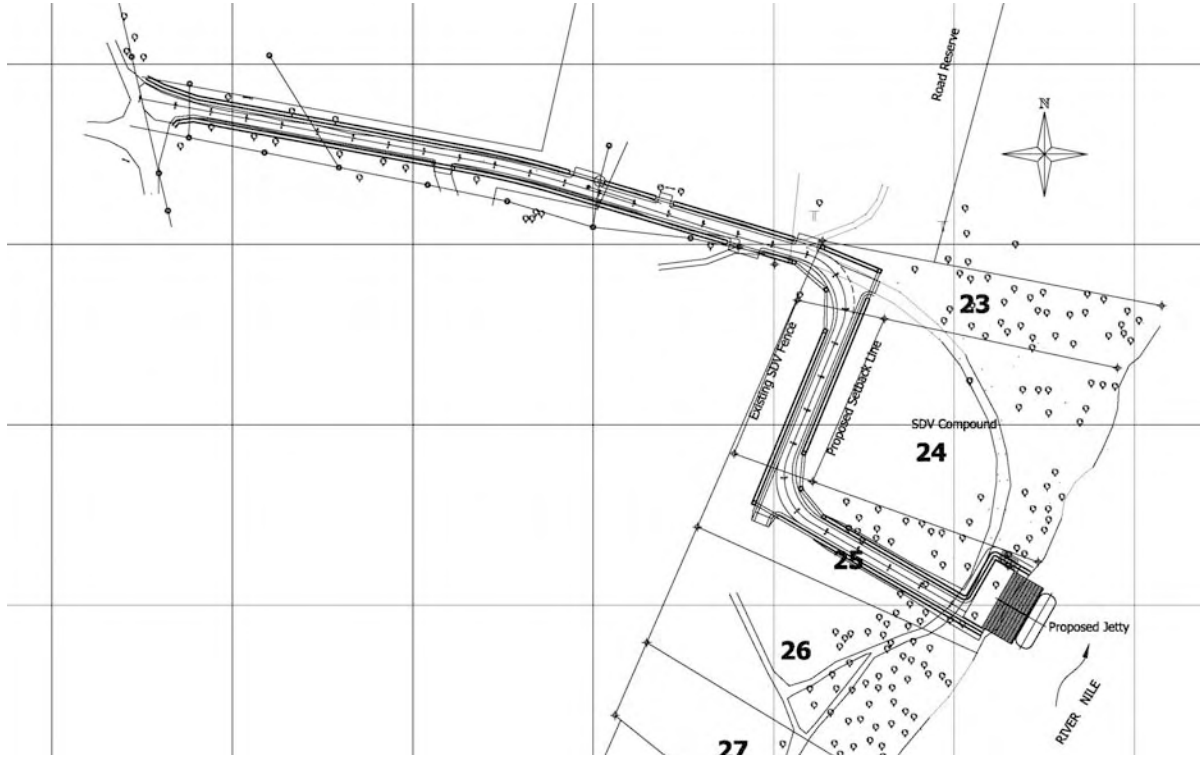


Figure 7.1-5 Plan of Access Road

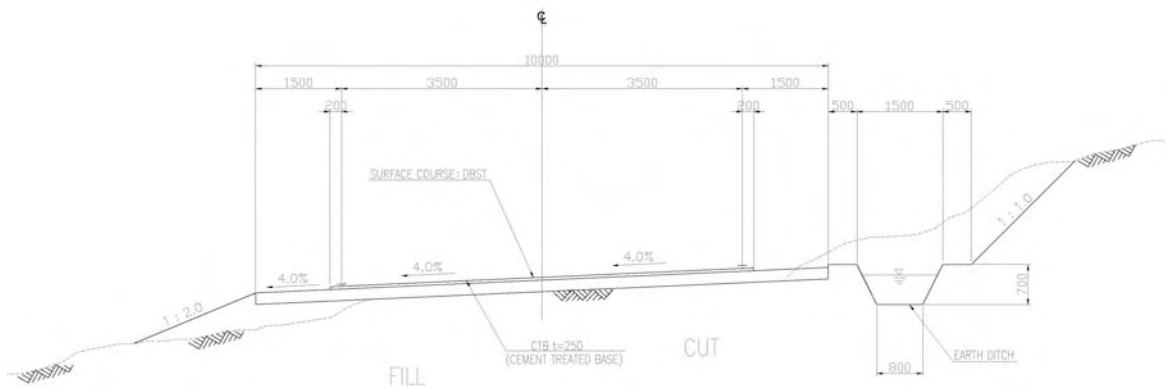


Figure 7.1-6 Typical Cross Section

7.1.4 Construction Plan

(1) Equipment and Materials Procurement Plan

Most of the equipment and materials necessary for the project should be procured outside of Juba and carried into the project site, since those procurable at the site (in Juba) are very limited. An equipment and materials procurement plan is made according to the following principles:

- The materials procurable at the site are procured at the site, including those available at the markets, even imported materials. However, no equipment is available at the site, except for simple tools.
- The equipment and materials which are procurable in Nairobi/Kampala are procured therein, except in the following cases :
 - Their quality/performance are not satisfied.
 - The available quantities and/or the time of supply are not stable.
- No equipment or material is procured in Khartoum because the transportation from Khartoum is more difficult, risky, costly and longer than that from Nairobi and all items available in Khartoum are also available in Nairobi.
- All others are procured in Japan.

The equipment and materials procurement plan is shown in Table 7.1-3.

Table 7.1-3 Equipment and Materials Procurement Plan

Facilities	Equipment/Materials	Specifications	Quantity	Weight (t)	Supposed Procurement Place
Materials					
General	Fuel				Construction Site
Berthing Facilities	Steel Materials	H-300, L=11m	72 pcs	73.66	Japan
		H-350, L=4.9, 5.2m	63 pcs	43.04	
		[-300, L=6.6, 10.5m	32 pcs	13.29	
		[-300, L=4.9, 5.2m	14 pcs	3.44	
		[-200, L=6.6, 10.5m	32 pcs	6.60	
	L-100, 75, PL, CT	1 set	11.92		
	Steel Deck	1.0 x 2.0 x 0.2	315 pcs	133.25	Japan
	High-tension Bolt & Nut	M22, L=60,65,70,75,80	3,024 pcs	1.65	Japan
	Mooring Post	for 25t, Bent	4 pcs	0.08	Japan
	Gabion	1.2 x 2.5 x 0.5	450 pcs	6.75	Japan
Cargo Handling Facilities	Gantry Crane	3.0t	1 set	20.00	Japan
	Crane Rail	22kg/m	70 m	1.54	Japan
	Generator	55kw	1 set	1.40	Japan
	Storehouses	Brick	1 set	1.60	Construction Site
Cargo Handling Yard and Access Road (DBST)	Crushed Stone	0-40mm	1,100 m ³	2970.00	Construction Site
	Asphalt	straight asphalt	35,000 L	35.00	Nairobi/Kampala
	Cement	portland cement	264 t	430.00	Nairobi/Kampala
Sub-total			3753.22		
Equipment					
Berthing Facilities	Crawler Crane	50t	1 pcs	55.86	Japan or Nairobi/Kampala
	Vibratory Pile Hammer	350KVA	1 pcs	11.63	Japan
Cargo Handling Yard and Access Road (DBST)	Backhoe	0.6m ³	1 pcs	14.90	Japan or Nairobi/Kampala
	Motor Grader	3.7m	1 pcs	9.80	Japan or Nairobi/Kampala
	Vibration Roller	8t	1 pcs	8.00	Japan or Nairobi/Kampala
	Tire Roller	8.5t	1 pcs	8.50	Japan or Nairobi/Kampala
	Dump Truck	8t	4 pcs	28.40	Japan or Nairobi/Kampala
	Asphalt Sprayer	25-30L/min	1 pcs	0.50	Japan or Nairobi/Kampala
	Truck	4t	1 pcs	3.80	Japan or Nairobi/Kampala
Sub-total			141.39		

(2) Equipment and Materials Transportation Plan

Items to be procured in Nairobi

Although the shortest route from Nairobi to Juba is the one passing across the Kenya-Sudan border at Lokichokio, i.e. Nairobi-Lokichokio-Kapoeta-Juba route, almost all the road section is in very poor condition and almost impassable. Therefore, the route by way of Kampala is taken though it has to pass across the border two times.

Items to be procured in Kampala

The Kampala-Oraba-Juba route is taken.

Items to be procured in Japan

There two possible routes, viz.,

Yokohama, Japan Port Sudan Kosti Juba, and

Yokohama, Japan Mombasa Kampala Juba.

The second route is taken, which is more advantageous in terms of time, cost and steadiness.

The route and time are shown in Table 7.1-4.

Table 7.1-4 Equipment and Materials Transportation Plan

Procurement Place	Route to be taken				Procurement Place	Alternative Route			
	City	Mode	Distance(km)	Time(days)		City	Mode	Distance(km)	Time(days)
Nairobi Juba	Nairobi	Road	660	10					
	Kampala	Customs		4					
		Road	640	8					
	Oraba	Customs		4					
		Road	230	2					
	Juba								
Total			1,530	28					
Kampala Juba	Kampala	Road	640	8					
	Oraba	Customs		4					
		Road	230	2					
	Juba								
Total			870	14					
Japan Juba (via.Mombasa)	Yokohama	Ocean		30	Japan Juba (via. Port Sudan)	Yokohama	Ocean		30
	Mombasa	Customs		7		Port Sudan	Customs		20
		Road	500	5			Road	1,200	10
	Nairobi	Road	660	10		Kosti	River	1,200	30
	Kampala	Customs		4		Juba			
		Road	640	8					
	Oraba	Customs		4					
		Road	230	2					
	Juba								
	Total			2,030		70	Total		

(3) Implementation Schedule

The implementation schedule is shown in Table 7.1-5.

Table 7.1-5 Implementation Schedule

Work Item	Year Month	2006												2007			
		2	3	4	5	6	7	8	9	10	11	12	1	2	3		
Planning		■	■														
Preparation of Detailed Design and Bidding Documents			■	■	■	■											
Bidding and Contract						Bidding	Contract										
Procurement of Equipment and Materials							■	■	■								
Transportation of Equipment and Materials							■	■	■								
Construction Work																	
Mobilization								■	■								
Survey									■	■							
Excavation and Earth Retaining										■	■	■					
Piling for Pier										■	■	■					
Erection of Structure										■	■	■					
Deck Installation										■	■	■					
Installation of Crane											■	■					
Earth Work of Access Road											■	■	■				
Pavement of Cargo Yard & Access Road												■	■	■			
Side Ditch Excavation												■	■	■			
Miscellaneous Works													■	■	■		
Technical Transfer for Maintenance														■	■	■	
Demobilization																■	■

7.1.5 Bidding and Contract

(1) Preparation of Bidding Documents

It is more economical to combine two pilot projects into one contract package: one in transport sector described in this chapter and another in water supply sector described in Chapter 8, than implementing the two projects in separate contracts packages because:

- Some equipment is commonly used for both projects.
- It is more efficient to transport materials and equipment necessary for both projects at once.

Therefore, two projects are combined into one contract package.

The bid documents are composed of the following:

- Section 1 Invitation to Bid
- Section 2 Instructions to Bidders
- Section 3 Bid Forms
- Section 4 Form of Contract
- Section 5 Conditions of Contract
- Section 6 Specifications
- Section 7 Drawings

(2) Bidding and Contract

The time and place of the bidding held and its result are as follows:

- Date of the Bidding : 26 June 2006
- Place of the Bidding : JICA Office at African Expedition (AFEX) Compound,
Juba, South Sudan
- Successful Bidder : Urban Tone Corporation (Japanese Contractor)
- Date of making the Contract : 10 July 2006

7.2 CONSTRUCTION

7.2.1 Work Progress

As of the end of February 2007, progress of work as a whole has already passed two thirds (2/3) line of the total works because of the completion of procurement and transportation to constitute 58% of total project cost, although the components of jetty and road construction work has made still very little progress against the original plan, implying that the completion by mid March 2007 may not be possible due to delay of securing the port area mainly by objections from land lease holders since 1930's as stated in 7.1.2 (5). As a whole, actual cumulative progress has reached 68.0% against the revised planned progress of 77.0% at the end of February 2007. Due to additional delay in relation to legal procedure to tackle with land issue by CES, aforementioned revised schedule has been re-revised again and it is shown in Figure 7.2-1. Based on this re-revised schedule, all works will be completed during the course of the following extended period up to mid July 2007 granted by JICA, and this re-revised schedule is indicated as blue color line against the original schedule as green color line, and actual progress as red color line in the chart.

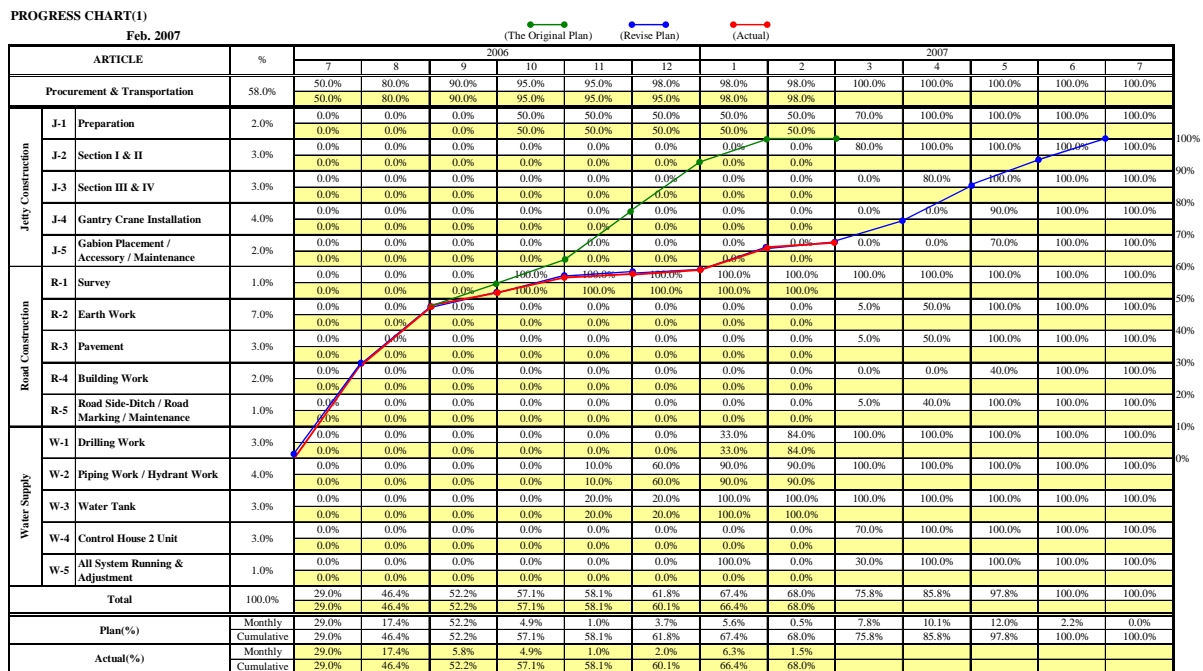


Figure 7.2-1 Work Progress Chart

On 16th February 2007, Attorney General of the Central Equatorial State has finally released an order authorizing the Ministry of Physical Infrastructure of the State to fence the Port Area to be able to resume construction works for Jetty as well as Access Road, and any interference with that process will draw an immediate arrest to the person or people as

offender, after long process of negotiation on compensation of the fruiting trees along the western bank of the River Nile with acclaimed land lessees and their representative advocate who has claimed that the State Decree dated 28th September 2006 is not effective since land lease agreements in 1930's are outdated.

After completion of fencing works and securing the site by deployment of the law enforcement personnel by the State, following works shall be taken place during the next three and a half months from March to July 2007;

- Jetty Construction
 - Preparation
 - Pier Erection & Deck Plate Installation
 - Gantry Crane Installation
 - Gabion and Accessory Placement
- Road Construction
 - Survey
 - Earth Work
 - Pavement
 - Building Work
 - Side Ditch & Road Marking
- Water Supply
 - Drilling Works
 - Piping & Hydrant Work
 - Water Tank
 - Control House
 - System Running & Adjustment

7.2.2 Quality Control

Following tests shall be taken place in mostly in Juba and partially in Nairobi;

- Jetty Construction
 - Pile (Pile Driving Test)
 - Jetty Deck (Torque Test)
 - Concrete (Slump Test, Compressive Strength Test, Trial Mix Test)
- Road Construction
 - Base Course (Proof Rolling Test, CBR Test, Static Penetration Test, Mix Proportion Test)
 - Surface Course (Abrasion Test)

7.3 MAINTENANCE AND MANAGEMENT PLAN

7.3.1 General Issue of Maintenance and Management Plan

(1) Outline of the Port Facilities (See Figure 7.3-1, Figure 7.3-2 and Figure 7.3-3)

Followings are outlines of the port facilities;

Piled jetty

Width: 30.0m (w/ Handling Yard) / 16.0m (Piled Jetty Only)

Length: 35.0m

Height: 453.70m (ASL)

Gantry crane (Hoist)

Rated load: 1.5ton

Span: 15.4m

Power source: 3-phase / 380V / 50Hz

Water surface

High water level: 452.86m (-0.84m from Jetty Surface)

Low water level: 451.36m (-2.34m from Jetty Surface)

Design river bed: 448.70m (-5.00m from Jetty Surface)

Design vessels

Displacement tonnage: 500 D.T. (L=33.0m, W=10.0m, D=2.1m)

General plan

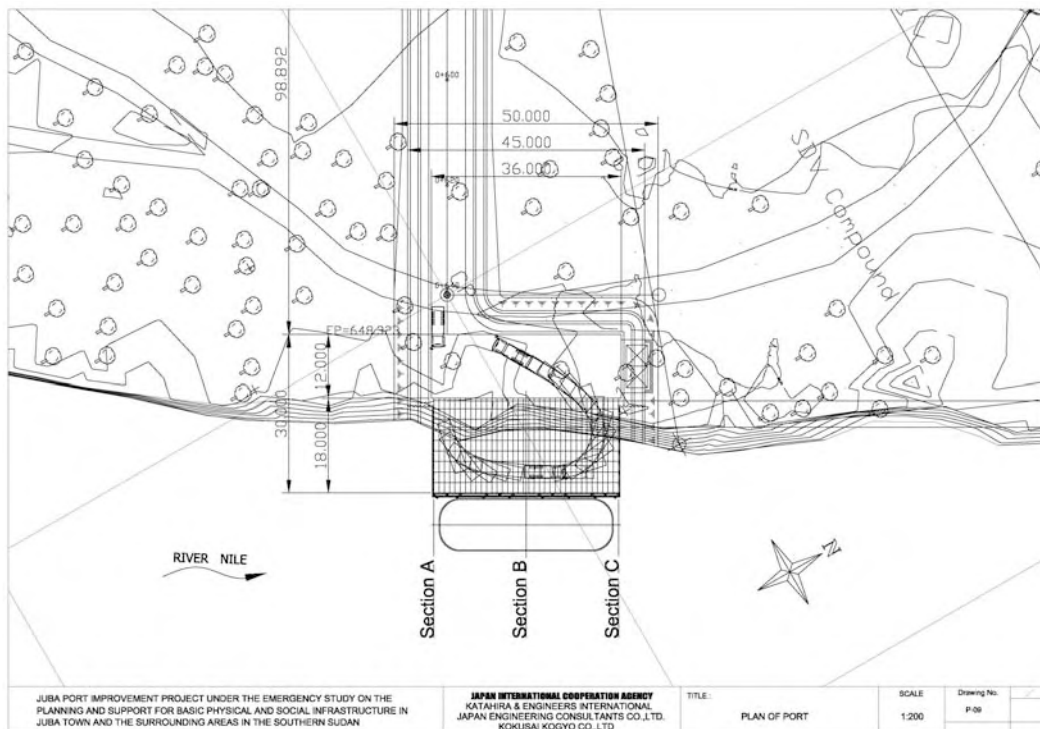


Figure 7.3-1 Layout Plan

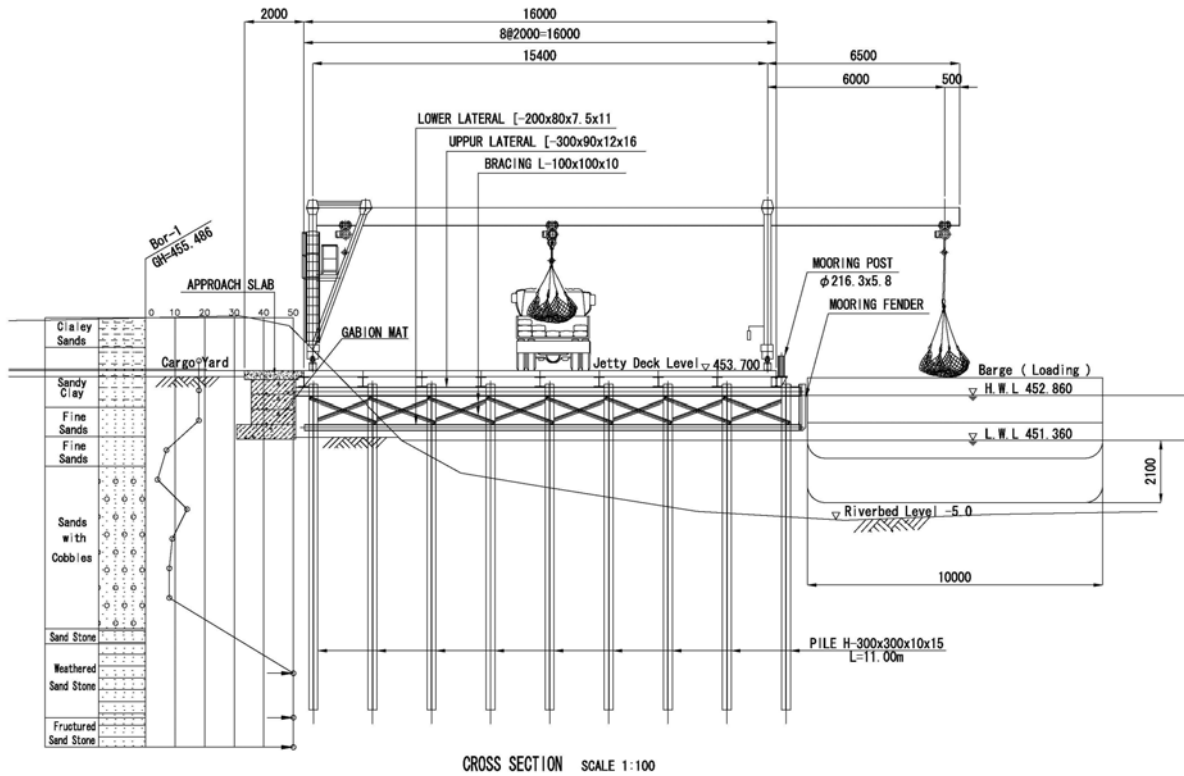


Figure 7.3-2 Cross Section

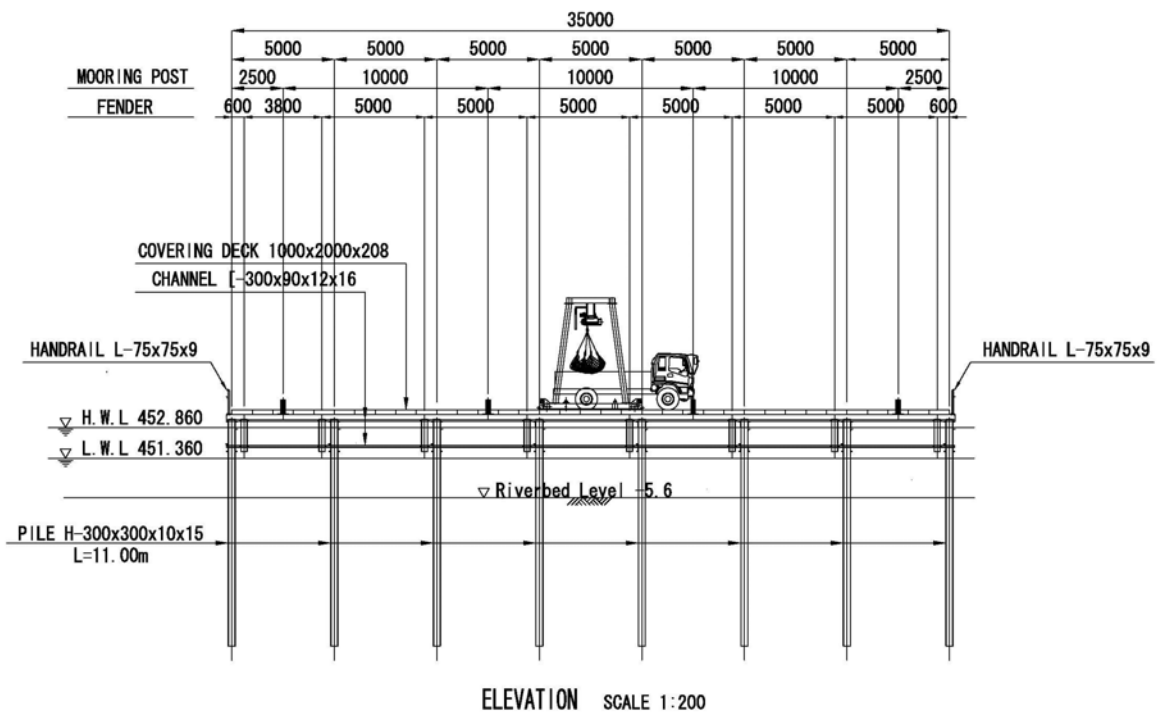


Figure 7.3-3 Elevation

(2) Inspection Plan toward Reservation of the Soundness

Maintenance and management of port facilities shall be done through the inspection based on the maintenance and management plan by evaluating soundness of the facilities. And if necessary, repairing works shall be carried out to maintain the original condition.

Inspection for maintenance and management shall be carried out based on the flow provided in the maintenance and management plan. Followings are general classifications of such inspection;

- Regular Inspection
 - General Inspection
 - Detail Inspection
- Irregular (Provisional) Inspection

Under normal condition, General Inspection shall be carried out to determine whether or not corrosion protection is working well by inspecting the condition of corrosion protection of existing facilities periodically.

As a result, if irregularity is observed, Detail Inspection which is composed of (1) Evaluation of Soundness of Corrosion Protection Works, (2) Corrosion Condition Investigation of Steel Members, and (3) Soundness Investigation, shall be carried out.

In addition to above, Irregular (Provisional) Inspection shall be carried out for the purpose of investigating whether condition of structures and corrosion protection works are still sound or not, after unusual incidents, such as severe weather, earth quake, and/or collision of vessel to the facilities.

Such inspections shall be arranged according to the importance and/or other circumstances of facilities by adjusting inspection interval and/or inspection contents.

To reserve the soundness of the facilities, it is required to apply the most rational counter measures by discovering the major deformation of the structures at an early stage and judging degree of such deformation(s) correctly according to the structure and/or quality of material of every facility.

In identifying the major deformation of the structures, it is important to describe the sequence of deformation which generally progress in the following steps; (1) cause of deformation, (2) manner/made of deformation, (3) influence of deformation, and (4) defects of function(s).

The following is the typical chain link of deformations which was made modelling the general pier type mooring facility indicated in the Maintenance & Repair Manual of the Port Structure (Coast Development Technical Research Center - Japan, June 1999).

In this report, the piled pier which is now under construction shall be examined, based on this flow chart. However, since equipment (i.e. gantry crane and storage house) is not contained in this chain link flow. Therefore it shall be handled separately.

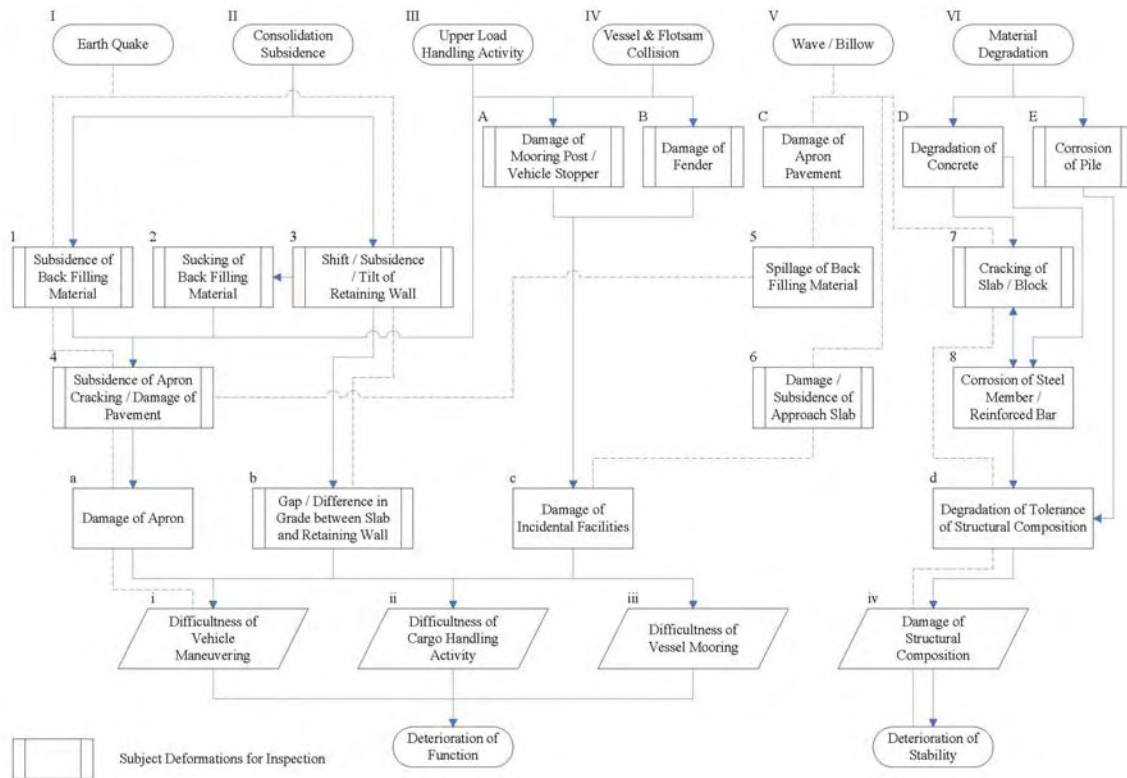


Figure 7.3-4 Major Chain Link of Deformation of Typical Pier Type Mooring Facility

(3) Identification of Cause of Detects Function of the Cargo Handling Facility and Contents of the Inspection

The general sequence of deformation of pier type mooring facility described in the preceding clause pertains to this facility, and defects of the function of cargo handling facility can be inspected accordingly.

Table 7.3-1 shows the structures and feature of the subject facilities based on the following classifications;

- Structure of Piled Pier and Retaining Wall
- Crane Equipment with Hoist
- Securing Required Draft for the Mooring Vessels

Table 7.3-1 Structures and Features of the Subject Facilities

Facilities	Compositions	Dimensions / Specification
Piled Pier	Main Girder	H-350 x 350 x 12 x 19 (SS400)
	Bracing	CT-118 x 176 x 8 x 8 (SS400)
	Upper Lateral	[-300 x 90 x 12 x 16 (SS400)
	Lower Lateral	[-200 x 80 x 7.5 x 11 (SS400)
	Pile	H-300 x 300 x 10 x 15 (SS400)
	Bolt	HTB M22 (F10T)
	Deck Plate	1,000 x 2,000 x 208
	Fender	270 x 170 x 2000
	Mooring Post	Ø216.3 x 5.8 (STK400)
	Approach Slab	2,000 x 2,000 x 300
Retaining Wall	Gabion	
Cargo Handling Facilities	Gantry Crane w/ Hoist	Rated Load: 1.5ton, Span: 15.4m, Power Source: 3C 380V 50Hz

1) Structures of Piled Pier and Retaining Wall

The facilities consists of the piled pier with steel structure, the retaining wall made of gabion and the approach slab provided for smooth transition between back yard and deck plate of the piled pier.

Because of the fact that steel piles have to support all loads of cargo handling works above, the deformation caused by the decrease of thickness as a result of the corrosion of foundation piles leads to the reduction of stability. Further the load of approaching vessels is supported by the fender (270 x 170 x 2,000 mm) and transmitted to the support piles via lateral and bracing members.

Since all the main components are made of steel, decrease in thickness by corrosion may cause reduction of the stability of the pier.

Although the facility is located along the river and corrosion due to sea water is not supposed to occur, the inspection of the main components of the pier is required to avoid destruction and degradation which make the mooring impossible.

If the wire of the gabion is corroded and the fill material in the gabion will lose the confinement, the subsidence of apron and/or the level difference between approach slab and deck plate of the pier will occur. Therefore, inspection of retaining wall structure (gabion) is also necessary.

By arranging major chain link of deformations of typical pier type mooring facility based on

the proposed components of the subject piled pier, the point requiring their attention and inspection contents for maintaining the soundness of the facilities becomes clear.

Additionally, according to the Maintenance & Repair Manual of the Port Structure, the inspection frequency of the pier is prescribed as follows;

Table 7.3-2 Inspection Contents of the Pier Type Mooring Facility

Target Deformations	Location	Contents
Corrosion	Pile	Condition of Corrosion Thickness of Material
Cracking	Apron	Condition of Cracking (Exfoliation / Damage)
Damage / Subsidence	Approach Slab	Condition of Subsidence, Shift, Damage

Table 7.3-3 Contents and Frequencies of Regular Inspection of the Pier Type Mooring Facility

Location	Contents	Frequency
Pile	Condition of Corrosion Thickness of Material	Every 2 Years Every 5 Years
Apron	Condition of Cracking	Every 2 Years

Above described frequencies of the regular inspection are for the pier type mooring facilities installed in ocean area (Superstructure; Reinforced Concrete, Substructure; Steel Pipe Pile, etc.), therefore we shall apply the same for the subject facilities (Superstructure; Steel Girder [H-350] with Deck Plate [2,000 x 1,000 x 208], Substructure; Steel Pile [H-300]) as much as possible for reference.

2) Crane Equipment with Hoist

The crane equipment installed in the cargo handling facilities contained a hoist with rated load of 1.5 ton.

Followings are its components;

- Structure components, such as a support, a beam, etc. which forms the gantry frame
- The wheels and their power component for moving a gantry crane
- Hoist which lifts cargos
- Control unit

Since the crane equipment containing the hoist is main equipment used for the cargo handling works, it becomes fatal for cargo handling works, if failure of equipment occurs.

Therefore, periodical maintenance and management is required for, so that the equipment works safely without break down.

It is a matter of course that contents of inspections, frequency of renewal, etc. required for this cargo handling equipment need to take into consideration and be defined based on the relevant regulations, the situation of supply of the equipment and parts, maintenance of the apparatus, etc. in the Southern Sudan. However, they shall be examined based on the general safety rule of the crane, data offered by the manufacturer and/or relevant organization in Japan as reference since there are many unknown factors.

3) Securing Required Draft for the Mooring Vessels

Even if the facility of the piled pier (including apron) is maintained well, enough draft for the typical barges with displacement tonnage of 500 shall be secured all the time. When the sedimentation is expected in front of the pier facility by the river bed fluctuations, especially after a flood, it is also assumed that mooring of vessels become impossible due to insufficient draft. Therefore, countermeasures, such as periodical inspection of water depth, and maintenance dredging at the time of sedimentation, are also required.

Table 7.3-4 Contents and Frequencies of Inspections for Crane Equipment with Hoist

Contents of Inspection for Structures of Gantry Crane

Inspections	Contents		Frequency
Pre-Starting Inspection	Post (include Joints)	No - Corrosion, and Degradation	Daily
	Beam (include Joints)	No - Corrosion, and Degradation	
	Rails & Wheels	No - Corrosion, Degradation, and Crunching by Foreign Substances	
	Warning System, Brake, Clutch, and Controller	Functions Affirmation	

Contents of Inspection for Gantry Crane with Rated Capacity of 0.5~3.0 ton

Inspections	Contents		Frequency
Periodical Duty Inspections	Anti Over Rolling System, Other Safety System, and Brake & Clutch	No Irregularities	Once A Year
	Over Loading Warning System, and Other Warning System	No Irregularities	
	Wire Rope, and Sling Chain	No Damage	
	Hook, and Grab Bucket,	No Damage	
	Wiring, Distribution Board, and Controller	No Irregularities	
	Loading Test (No Difficulties of Maneuvering by Standard Loading and Speed)		
Periodical Self Inspections	Anti Over Rolling System, Other Safety System, and Brake & Clutch	No Irregularities	Once A Month
	Over Loading Warning System, and Other Warning System	No Irregularities	
	Wire Rope, and Sling Chain	No Damages	
	Hook, and Grab Bucket,	No Damages	
	Wiring, Distribution Board, and Controller	No Irregularities	
Pre-Starting Inspections	Anti Over Rolling System	Functions Affirmation	Daily
	Over Loading Warning System	Functions Affirmation	
	Other Warning System, Brake, Clutch, and Controller	Functions Affirmation	

Contents of Inspection for Hoist

Classifications	Components	Conditions of Replacement	Replacement Method
Consumable Parts	Wire Rope Break Lining, and Shoe Brake Coil, and Iron Core Seals, O-Rings, and Lubricants Buffer, Magnetic Contacts, and Push Button Switches	Cut, Wear & Tear, Crack Deformation, Exfoliation, Looseness Corrosion, Degradation	Replacing Parts based on the Limited Life Span
Semi-Consumable Parts	Wire Drum, Hook, and Sheep Key, Wheel, and Axle Couplings, Opened Gears, and Grease External Cable, and Over Rolling Limit Switch Inverter	Wear & Tear Crack Corrosion Deformation Degradation	Replacing Parts based on the Total Operation Hours
Permanent Parts	Frames, and Casing Closed Gears, and Coils	Fatigue Crack, Corrosion, Wear & Tear Deformation, Isolate Degradation	-

(Source: The Japan Electrical Manufacturers' Association, <http://www.jema-net.or.jp>)

(4) Examination of Inspection Contents in Maintenance and Management of the Facility

The followings represent the contents required for maintenance and management of the subject facility based on the arranged contents in the preceding clause.

- Contents of Inspection
- Method of Inspection
- Frequency of Inspection
- Maintenance & Management of Draft in front of Pier
- Required Number of Staff for Inspection
- Expected Contents of Repair Works

Table 7.3-5 Inspection Contents in Maintenance and Management of the Mooring Facility

Facilities / Equipment	Components	Phenomenon of Deformations	Contents of Inspections and Judgments	Classification of Inspections												Expected Repair Works																						
				Regular Inspections				Detail Inspections				Irregular (Provisional) Inspections																										
				Every Week or Month	Method	No. of Staff	Remarks	Periodical	Method	No. of Staff	Remarks	Immediately after Incident *4	Method	No. of Staff	Remarks																							
Mooring Facility	Pier	Quay Wall Alignment	Difficulties of Vessel Moorings	No Irregular Alignment of Quay Wall	Yes	Visual			Yes *2	Visual	3 Men per Time	Partial Affirmation of Deformation of the Structures by Removing Deck Plates Between 2-3 Lines of Piles Shall Be Carried Out. In Case of Recognition of Any Deformations by Above, Full Scale Affirmation by Removing All Deck Plates Shall Be Required.	Yes	Visual	1 Man per Times	Inspections of Front and Both Sides of Pier from Boat and/or Berge Shall Be Carried Out.	-																					
		Main Girders *1	Deterioration of Stress & Stability of the Structures	No Deformation (Bending / Twisting)	Yes	Visual	Yes *2	Visual	Yes	-			Yes *2	-			Yes	-	Yes	-	Partial Reinforcement, Reconstruction																	
				No Damage (Cutting / Missing)	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
				No Corrosion	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
				No Cracking at Welding Points	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
		Laterals / Bracings *1 (Fender Base)	Deterioration of Stress & Stability of the Structures	No Deformation (Bending / Twisting)	Yes	Visual	Yes *2	Visual	Yes	-			Yes *2	-			Yes	-	Yes	-	Partial Reinforcement, Reconstruction																	
				No Damage (Cutting / Missing)	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
				No Corrosion	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
				No Cracking at Welding Points	Yes		Yes *2		Yes				Yes *2				Yes		Repair																			
		Other Major Members *1	Deterioration of Stress & Stability of the Structures	No Deformation (Bending / Twisting)	-	-	Yes *2	Visual	-	-			Yes *2	-			-	-	-	-	Partial Reinforcement, Reconstruction																	
				No Damage (Cutting / Missing)	-		Yes *2		-				Yes *2				-		Repair																			
				No Corrosion	-		Yes *2		-				Yes *2				-		Repair																			
				No Cracking at Welding Points	-		Yes *2		-				Yes *2				-		Repair																			
		Bolts & Nuts	Deterioration of Structures' Stress & Stability	No Omission	Yes	Visual	Yes *2	Visual	Yes	-			Yes *2	-			Yes	-	Yes	-	Repair, Replacement																	
				No Damage (Cutting / Missing)	Yes		Yes *2		Yes				Yes *2				Yes		Visual																			
				No Corrosion	Yes		Yes *2		Yes				Yes *2				Yes		Visual																			
				No Cracking at Welding Points	Yes		Yes *2		Yes				Yes *2				Yes		Visual																			
		Deck Plates *1	Deterioration of Stress of Deck Plates	No Deformation (Bending / Twisting)	Yes	Visual	Yes *2	Visual	Yes	-			Yes *2	-			Yes	-	Yes	-	Repair, Replacement																	
No Damage (Cutting / Missing)	Yes			Yes *2	Yes		Yes *2		Yes		Visual																											
No Corrosion	Yes		Yes *2	Yes	Yes *2		Yes		Visual																													
No Loose	Yes		Yes *2	Yes	Yes *2		Yes		Visual																													
Fender	Difficulties of Cargo Handling Works & Vehicle Manueverings	No Gap (Horizontal & Vertical)	Yes	Visual	Yes *2	Visual	Yes	-	Yes *2	-	Yes	-	Yes	-	Replacement																							
		No Deformation (Bending / Twisting)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Damage (Cutting / Missing)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Deformation (Bending / Twisting)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
Mooring Posts	Difficulties of Cargo Handling Works & Vessel Moorings	No Damage (Cutting / Missing)	Yes	Visual	Yes *2	Visual	Yes	-	Yes *2	-	Yes	-	Yes	-	Repair, Replacement																							
		No Deformation (Bending / Twisting)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Damage (Cutting / Missing)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Loose	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
Approach Slab	Difficulties of Cargo Handling Works & Vehicle Manueverings	No Gap (Horizontal & Vertical)	Yes	Visual	Yes *2	Visual	Yes	-	Yes *2	-	Yes	-	Yes	-	Repair, Replacement																							
		No Damage (Cutting / Missing)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Cracking	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
		No Gap (Horizontal & Vertical)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																									
Apron	Pavement	Difficulties of Cargo Handling Works & Vehicle Manueverings	No Subsidence	Yes	Visual	Yes *2	-	Yes *2	-	Yes *2	-	Yes	-	Yes	-	Repair																						
			No Cracking	Yes		Yes *2		Yes		Yes *2		Yes		Visual																								
			No Gap (Horizontal & Vertical)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																								
			No Damage (Cutting / Missing)	Yes		Yes *2		Yes		Yes *2		Yes		Visual																								
Cargo Handling Facility	Pier	General Facilities	Difficulties of Cargo Handling Works	No Difficulties of Maneuvering by Standard Loading and Speed	-	-	-	-	Yes *3	Visual	3 Men per Time	-	-	-	-	-	-	Repair																				
																			Wheels & Rails	Difficulties of Cargo Handling Works & Crane Manueverings Deterioration of Crane's Stability	No Deformation (Bending / Twisting)	Yes	Visual	Yes *3	Visual	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Repair, Replacement
																					No Damage (Cutting / Missing)	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Corrosion	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Crunching Foreign Substances	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																			Posts & Beams	Deterioration of Crane's Stress & Stability	No Deformation (Bending / Twisting)	Yes	Visual	Yes *3	Visual	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Partial Reinforcement, Replacement
																					No Damage (Cutting / Missing)	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Corrosion	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Cracking at Welding Points	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																			Bolts	Deterioration of Crane's Stress & Stability	No Loose	Yes	Visual	Yes *3	Visual	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement
																					No Omission	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Damage (Cutting / Missing)	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																					No Corrosion	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																			Hoist	Irregular Vibration	No Irregular Vibration	Yes	Visual / Physical	Yes *3	Visual / Physical	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Partial Replacement
																					No Irregular Noise	Yes		Yes *3		Yes		Yes *3		Yes		Visual / Physical						
																					No Irregular Temperature Increases	Yes		Yes *3		Yes		Yes *3		Yes		Visual / Physical						
																					No Malfunctions by Operation Affirmations	Yes		Yes *3		Yes		Yes *3		Yes		Visual						
																			Anti Over Rolling Devise	Malfunctions	No Malfunctions by Operation Affirmations	Yes	Visual	Yes *3	Visual / Insulation Resistance Measurement	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement
No Malfunctions by Operation Affirmations	Yes	Yes *3	Yes	Yes *3	Yes	Visual																																
No Damage	Yes	Yes *3	Yes	Yes *3	Yes	Visual																																
No Damage	Yes	Yes *3	Yes	Yes *3	Yes	Visual																																
Over Loading Warning Device & Other Warning Devices	Malfunctions	No Malfunctions by Operation Affirmations	Yes	Visual	Yes *3	Visual / Insulation Resistance Measurement	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement																			
		No Malfunctions by Operation Affirmations	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
Wire Rope & Sling Chain	Break / Wear & Tear / Crack / Damage	No Damage	Yes	Visual	Yes *3	Visual / Insulation Resistance Measurement	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement																			
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
Hook, Grab Bucket, etc.	Crack / Damage	No Damage	Yes	Visual	Yes *3	Visual / Insulation Resistance Measurement	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement																			
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
Power Cable, Control Panel, and Controller	Malfunctions	No Malfunctions by Operation Affirmations	Yes	Visual	Yes *3	Visual / Insulation Resistance Measurement	Yes	-	Yes *3	-	Yes	-	Yes	-	Yes	-	Yes	-	Replacement																			
		No Malfunctions by Operation Affirmations	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
		No Damage	Yes		Yes *3		Yes		Yes *3		Yes		Visual																									
Water Surface	River Bed in front of Pier	Difficulties of Mooring by Sedimentations	No Sedimentations (Affirmation of Design Draft by Soundings)	-	-	-	-	-	Yes *2	Water Depth Soundings	Carried Out With Mooring Facility Inspections	Boat Shall Be Arranged	Yes	Water Depth Soundings	Carried Out With Mooring Facility Inspections	Boat Shall Be Arranged	-	Maintenance Dredging																				

*1 In Case Of Rust-Proof Paints Are Applied to the Pier Structures, Damage of Paints Also Shall Be Inspected.
 *2 Every Bi-Annual
 *3 According to the Crane Regulation in Japan, Annual Inspection Shall Be Required, Therefore Same Manner Is Applied for This Facility.
 *4 Incidents Shall Be Varied, Such As Flood, Collision to Pier, And/Or Severe Weather, Therefore Contents of Inspections Also Shall Be Varied. In This Table, Flood & Collision Are Considered.

7.3.2 Maintenance and Management Organization

Followings are proposed as a reference based on the typical organization in Japan, and operation conditions for further operation cost estimate. Detailed operation, maintenance and management plan shall be determined by the Government of Suthern Sudan and relevant governmental organizations.

(1) Organization

The operation maintenance and management of the port shall be handled by the public sector, such as RTC in the Sudan. Out of operation maintenance and management activities, actual operation such as loading and unloading activities is usually carried out by direct management or contracted out with private sector, such as logistics companies.

Figure and Table 7.3-5 shows such typical organization structure and required number of staff in case of private sector participation to the loading and unloading activities.

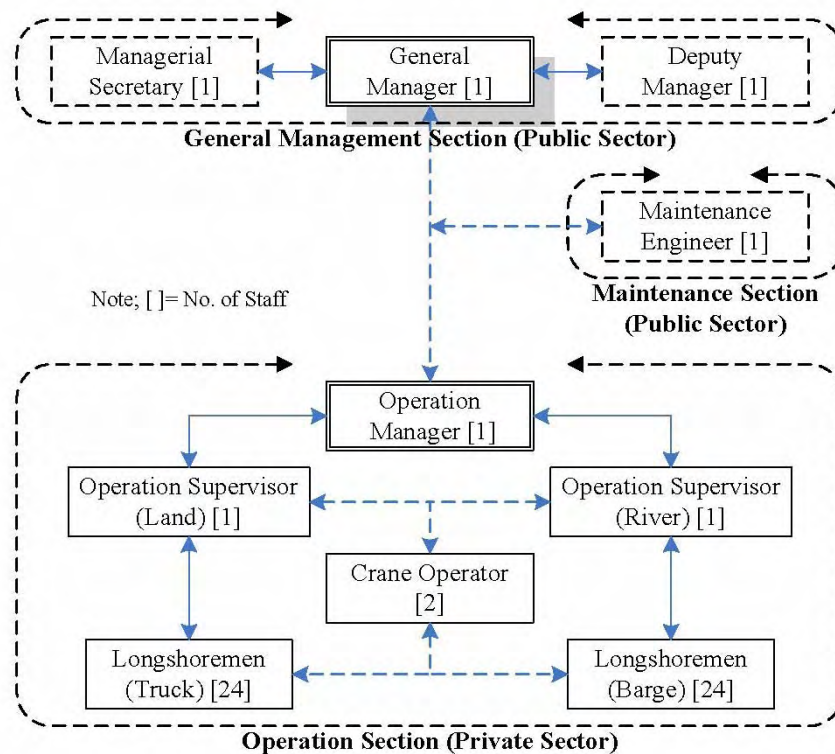


Figure 7.3-5 Proposed Maintenance and Management Organization

According to this structure, the RTC may have to appoint 2 more permanent staff to assist general manager. Regular Inspection will be carried out by Maintenance Engineer, and General Inspection is supposed to be carried out by General Manager and Dputy Manager in addition to the Maintenance Engineer.

On the other hand, the logistics company shall consist of 5 core staff, such as 1 operation manager, 2 operation supervisors, and 2 crane operators, and 2 team of longshoremen for land (truck) and river (barge).

Table 7.3-6 Proposed Maintenance and Management Organization

Position	Role	No. of Staff (in Juba)	Remarks
Director	General Manager	1	River Transport Corporation (Public Sector)
Deputy Director	Assistant Manager	1	
Secretary	Managerial Secretary	1	
Manager	Operation Manager	1	Logistics Company (Private Sector)
Supervisor	Operation Supervisor	2	
Operator	Crane Operator	2	
Staff (Land)	Longshoremen (Truck)	24 (8 x 3)	
Staff (River)	Longshoremen (Berge)	24 (8 x 3)	
Total		56	

Note that the above-described organization structure is just for reference purpose only and actual appointments of staff and/or contact out shall be determined by the Government of Southern Sudan and Central Equatorial State.

7.3.3 Operation Cost

Conditions

Followings are proposed operation conditions;

Working Days per Month	:	25 Days per Month
Handling Cargo Volume per Month	:	7,500 Tons per Month
Working Hours per Day	:	10 Hours per Day (8 Hours per Day in Japan)
Handling Cargo Volume per Day	:	300 Tons per Day
Handling Cargo Volume per Hour	:	30 Tons (30,000 kg = 600 Bags) per Hour (50 kg per Bag)
Cargo Handling Cycle	:	3 Minutes (Loading: 1 Min., Travel: 1 Min., Unloading: 1 Min.)
Handling Cargo Volume per Cycle	:	30 Bags (1.5 ton) per Cycle

Current Operation Cost

According to the current tariff applied by the River Transport Corporation (RTC), in case of 10 ton of commodity are unloaded, the RTC shall charge 10.0 Dinal for general loading and unloading fee, 14.3 Dinar for supplemental unloading fee, and 28.4 Dinar for additional fee per kilogram. Therefore, it would be 52.7 Dinal per kilogram and total fee of 10 ton of commodity become 527,000 Dinal or 2,635 Dollars, although this figure does not include any labour fees for actual unloading works, and such fees^{*1} would be charged separately by the local logistics company contracted. Those are considered as revenue accruing to the port operation.

Beside above described loading & unloading fees, the RTC may charge other fees, such as storage fee, crane fee, delay fee, and landing fee, based on the tariff presented in the next page.

Although above extra fees shall not be considered in this report, since storage facility is not provided, crane capability is far less than those in the current tariff, and delay and landing fees are not always applied.

Required Cost

Followings are required cost for maintenance and management based on the proposed situation;

- Management & Operation (Personnel)
 - USD 1,500 per Barge or USD 5.00 per Ton^{*2}
- Maintenance (Reserve & Consumption)
 - USD 300 per Barge or USD 1.00 per Ton^{*2}

Breakdowns of above described required cost estimate are shown in Table 7.3.7a and -b. It is recommendable that repair works including procurement of materials be contracted out to the private sector.

Considering current tariff by RTC and practical charge by logistics companies, even after installation of new mooring facility, maintenance and management cost would be absorbed within the current charges without further surcharge.

^{*1} Usually it would be 30 Dinal (Approx. 15 Cents) per kilogram, therefore total handling fees would fall around USD 415 per ton ($2,635 / 10 + 0.15 \times 1,000$) for both public and private sectors, if no delay considered.

^{*2} Assumed carrying 300 ton of cargo

Followings are current tariff applied by the River Transport Corporation;

- Loading and Unloading Charges:

- Loading and unloading fees are collected as 100 Piaster for each kilogram,
- Unloading fees are collected as 143 Piaster for one kilogram, and
- For parcels and other objects with weight more than 500 kilograms, in addition to above mentioned fees, other additional fees are collected as per the following table:

Commodities Weight (kilogram)	Fees per kg	
	(Piaster)	(Cent)
501 – 2,000	170	0.85
2,001 – 4,000	199	1.00
4,001 – 6,000	227	1.14
6,001 – 8,000	256	1.28
8,001 – 10,000	284	1.42
10,001 – 12,500	313	1.57
12,500 – 15,000	341	1.71

- Storage (for Occupied Land Area) Fees:

Commodities as per General Categories List	Fees for Each kg for 24 Hours or Less	
	(Dinar)	(Dollar)
Category 1, 2 and 3	43	0.22
Category 4, 5 and 6	29	0.15
Category 7, 8, 9 and 10	22	0.11

- Storage Fees:

Commodities as per General Categories List	Fees for Each Ton or Part of It per Day	
	(Dinar)	(Dollar)
Category 1, 2 and 3	43	0.22
Category 4, 5 and 6	29	0.15
Category 7, 8, 9 and 10	22	0.11

- Crane Fees:

Crane Capacity (Ton)	Fees per Hour	
	(Dinar)	(Dollar)
10	18,611	93.31
20	25,937	129.69
30	33,445	167.23
45	37,541	187.71

- Fees for Delaying River Vessels

Type	Delay Fees per Day	
	(Dinar)	(Dollar)
Vessel Type (A)	51,192	255.96
Vessel Type (B)	38,394	191.97
Vessel Type (C)	25,569	127.85
Barge Type (A)	21,330	106.65
Barge Type (B)	18,486	92.43

- Landing (Port Call) Fees:

Vessel or Barge	Landing Fees per Day or a Part of It	
	(Dinar)	(Dollar)
Mosheer	9,377	46.89
Al Canal / Al Mokran / Gharb Al Nowair	6,250	31.25
Barges and Banateen	4,690	23.45
Launches (Boats)	2,345	11.73
Barges Type 600	9,377	46.89

(Exchange Rate: 1 US Dollar = Approx. 200 Sudan Dinal / 10 Piaster = 1 Dinal)

Table 7.3-7a Breakdown of Maintenance Cost

(Unit: USD)

Reserve										
Facilities	Composition	No. of Item	Life Span	Unit Cost	Amount	Annual Reserve	Required Budget	Charge per Ton	Charge per Barge	By Facility
Number						12	150	7,500	300	
Unit						Year	%	Ton	Ton	
Mooring Facility	Rope	4	0.67	625	2,500	3,750	5,625	0.06	18.90	
	Fender	8	5.00	180	1,440	288	432	0.01	1.50	25.00
	Mooring Post	4	10.00	1,200	4,800	480	720	0.01	2.40	
Gantry Crane	Structure	1	10.00	48,000	48,000	4,800	7,200	0.08	24.00	
	Generator	1	3.33	12,000	12,000	3,600	5,400	0.06	18.00	
	Hoist	1	5.00	16,000	16,000	3,200	4,800	0.05	15.90	80.00
	Wire	1	2.00	150	150	75	113	0.00	0.30	
	Wire Basket	4	0.67	625	2,500	3,750	5,625	0.06	18.90	
Water Surface	Dredging	1	1	9,000	9,000	9,000	13,500	0.15	45.00	45.00
Total							43,415	0.48	144.90	150.00

Consumption

(Unit: USD)

Facilities	Composition	Daily Consumption	Unit Cost	Monthly Cost	Annual Cost	Required Budget	Charge per Ton	Charge per Barge	By Facility	
Number				25	12	150	7,500	300		
Unit				Days	Month	%	Ton	Ton		
Gantry Crane	Generator Fuel	30	Litter	1.00	750	9,000	13,500	0.15	45.00	50.00
	Generator Fuel	30	Litter	1.00	750	9,000	13,500	0.15	45.00	
Administration Building	Water	2	Cubic Meter	5.00	250	3,000	4,500	0.05	15.00	100.00
	Sewer	0.1	Cubic Meter	60.00	150	1,800	2,700	0.03	9.00	
	Telecom	15	Min	1.00	375	4,500	6,750	0.08	22.50	
Total						40,950	0.46	136.50	150.00	

Table 7.3-7b Breakdown of Management & Operation Cost

Personnel

(Unit: USD)

Position	Role	No. of Staff	Remarks	Daily Allowance	Monthly Payment	Annual Payment	Required Budget	Charge per Ton	Charge per Barge	By Sector
Number					25	15	150	7,500	300	Round-Up
Unit					Days	Months	%	Ton	Ton	Figures
Director	General Manager	1	River Transport Corporation (Public Sector)	36	900	13,500	20,250	0.23	69.00	
Deputy Director	Assistant Manager	1		30	750	11,250	16,875	0.19	57.00	175.00
Secretary	Managerial Secretary	1		24	600	9,000	13,500	0.15	45.00	
Inspector	Maintenance Engineer	1		36	900	13,500	20,250	0.23	69.00	70.00
Manager	Operation Manager	1		30	750	11,250	16,875	0.19	57.00	
Supervisor	Operation Supervisor	2	Logistics Company (Private Sector)	24	600	9,000	27,000	0.30	90.00	
Operator	Crane Operator	2		18	450	6,750	20,250	0.23	69.00	1,300.00
Staff (Land)	Longshoremen (Truck)	24		12	300	4,500	162,000	1.80	540.00	
Staff (River)	Longshoremen (Berge)	24		12	300	4,500	162,000	1.80	540.00	
Total		57					459,000	5.12	1,536.00	1,545.00

CHAPTER 8

PILOT PROJECT IN WATER SUPPLY SECTOR

CHAPTER 8 PILOT PROJECT IN WATER SUPPLY SECTOR

8.1 OUTLINE OF PROJECT

8.1.1 Selection of Project

Considering the nature of the pilot project and the policy of Sudanese Government on water supply development as shown below, a piped water supply system in which water is drawn from deep wells is selected as a pilot project in the water supply sector.

- **Nature of the Pilot Project**

The pilot project is the urgent rehabilitation of basic infrastructure to be implemented in a short time in order to meet the urgent needs. A water supply system taking water from the White Nile River does not pertain to the pilot project since it is too large in scale to be implemented in a short time.

- **Policy of Sudanese Government on Water Supply Development**

The basic policy of Sudanese Government on water supply development is that the piped water supply system is applied in the urban areas while direct supply of water from wells operated by hand pumps is acceptable in the rural areas.

This project is expected to be a model case of urban-type water supply.

8.1.2 Design Policy

8.1.2.1 Location and Population Served

Proposed location of wells is the northern part of Munuki, where houses are infrequent . The reason of selecting the location is as follows :

In the populated area, there exist many wells at short distances of 100 to 300 meters from each other and the ground water level tends to draw down due to interference between wells. Intake of water from new deep wells with submersible motor pumps in such an area threaten to lower the ground water level and make the existing wells un-operational. Therefore, new wells are planned to be located in the area with less houses.

Target area is the northern part of Munuki, which is populated but not supplied with sufficient water. The project is planned to serve about 2,300 people and supply 13 to 20 litres of water per person per day, depending on the possible amount of water to draw.

8.1.2.2 Water Supply System

The planned system is as follows (refer to Figure 8.1-1):

- Bore two deep wells with a depth of about 50 meters.
- Draw water from the wells with submersible motor pumps.
- Transmit the water to an elevated water tank through the transmission pipe.
- Distribute the water to 8 public hydrants through the distribution pipe.
- Supply the water through 3 taps in each hydrant.

Water supply amount is estimated at 13 to 20 litres per person per day as shown below:

- Expected pumping amount per well : 20 to 30 litres/minute
- Pumping hours per day : 18 hours
- Assumed water leakage ratio : 30 %
- Pumping amount per day :
 $20 \text{ to } 30 \text{ litres/minute/well} \times 2 \text{ wells} \times 60 \text{ minutes/hour} \times 18 \text{ hours} \times (1-0.3)$
 $= 30,240 \text{ to } 45,360 \text{ litres/day (about } 30,000 \text{ to } 45,000 \text{ litres/day)}$
- Water supply amount per person :
 $30,000 \text{ to } 45,000 \text{ litres/day} / 2,300 \text{ persons} = 13 \text{ to } 20 \text{ litres/person/day}$

8.1.2.3 Scope of the Project

The project includes the following items :

- Construction of 2 deep wells with submersible motor pumps and generators
- Construction of an elevated water tank
- Laying of water transmission pipe from the wells to the elevated water tank
- Laying of water distribution pipe from the elevated water tank to 8 public hydrants
- Installation of 3 taps each at the hydrant

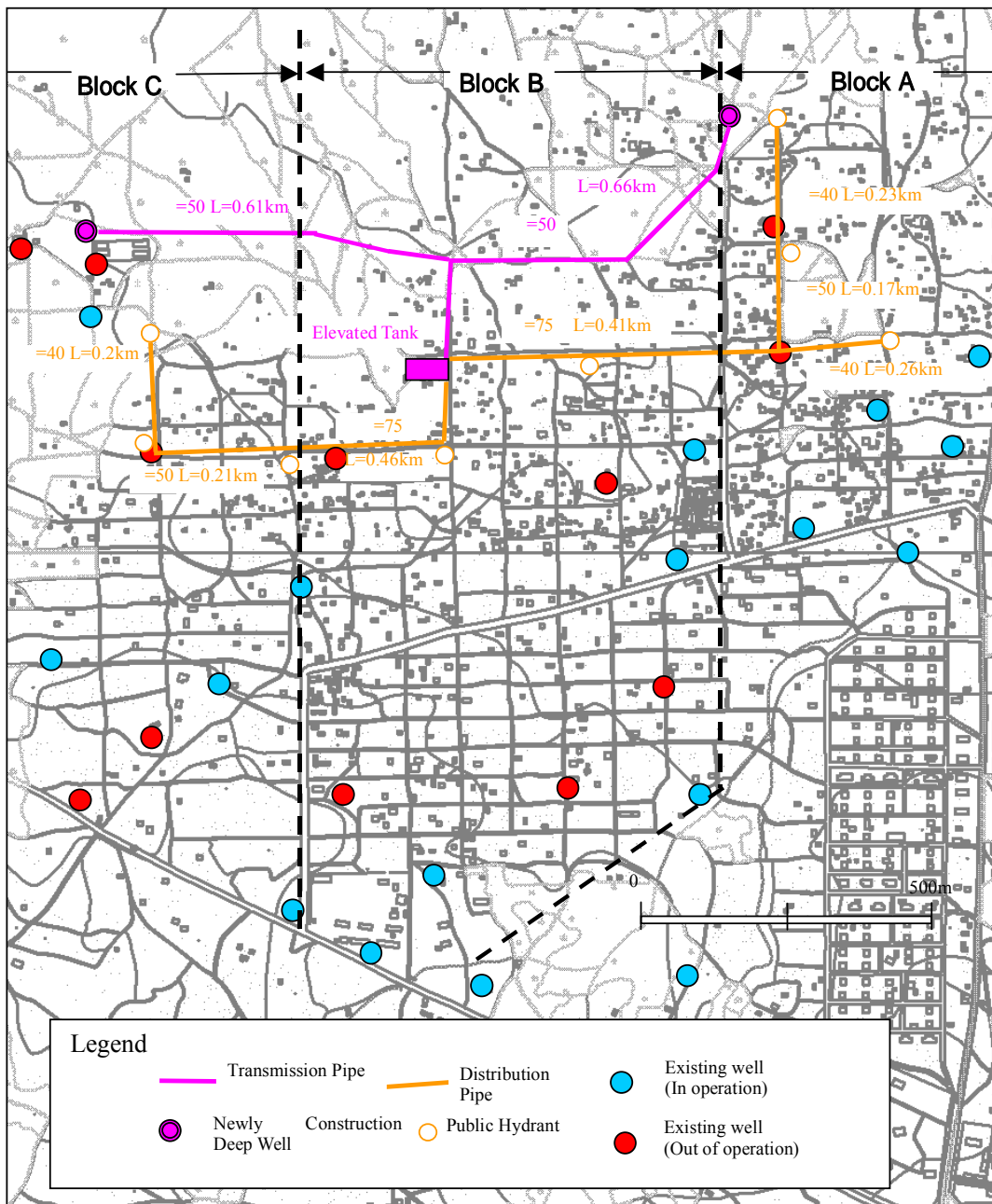


Figure 8.1-1 Layout Plan of Water Supply Facility

8.1.3 Design

The water supply facilities to be designed is illustrated below:

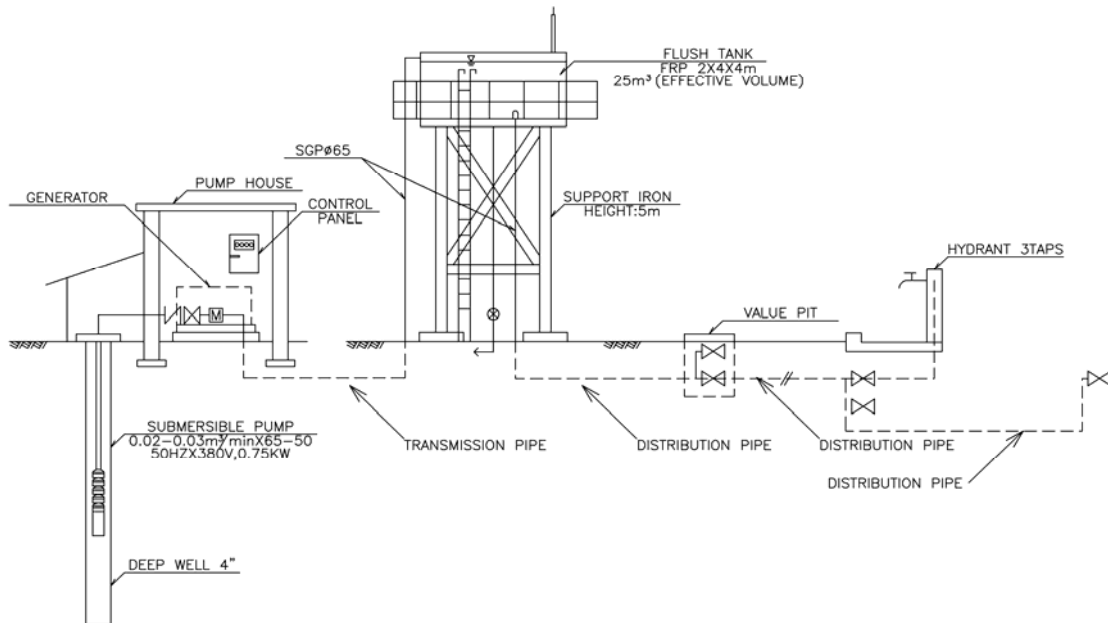


Figure 8.1-2 Water Supply Facility

8.1.3.1 Deep Wells (Two Nos.)

The structure of the planned deep wells is illustrated below.

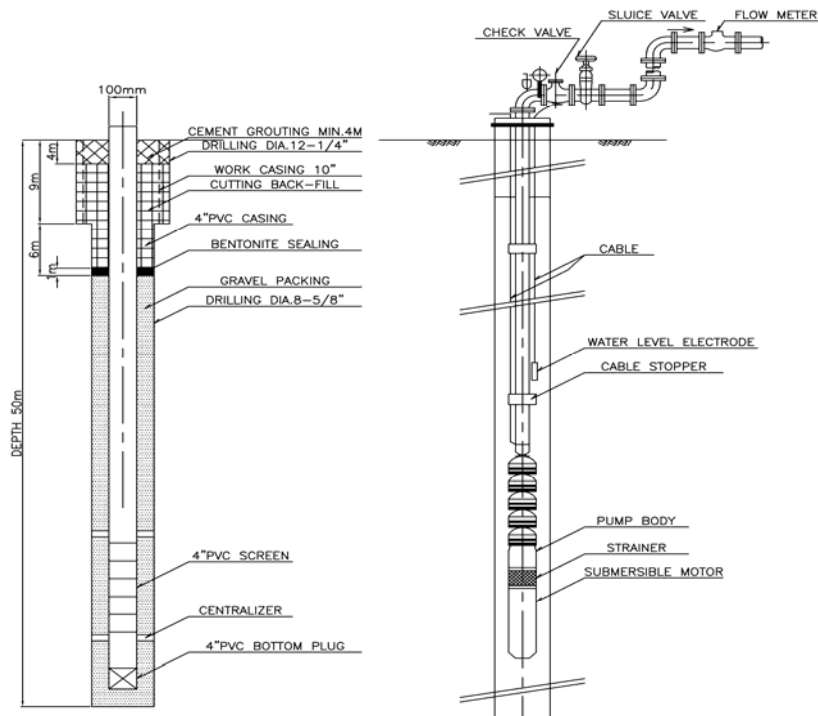


Figure 8.1-3 Structure of Deep Well

(1) Well Structure

Depth	: 50 – 55 m (average depth: 52.5 m)
Drilling diameter	: Depth range of 0 – 9 m; 12 ¼” Depth range of 9 – 52.5 m; 8 5/8”
Guide Pipe installation	: Depth range of 0 – 9 m 10” in diameter
Casing pipe	: PVC pipe of 4” in diameter; threaded joint
Screen pipe	: PVC pipe of 4” in diameter; threaded joint Slot size ≤ 1.0 mm; numerical aperture ≥ 5%
Filling of filter sand	: Between 15 m and 52.5 m in depth
Water barrier	: Between 14 m and 15 m in depth with a thickness of approximately 1 m
Refilling of excavated soil	: Between 4 m and 14 m in depth
Cementing	: Top 4 m section

(2) Pumping Test

The following pumping test will be conducted to determine the feasible pump discharge and suitability of a deep well.

Staged pumping test	: 4 stages or more; 2 hours/stage
Continual pumping test	: 6 hours or more
Recovery test	: 3 hours or more

8.1.3.2 Submersible Motor Pump (Two Sets)

A submersible motor pump will be installed in each deep well for pumping operation. The installation of this pump is already illustrated earlier.

The required capacity of this submersible motor pump is given by the following formula.

$$P_m = 0.163 \times \gamma \times Q \times H / \eta_p (1 + \alpha)$$

Where,

P_m : Required motor output (kW)

γ : Unit weight of liquid = 1.0 (water)

Q : Pump discharge = 30 litres/min = 0.03 m³/min

H : Total head = head loss around the pump + actual head + head loss due to friction in the delivery pipe + head loss due to friction in the transmission pipe + miscellaneous head loss

Head loss around the pump = 0.7 m

Actual head (H_a) = design pumping depth of well + specific height difference between the well head and the elevated water tank (HWL) = $35.4 + 7.6 = 43$ m

Head loss due to friction in the delivery pipe (H_{l1}) = $10.666 \times C - 185 \times D - 4.87 \times Q^{1.85} \times L$

C : capacity coefficient = 110; D: pipe diameter = 0.025 m

Q : pump discharge = 0.03 m³/min; L: pipe length = 37 m

$H_{l1} = 10.666 \times 110 - 1.85 \times 0.025 - 4.87 \times 0.0005^{1.85} \times 37 = 3.27$ m

Head loss due to friction in the transmission pipe (H_{l2}) = $10.666 \times C - 1.85 \times D - 4.87 \times Q^{1.85} \times L$

C : capacity coefficient = 110; D: pipe diameter = 0.05 m

Q : pump discharge = 0.0005 m³/sec; L: pipe length: 670 m

$H_{l2} = 10.666 \times 110 - 1.85 \times 0.0025 - 4.87 \times 0.0005^{1.85} \times 670 = 2.02$ m

Miscellaneous head loss (H_m): 10% of the head loss due to friction in the delivery pipe and transmission is assumed to be the loss with a bent pipe, valves and other accessories and friction loss caused by extension of the pipe

$H_m = (3.27 + 2.02) \times 0.1 = 0.53$ m

$H = 0.7 + 43 + 3.27 + 2.02 + 0.53 = 49.52$ m ... 50 m

γ_p : Pump efficiency = 0.5

Margin of safety for the motor = 0.25 (19 kW or lower)

$P_m = 0.163 \times 1.0 \times 0.0005 \times 50 / 0.5 \times (1 + 0.25) = 0.61$ kW

Required rated output: 0.75 kW

8.1.3.3 Motor

The power source for the motor will be a low speed diesel generator providing three phase and 415 V power supply. The required capacity of the motor is determined as follows.

(1) Normal Operation Time

1) Generator Output (P_c)

$$P_c = 1 / (\eta_f \times pf) \times P_m \times K$$

P_c : Required generator output (KVA)

K : Load factor of the motor = 0.90

P_m : Submersible pump output = 0.75 kW

pf : Load factor = 0.71

η_f : Load efficiency = 0.695

$$P_c = 1 / (0.695 \times 0.71) \times 0.75 \times 0.9 = 1.37$$
 KVA

2) Motor Output (Pe1)

$$Pe1 = Pc \times Pft / \eta_g$$

Pe1 : Motor output

Pft : Total load power factor = 0.9 (in the case of low pressure load)

η_g : Generator efficiency = 0.7

$$Pe1 = 1.37 \times 0.9 / 0.7 = 1.761 \text{ (Normal Operation Time)}$$

(2) Start-Up

1) Start-Up Capacity of Motor (Ps)

$$Ps = \beta \times C \times Pm$$

β : Start-up coefficient = 7.2

C : Start-up method coefficient – 1.0

$$Ps = 7.2 \times 0.75 \times 1.0 = 5.4 \text{ kW}$$

2) Start-Up Generator Output (Pc2)

$$Pc2 = Ps \times (1/Vd - 1) \times Xd$$

Vd : Permissible voltage drop factor = 0.3

Xd : Mean value of transient reactance and initial transient reactance of the generator = 0.2

$$Pc2 = 5.4 \times (1/0.3 - 1) \times 0.2 = 2.52 \text{ KVA}$$

(3) Motor Output (Pe2)

$$Pe2 = (Ps \times Vd) \times /(\eta_g \times K1)$$

η_g : Start-up power factor = 0.7

Vd : Permissible voltage drop factor = 0.4

K1 : Instantaneous load input factor = 1.0

$$Pe2 = 5.4 \times 0.4 / (0.7 \times 1.0) = 3.09$$

Based on the above, a 5 KVA generator which enables operation for relatively long hours will be selected even though its output is slightly higher than the required output.

8.1.3.4 Pump House and Control Panel

A pump house will be set up to install the pump and generator and to facilitate their maintenance and inspection. The floor size of this house will be approximately 3 m by 4 m. Concrete blocks will be used to construct the walls while the roof will be made of corrugated steel sheets.

A panel to control the starting and stopping of the pump and generator will be installed in this room. A relay function to enable the automatic stoppage of the pump will be either built in or attached to this control panel.

8.1.3.5 Starting and Stopping of Submersible Motor Pump and Generator

(1) Starting and Stopping for Normal Operation

Both the submersible motor pump and generator will be started or stopped manually.

(2) Stoppage of Pump When Elevated Water Tank is Full

When the elevated water tank is full, the electrode installed in the tank will detect this, triggering the relay installed at the control panel to automatically stop the submersible water pump. As an alarm will sound at the same time, the worker should stop the generator manually.

(3) Stoppage below Set Groundwater Level

When the groundwater level in the deep well falls below the set water level, the electrode installed inside the well will send a signal to trigger the relay at the control panel to automatically stop the submersible water pump. As an alarm will sound at the same time, the worker should stop the generator manually.

8.1.3.6 Delivery Pipe and Transmission Pump

The length of the delivery pipe will be 37 m, stretching from the discharge port of the pump to the surface of the deep well. The diameter will be 25 mm which is same as the diameter of the discharge port. This pipe will be made of zinc plated steel (SGP). Meanwhile, the transmission pipe will run between the pump house and the elevated water tank. Based on technical and economic considerations, the diameter will be 50 mm from the well to the confluence and will be 75 mm from the confluence to the elevated water tank. As there is no

risk of its exposure to outcropped rock, this pipe will be made of PVC which is light and offers good workability. Given the fact that the riser for the elevated water tank will be exposed, a SGP pipe with a diameter of 65 mm will be used for this section.

8.1.3.7 Elevated Water Tank

The elevated water tank will have a height of 5 m to secure a terminal water supply pressure of 0.2 kg/cm². The storage capacity of this elevated water tank should be sufficient to store six hours' equivalent of water intake as the terminal water demand will be concentrated over three hours in the morning and three hours in the afternoon, totalling six hours.

$$\text{Water tank capacity} = 30 \text{ litres/min} \times 2 \times 60 \times 6/1,000 = 21.6 \text{ m}^3$$

When using a standard water tank of 4.0 m x 4.0 m x 2.0 m with an effective water depth of 1.6 m, the effective storage capacity will be 25.6 m³ which will meet the above-mentioned required storage capacity.

FRP panel are the desirable materials in view of their light weight, excellent anti-corrosion performance and good workability.

This elevated water tank will be composed of a panel water tank, an elevated base made of a H section steel frame, supporting pillars, L section steel supports and a concrete base on the ground and will be able to withstand the wind pressure of a sandstorm (max. 30 m/sec). The dimensions of the steel frame elevated base will be 5,203 mm x 5,203 mm x 1,000 mm while those of the concrete base will be 6,400 mm x 6,400 mm x 300 mm as determined by the structural examination results and taking the soft ground into consideration.

8.1.3.8 Distribution Pipes

The diameter of the distribution pipes is determined so that they can continue to be used when the target area is covered by an urban water supply system in the future.

The hydraulic calculation for the distribution pipes uses the following formula.

$$HI = 10.666 C^{-1.85} \times D^{-4.87} \times Q^{1.85} \times L$$

HI : Friction (head) loss in the pipeline (m)

- C : Discharge coefficient = 110
D : diameter of pipe (m)
Q : Discharge (m³/sec)
L : Length of pipeline

	Designed water supply unit 20L / day / capita								Designed water supply unit 40 L / day / capita							
	C	D	Q	L	HI	(1 + α)HI	GL	S. Head	C	D	Q	L	HI	(1 + α)HI	GL	S.Head
ETPortion	110	0.065	0.001	8	0.024	0.027	468.24	4.973	110	0.065	0.001	8	0.024	0.027	468.24	4.973
L.Branch 1	110	0.075	0.0005	160	0.067	0.074	468.94	4.199	110	0.075	0.001	160	0.242	0.266	468.94	4.007
L.Branch 2	110	0.075	0.0004	310	0.076	0.084	470.36	2.695	110	0.075	0.0008	310	0.275	0.303	470.36	2.284
L.Branch 3	110	0.05	0.0003	200	0.168	0.185	470.80	2.071	110	0.05	0.0005	200	0.605	0.665	470.80	1.179
L.Branch 4	110	0.04	0.0001	210	0.145	0.159	468.70	4.011	110	0.04	0.0003	210	0.522	0.574	468.70	2.704
R.Branch 1	110	0.075	0.0005	180	0.076	0.083	468.24	4.890	110	0.075	0.001	180	0.272	0.300	468.24	4.674
R.Branch 2	110	0.075	0.0004	410	0.104	0.114	468.10	4.916	110	0.075	0.0008	410	0.373	0.411	468.10	4.403
R.Branch 3	110	0.05	0.0003	170	0.143	0.157	467.93	4.929	110	0.05	0.0005	170	0.514	0.565	467.93	4.008
R.Branch 4	110	0.04	0.0001	230	0.159	0.175	466.39	6.295	110	0.04	0.0003	230	0.572	0.629	466.39	4.918
R.Branch 5	110	0.04	0.0001	260	0.179	0.197	466.61	6.052	110	0.04	0.0003	260	0.646	0.711	466.61	4.616

- ETPortion : Standing pipe at elevated tank
L. Branch : Left side distribution branch pipe
R. Branch : Right side distribution branch pipe
C : Discharge coefficient
D : Diameter of pipe(m)
Q : Discharge (m³ / sec)
L : Length(m)
HI : Friction loss(m)
α : Surplus ratio for loss head due to bend, valve and extension of pipe,etc. (=0.1)
GL : Ground Elevation(m)
S.Head : Water supply Head(m)

The hydraulic calculation results indicate that a terminal water supply pressure of 0.2 kg/cm² can be secured at a water supply unit of 20 litres/day/person. Even if the water supply unit increases to 40 litres/day/person when an urban water supply system is in place in the future, the pipeline head loss will be well balanced, making these distribution pipes usable and allowing their extension with pipes of a suitable diameter.

75 mm	1,060 m
50 mm	370 m
40 mm	700 m

These pipes will be PVC pipes because of their light weight and excellent workability. As the riser for the elevated water tank is exposed, it will be a SGP pipe with a diameter of 65 mm.

8.1.3.9 Public Hydrant

One public hydrant will be given three faucets and the apron will be made of concrete. The gate valve chamber of this public hydrant will have a branch pipe in preparation for the introduction of an urban water supply system in the future. A concrete drain as well as catch basin will be constructed on the downstream side of the apron to facilitate the drainage of waste water. The catch basin will be filled with sand to facilitate the infiltration of drained waste water.

8.1.4 Construction Plan

8.1.4.1 Equipment and Materials Procurement Plan

The equipment and materials for this project which can be procured in Sudan is extremely limited. Many other equipment and materials which cannot be procured in Sudan should be procured from third countries or Japan. As for the third countries, because the transport length is short and equipment and materials are comparatively abundant, Uganda and Kenya are suitable for the procurement place. However it is difficult to procure the feed water tank made of FRP in the nearby third countries. Therefore, the feed water tank should be procured from Japan.

It is assumed that a set of the well drilling machine should be procured from the third countries. Assumed procurement places of each equipment and materials are shown in Table 8.1-1. Assumed procurement places of construction machinery are shown in Table 8.1-2.

Table 8.1-1 Equipment and Material Procurement Plan

Equipment and Materials	Specification	Quantity	Weight (t)	Procurement Place
Discharge Pipe	SGP 25	78 m	0.19	Sudan
Transmission Pipe	PVC 50	1390 m	1.56	Third countries
Distribution Pipe	PVC 40	700 m	0.55	
	PVC 50	370 m	0.42	
Hydrant	PVC 75	1060 m	2.33	Sudan
	SGP 15	36 m	0.05	
	SGP 25	16 m	0.04	
Miscellaneous Materials	Piping	80 m	0.06	Third countries
		1 set	0.20	
Steel Materials		1 set	4.30	Sudan
Gravel		7.9 m ³	21.20	
Concrete		21.2 m ³	53.00	Third countries
Steel Materials		1 set	4.30	
Water Tank	30m3 FRP	1 pcs	1.00	Japan
Well Pump	30L/min, 0.75k w	2 pcs	0.05	Third countries/Japan
Cable		2 set	0.04	
Generator	5.0KVA	2 pcs	0.24	
Total			89.53	

Table 8.1-2 Construction Machinery Procurement Plan

Construction Machinery	Specification	Quantity	Weight (t)	Procurement Place
			Volume(m ³)	
Drilling Machine	On-bord type	1 pcs	50.00	Third Countries
			120.50	
Compressor	350 ps	1 pcs	5.90	Third Countries
			25.80	
Truck	8t	3 pcs	23.00	Third Countries
			158.90	
Total			78.90	
			307.20	

8.1.4.2 Implementation Schedule

The implementation plan is divided into eight items as follows;

1. Borehole drilling work
2. Pumping Test
3. Submersible Pump Installation
4. Building work
5. Transmission Pipe Laying work

Distribution pipe Laying Work

6. Elevated Tank Installation Work
7. Hydrant Installation Work

The implementation Schedule is shown in Table 8.1-3.

Table 8.1-3 Water Supply Work Implementation Schedule

W+B29	REMARK	JULY			AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
		10	20	30					
BOREHOLE DRILLING WORK	3nosx2places	[Red bar]			[Black bar]		75	[Black bar]	
PUMPING TEST	3nosx2places	[Red bar]			[Black bar]		67	[Black bar]	
SUBMURGIBLE PUMP INSTRATION	2 places	[Red bar]			[Black bar]		25		[Black bar]
BUILDING WORK		[Red bar]			[Black bar]		50	[Black bar]	
TRANSMISSION PIPE LAYING WORK		[Red bar]			[Black bar]		35	[Black bar]	
DISTRIBUTION PIPE LAYING WORK		[Red bar]			[Black bar]		46	[Black bar]	
ELEVATED TANK INSTRATION WORK		[Red bar]			[Black bar]		35		[Black bar]
HYDRANT INSTRATION WORK		[Red bar]			[Black bar]		55		[Black bar]
		[Red bar]			[Black bar]		55		[Black bar]

Procurement

Construction Work

8.2 PROGRESS OF PROJECT IMPLEMENTATION

8.2.1 Work Progress

(1) Progress of Procurement and Transportation

It is scheduled to come into service in July, and the progress rate as of the beginning of December is 100%. (Accomplishment)

The main origins of procurement are Japan, Thailand, and Cambodia. The main items have been unloaded to Kenya (Mombasa), and being transported by land towards the site as of February 2007.

(2) Progress of Construction

Water Supply

As of February 28

- | | | |
|---|----------------------------|--|
| 1 | Distribution Pipe Line --- | Plan 1967m / Operation 1950m (Backfill completed) |
| 2 | Transmission Pipe Line - | Plan 1335m / Operation 180m (Excavation completed) |
| 3 | Elevated Water Tank ---- | Base Concrete Completed. |
| 4 | Hydrant ----- | Completed 8 hydrants complete. |

The Remaining of Works

- | | | | |
|---|---------------------|-------|------------------------|
| 1 | Water Well | ----- | 2 locations |
| 2 | Well Control House | ---- | 2 locations |
| 3 | Elevated Water Tank | ---- | Structure and FRP Tank |

Schedule

By February 28th, 5 boreholes have been drilled aiming to get 2 successful wells. However, the quality and/or quantity of the water obtained from these boreholes does not meet the criteria for drinking water, and the drilling of 6th borehole has been started. After the completion of construction of 2 wells, Installation of 2set of pumps and generators, 2 control houses and a elevated water tank are to be completed by April 30th.

8.2.2 Quality Control

Followings are main quality control items.

Materials

- Concrete : Refer to Trial Mix report and Site Test results.
- Reinforced Bar : Refer to Mill Sheet

Inspections

- Water Leak Test : Test results are shown in APPENDIX
- Pumping Test : Scheduled to be done after installation
- Water Quality Test : Being planned

8.3 OPERATION AND MAINTENANCE PLAN

In the Project, the following operation and maintenance plan are proposed for the effective and sustainable operation and maintenance of the new system. However, the concrete and detailed operation and maintenance plan is to be decided by Southern Sudan Governments.

8.3.1 Organization

The organization responsible for operation and maintenance of the piped water supply system in the Pilot Project shall be Urban Water Corporation under the Ministry of Physical Infrastructure, Central Equatorial State. This organization has long experience and 158 members of the staff in six departments for operation and maintenance of the present urban water supply system in the core area of Juba Town.

However, because of the limited budget and lack of skilled staff, the organization is in difficult situation to arrange full-time staff except two operators for the submergible pump and generator for operation and maintenance of the new system. The beneficiaries shall be, therefore, requested to participate in the operation and maintenance of the new system, especially for fair water distribution at standpipes and collection of water tariffs. They shall organize the water users association at each stand pipe (8 standpipes in total) to effectively and timely carry out the operation and maintenance for their part, if needed. Water Users' Association shall prepare the article of association on the basis of the national regulation (if any) and select the following members by election among associates.

- Head of the Association
- Administrator
- Accountant
- Hygiene Care Worker
- Water Watchman

Eight (8) Water Users' Associations shall assist operation and maintenance activities of Urban Water Corporation with mutual corporation under Munuki Council. The organization chart of operation and maintenance for the new system is as follows.

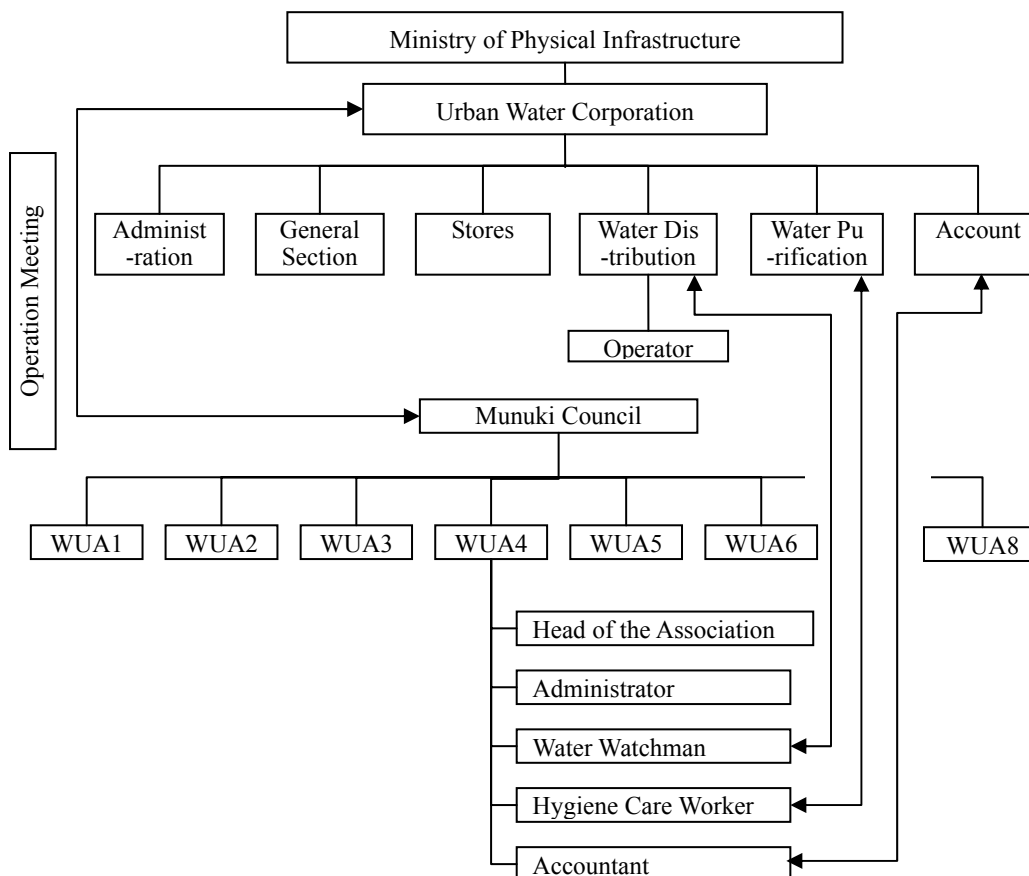


Figure 8.3-1 Organization Chart for Operation and Maintenance

8.3.2 Operation Plan

Urban Water Corporation shall prepare the operation plan in consultation with Director of Muniki Council and Heads of Water Users' Associations. On the basis of the above plan, Urban Water Corporation dispatch two operators for running the generator and the pump.

The operators confirm the amount of fuel in auxiliary tank for the diesel generator and check the condition of them before starting. Then they start the generator and the submergible pump in accordance with the operating manual submitted by the contractor. They keep watching the condition of the generator during its running and manually stop it when an elevated water tank becomes full with water, although the pump is stopped automatically. And they restart the generator and the pump, if necessary. They shall record daily operating conditions (start time, stop time, run hours, meter reading of flowmeter and amount of fuel consumption etc.), and report them to their head office regularly.

The water shall be controlled by a water watchman of Water Users' Association at the water standpipe for its fairly distributing, so that trouble among beneficiaries cannot occur over the turn of water supply and the burden of water tariff.

The water tariff shall be collected by the accountant of Water Users' Association according to i) per household, ii) per adult/person, iii) pay as you fetch, iv) combination of the above to ensure the cost recovery by and shall be paid to the accountant department of Urban Water Corporation. The accountant department records the safekeeping it and disburses for purchasing of fuel, procurement of materials and spare parts for the maintenance and payment of salary for operators and the reward to the committee of Water Users' Association, etc., if necessary.

8.3.3 Maintenance Plan

8.3.3.1 Maintenance of System

Maintenance of the new water supply system is carried out by Urban Water Corporation. Their operators, while the role of Water Users' Association is as follows.

Urban Water Corporation

General

- Procurement and safekeeping of spare parts and materials for maintenance on the basis of the annual plan
- Purchase of spare parts and materials for maintenance, if necessary
- Provision of maintenance technique to their operators and Water Users Association

Transmission and Distribution Network

- At least once a year, check the whole network on foot
 - Look carefully along the pipe route to detect any removal of soil covering the pipes due to erosion and backfill and compact it, if necessary.
 - Check to see if the foundation of valve chambers has been eroded, and backfill and compact it, if necessary
 - Check all manholes and clean their insides for easy-handling of the valve
 - Once a year, detect any leakage using a detector and carry out repairs if necessary
 - Once a year, flush dirt out of the pipeline, if any
 - Once a year, check the operation of all valves and carry out necessary repairs or replacement of parts
 - Once a year, check all visible metallic parts of the network, and brush and repaint them, if necessary

Water Tank

- Once a year, check the cleanliness of the water tank, and empty, clean and fill it with pure

water, if necessary

- Once a year, check visible metallic parts of the tank, and brush and repaint, if necessary
- Once a year, check the operation of all valves and carry out necessary repairs or replacement of parts

Well

- Once or twice a year, confirm if water table is lowering by measuring the static water level
- If the water table has dropped, add more pipes to the original rising pipe (if the boreholes is deep enough) (ask a specialist to carry out this work)
- In case the water level has not dropped, the screen may be blocked and make cleaning if necessary

Submersible Motor Pump

- Once a year, remove the submergible motor pump and the rising pipe from the well and inspect it
- Check pipe threads, re-cut corroded or damaged threads and replace badly corroded pipes with new ones, if necessary
- Inspect electric cables and check insulation between cables

Pump House

- Check the operation of the generator, the panel and the detect system of the water level on the water tank, and carry out necessary repairs or replacement of parts
- Check starter contacts and replace them with new ones, if necessary

Operator

- Daily, check the each portion of the generator and its diesel engine in accordance with check items shown in the maintenance manual submitted by the contractor and repair it/them
- Check the operation of the panel, electric cable
- Check if the pump automatically stops when the water tank becomes full with water
- Once a month, check all pipes, valves and manholes in transmission net work and in and around the elevated water tank
- Record all significant problems and actions in the logbook
- Request repairs or replacements of parts to their head office, if necessary
- Once a week, clean the inside of pump house

Water User's Association

- Daily check the operation of water taps at the standpipe and leakage of water from it, and carry out repairs or replacements of parts if necessary

- Once a month, check if transmission pipes, valves and related devices etc. near standpipes and request repairs or replacements of parts, if necessary, to the head office of Urban Water Corporation through Munuki Council

8.3.3.2 Maintenance of Water Quality

The following action shall be done to maintain supply of safe water

Urban Water Corporation

- Regulate private action in the area within 50m from the well
- Once or twice a year, carry out comprehensive water quality tests to assure that the water is safe
- Inspect boreholes and de-silt, if required
- Keep a water quality report
- Properly carry out the hygiene education to hygiene care worker of Water Users Association

Water User's Association

- Daily, clean water basin portion of the standpipe and its surrounding area
- Extend hygiene awareness to associates

The water quality shall be evaluated on the basis of the following standard (WHO Guidelines).

Table 8.3-1 Item of water quality test and water Quality Standard values

Test Item	(WHO Guidelines)	Test Item	(WHO Guidelines)
Colour	15 TCU	Calcium	-
Odor	Not unpleasant	Magnesium	0.1mg/l-
Taste	Not unpleasant	Chloride	250mg/l
Turbidity	5 NTU	Sulfate	250mg/l
PH	6.5 to 8.5	Chromium	0.05mg/l
Hardness	500mg/l	Manganese	0.1mg/l
Copper	1mg/l	Fluoride	1.5mg/l
Zinc	3mg/l	Arsenic	0.05mg/l
Electric Conductivity	-	Coliform Group	Must not be detectable
Nitrate (NO ₃ -N)	11mg/l	Bacteria	-
Iron	0.3mg/l	Ammonium	1.5mg/l

8.3.4 Cost Estimate

8.3.4.1 Operation Cost

(1) Fuel and Lubricants Expenses

Fuel expenses

Pump operating time	18 hours per day
Diesel generator out-put	5 KVA x 2 nos.
Fuel consumption of 5 KVA Diesel Generator	0.6 ℓ/hr(Load ratio : 50%)
Unit price of diesel oil	1.8 USD/ℓ
Yearly fuel expenses	
$18(\text{hr/day}) \times 365(\text{day}) \times 0.6(\text{ℓ/hr}) \times 2 \times 1.8(\text{US\$/ℓ})$	= 14,191 USD/year

Lubricants expenses

Yearly lubricants expenses : 10% of yearly fuel expenses

$$14,191 \times 0.1 = 1,419 \text{ USD/year}$$

Total cost

$$14,191 + 1,419 = 15,610 \text{ USD/year}$$

(2) Salaries for Operators

Monthly salaries including bonus expenses (bonus, safety, welfare etc.)

$$25(\text{US\$/day}) \times 24 \text{ days/month} \times 2 = 1,200 \text{ USD/month}$$

Yearly salaries

$$1,200 \times 12 = 14,400 \text{ USD/year}$$

(3) Reward to Committee of Water User's Association

Monthly water tariff per family 3 USD/family/month

$$\text{Numbers of family : } 2,300/5 = 460$$

Reward to Committee : 10 % of water tariff

$$= 3 \times 460 \times 12 \times 0.1 = 1,646 \text{ USD/year}$$

(4) Yearly operation cost

$$\text{Yearly operation cost} = 15,610 + 14,400 + 1,646 = 31,656 \text{ USD/year}$$

8.3.4.2 Maintenance Cost

(1) Yearly Expenses for Maintenance by staffs of Urban Water Corporation

Yearly Expenses for Maintenance for staff
 $= 30 \times 30 = 900 \text{ USD/year}$

(2) Yearly Repairing Cost for Maintenance

	Fundamental Cost (USD)	Design Life (Year)	Cost Ratio to F. Cost	Yearly Repairing Cost (USD/year)
Well	122,000	25	1.5	1,830
Submergible motor pump, Generator	16,000	10	4.5	720
Rump house	41,500	25	1.5	623
Pipe	150,770	25	1.5	2,258
Water tank	45,500	25	1.5	683
Stand pipe	16,000	25	1.5	240
Total				5,354

(3) Yearly Depreciation Cost

Yearly Depreciation Cost

Well, Pump house, Pipe, Water tank, Stand pipe (Design life: 25 years)

$= (122,000 + 41,500 + 150,770 + 45,500 + 16,000) / 25 = 14,038 \text{ USD/year}$

Submergible motor pump (Design life : 10 years)

$= 16,000 / 10 = 1,600 \text{ USD/year}$

Total depreciation cost $= 14,038 + 1,600 = 15,638 \text{ USD/year}$

(4) Yearly Maintenance Cost

Cost excluding depreciation cost

Yearly maintenance cost $= 900 + 5,354 = 6,254 \text{ USD/year}$

Cost including depreciation cost

Yearly maintenance cost $= 900 + 5,354 + 15,638 = 21,892 \text{ USD/year}$

CHAPTER 9

PILOT PROJECT FOR SUPPORTING COMMUNITY

CHAPTER 9 PILOT PROJECT FOR SUPPORTING COMMUNITY

9.1 Outline of the Project

Based on the aspect selection of the community-based development needs for the current communities and specific situation regarding the income generation depicted in 6.2.2 and 6.4.3, respectively, the Study Team developed the Pilot Project Idea for supporting community as described in the following sub-sections.

9.1.1 Narrative Summary

The Pilot Project called “Skills Training Project for Livelihood Improvement in Juba Urban Area” is to establish sustainable and effective skill training base for improving livelihood of community people in Juba Town Area. Training programs include technical skills training and basic education required for participants to venture their own businesses using skills obtained.

The Project intends to establish a decent base of skill training in Juba Town Area operated by NGO for the local people. The established training programs under the Project are expected to be continued and expanded. Once the base is established it is easier to expand programs in terms of subjects and of participant groups than to create completely new programs from scratch.

By continuation and expansion of the activities the coverage for the people in need can be expanded. There are many groups of socially vulnerable people including IDPs returning and incoming, de-armed soldiers, orphans, those disabled during civil war, woman headed households, adult without education, and so on. It is impossible, however, to deal with them at the same time due to constraints in physical and financial resources, proper programs, human resources, and the alike. The programs established under the Project are expected to be bases for formulating new training programs addressing toward the specific groups. The trainees to be recruited for the Project, however, are ordinary resident people in Juba for the reason that training programs under the Project are basically experimental purpose.

Since the Project places importance on practicality, the construction and/or renovating works to establish training facilities and other actual construction works in the society can be utilized for the training practices. The latter opportunities are intended to be utilized as an income generation activity which may contribute to the sustainability of the training activities by the

NGO. The income is also utilized for other purposes such as supporting completed trainees for their own business venturing and providing extra incentive to the trainers and/or trainees.

The Project intends to contribute for preventing alienation of the people living in the Area from the development of Juba Town while it may contribute for providing domestic human resources for the coming construction boom and other economic activities as training programs expands in the Town.

The established programs contain consideration for completed participants to venture their own businesses by providing or supporting them to have necessary tools and/or equipment to utilize their skills in the businesses, and business management knowledge and skills. This also aims faster diffusion of their skills in the society.

Finally all these end with efficient economic and social growth in Southern Sudan by reducing economic leakage caused by foreign workers, by increasing trickle down effect of investments utilizing domestic work forces, by enhancing local entrepreneurship, and by preventing alienation of local people from rapid development.

9.1.2 Target Group, Location, and Duration of the Project

The Project was intended to have the duration of only six months up to December 2006 from July 2006. The target group for the initial trial training was planned to be 100 to 200 youths in Juba Town Area. The Project aims to establish physical base for trainings and model training programs for forthcoming regular operations and expansion. For this aim the target group of the Project is NGO which implement the training programs. Ordinary youths with proper capacities are assumed to be participants for the program establishment.

To cover the entire Area the Project was planned to establish two training centers operated by different NGOs with capabilities of continuation of operations.

Implementation of the Project, however, could be materialized with one NGO. As a result the target of the initial experimental training programs has been reduced to 80 youth with the establishment of one training center. The duration has been extended to the end of February 2007 due to procurement difficulty including building structure construction, equipment and machinery, and tools and materials.

9.1.3 Project Purpose

The original project purpose was assigned to establish training programs to provide basic job oriented skills, which are able to be utilized for envisaged reconstruction works and functioning of the Town of Juba as the Capital of the South Sudan, to community people in Juba Town and surrounding areas for their livelihood improvement.

It has changed to eliminate “and functioning” since implemented subjects are all construction related one as shown later. Consequently the project purpose is the following:

To establish training programs to provide basic job oriented skills, which can be utilized for envisaged reconstruction works of the Town of Juba as the Capital of the South Sudan, to community people in Juba Town and surrounding areas for their livelihood improvement.

9.1.4 Outputs and Activities with Brief Inputs

(1) Output 1

To establish an executive body of the skill training programs.

Activities

- Formulate executive institutions within the selected NGOs
- Recruit or assign administrators and staff
- Establish physical entities with office furniture and equipment for execution
- Ensure procurement and management capacities of the executive bodies
- Establish accounting system
- Establish monitoring and evaluation system within the body or within the NGOs

(2) Output 2

To establish a training center with adequate facilities, machinery, equipment, tools, and material for the skill trainings to provide skills to community people of Juba Town for its reconstruction. These skills may include carpentry, masonry, plumbing, electricity wiring, vehicle maintenance and repair, mechanical, electric appliance repair, woodworks, welding and so on.

Activities

- Procure necessary materials, machinery, equipment, computers and associating
- Construct and/or renovate workshops and computer rooms necessary for the training
- Install fixed facilities and computers

- Monitor and evaluate the use of workshop, facilities and computers
- Improve the conditions of these if necessary

(3) Output 3

To establish training programs regarding the said skills and associating basic education for skill acquisition and entrepreneurship with built-in sustainable mechanism.

Activities

- Recruit trainers
- Develop programs for trainings and education
- Establish support system for the participants' venturing of their businesses after completion
- Make the trainers to understand the programs and its background
- Conduct the training and education programs with participants
- Monitor and evaluate the programs in practice (during the course of the programs and the end of the programs)
- Modify the programs as necessary

(4) Output 4

To complete the initial training courses with common participants.

Activities

- Recruit participants
- Conduct training and education programs
- Monitor participants performance in training and education
- Evaluate and modify training and education programs according to the participants performances
- Evaluate the performances of the participants before completion
- Certify the completed participants
- Support participants' venturing of their own business as they wants

(5) Inputs

The Project, which was originally planned to implement two training schemes by two NGOs with the approximate budget amounting to USD310,000 respectively, was materialized with one NGO by the contract amounting to USD310,000.

9.2 PROJECT IMPLEMENTATION

9.2.1 Implementing Body and Contract Outline

(1) Preliminary Selection of Implementing Body

The Team contacted prospective international NGOs and organizations possessing implementation capacity of the scheme under the Project. These include ADRA, SFM, ACF-USA, GTZ, CRS, NPA, and NCA. Among them organization possessing positive wills to undertake implementation of the schemes are only ADRA and SFM which hold their own firm bases with workshops in Juba Town Area.

Other organizations' positions were that they are engaged by other donors or projects/programs, and/or possess no proper base in Juba Town Area for the schemes at present.

Since ADRA and SFM have capacities to conduct the activities required for the Project, the Team proceeded for negotiation of the implementation with these two organizations.

(2) Prior Coordination Meeting among the Team, the JICA Missions and NGOs

Before commencing the collaborative works for formulating practical project features and contract terms between SFM and the Team, and ADRA and the Team, the coordination meeting among representatives from SFM, ADRA, JICA Mission for the Study, JICA Mission for the Technical Cooperation Project, and the Team was held on June 16, 2006. In the meeting the basic project framework as a JICA project was explained by JICA side and after the discussion the following points were agreed by participated parties and were incorporated into the implementation contract.

Contract Period

Considering procurement and logistical conditions in Juba and the contract periods, which were originally specified as from the beginning of July to the end of December 2006, are a subject for change based on the realistic implementation plan to be discussed between ADRA, SFM and JICA Study Team.

Ownership of Facilities and Equipment

Ownership of all the facilities and equipment procured and utilized for the service execution shall belong to NGOs on the condition that they continue the skills training activities for the same purposes as the contract.

Ownership of the major facilities and equipment among the above mentioned ones shall be

transferred to the Government of the Southern Sudan when NGO ceases the said skill training activities.

Priority Implementation of JICA Training Scheme Projects by ADRA and SFM

ADRA and SFM place priority on the implementation of the JICA training scheme project especially ones under the Project on the Improvement of Basic Skills & Vocational Training in the Southern Sudan after the completion of the contracts.

Expenditure Base Contracts

The contracts are not lump sum basis but ones with expenditure in line with the budget specified in the contracts. Basically the contract amount shall be decided on the actual expenditure basis within the contract amount.

Inclusion of Performance Closure

ADRA and SFM accepted to reduce the contract amount due to insufficient performance of which criteria shall be spelled out later.

Confirmation of No Extra Payment in Association with Delay of the Completion

Delay of the completion of the contracts is admissible with prior consultation and agreement while the extra payment in association with the delay shall not be approved.

Uniform Measures to Minimize Dropouts from the Courses

ADRA and SFM shall apply identical measures to minimize dropouts from the training courses in basic with minimal incentive factor.

Further Discussion on Details of the Contract

SFM and JICA Study Team shall conduct detailed discussion to conclude the contract which is scheduled to commence on the beginning of July 2006. The same discussion between ADRA and JICA Study Team shall be conducted immediately after the Field Director be back in Juba.

(3) Formulation of Practical Project Features and Contracting

Based on the Project outline stated in 9.1 and preliminary proposals submitted by SFM and ADRA as well as the basic agreements described in 9.2.1, the Team and SFM, and the Team and ADRA conducted collaborative works for formulating the project features and the contract terms. As a result the Team concluded the contract on June 26, 2006 with SFM.

The other scheme with ADRA was, however, not reached to the contract conclusion. ADRA side did not accept cost reduction of mainly the space leasing charges paying to its mother Church.

(4) Contract Outline

The Project named “Skills Training Project for Livelihood Improvement in Juba Urban Area” features described in the contract are summarized as follows.

Training Courses : 5 training courses of Building, Carpentry, Electrical Works, Metal Works, and Plumbing Works

Trainees : 80 youth residents (16 persons for each course) in Juba Town Area

Training Duration : From the middle of July 2006 to the middle of January 2007

Project Duration : From the beginning of July 2006 to the middle of January 2007

Project Cost : USD310,000.-

Location of the project training activities and basic time schedule of the Project are shown in Figure 9.2-1 and Table 9.2-1 respectively.

Scope of works of the Project for SFM is as follows:

To establish executing body for the training activities within SFM.

To prepare adequate space for training courses with appropriate area, facilities and equipment.

To implement trial training courses, which may contain participants’ self-business initiation support scheme, for the following skill fields with 16 training participants each:

- Building
- Carpentry and Joinery
- Electrical Installation
- Metal Works
- Plumbing

To select participant with the following qualification:

- Resident of town Payams in Juba County,
- Age of above 16,
- Primary school completion or equivalent i.e. capability of read and write, and
- No discrimination regarding sex.

To submit following report to the JICA Study Team:

- (a) Weekly reports containing following items shall be submitted to the JICA Study Team early day in the following week of the subject period;
- Major activities and issues,

- Participants' attendance records, and
 - Major procurement items,
- (b) Monthly Reports except one for December 2006 which include the summary of weekly report and financial records for the following purposes within 7 days after the end of the subject month except the timing of Progress Report and Completion Report specified below;
- To review the activities and their results,
 - To analyze performance including problem,
 - To plan measures for improvement based on the analyses, and
 - To reflect the measures to the activities,
- (c) Progress Report combined with the Progress Report for July 2006 which may include a report on preparatory work completion, detailed training programs within 10 days after the completion of the preparatory works, and summary of previous works,
- (d) Completion Report including the following items within 10 days after the completion of Project;
- Overall result of Project
 - Assessment records of trainees,
 - Trainees' self assessment,
 - Auditing result,
 - Points of appreciation, improvement, difficulties and so on for the execution of Project, Suggestions for measures, means, ways to improve identical or similar training activities.

To keep records on the following items:

- Trainees' personal record, and
- Facilities and equipment valued above U.S. Dollar Two Hundred (200.-) at the time of purchase.

To utilize Food for Training Program by WFP for the support to trainees to continue the training courses as far as practical.

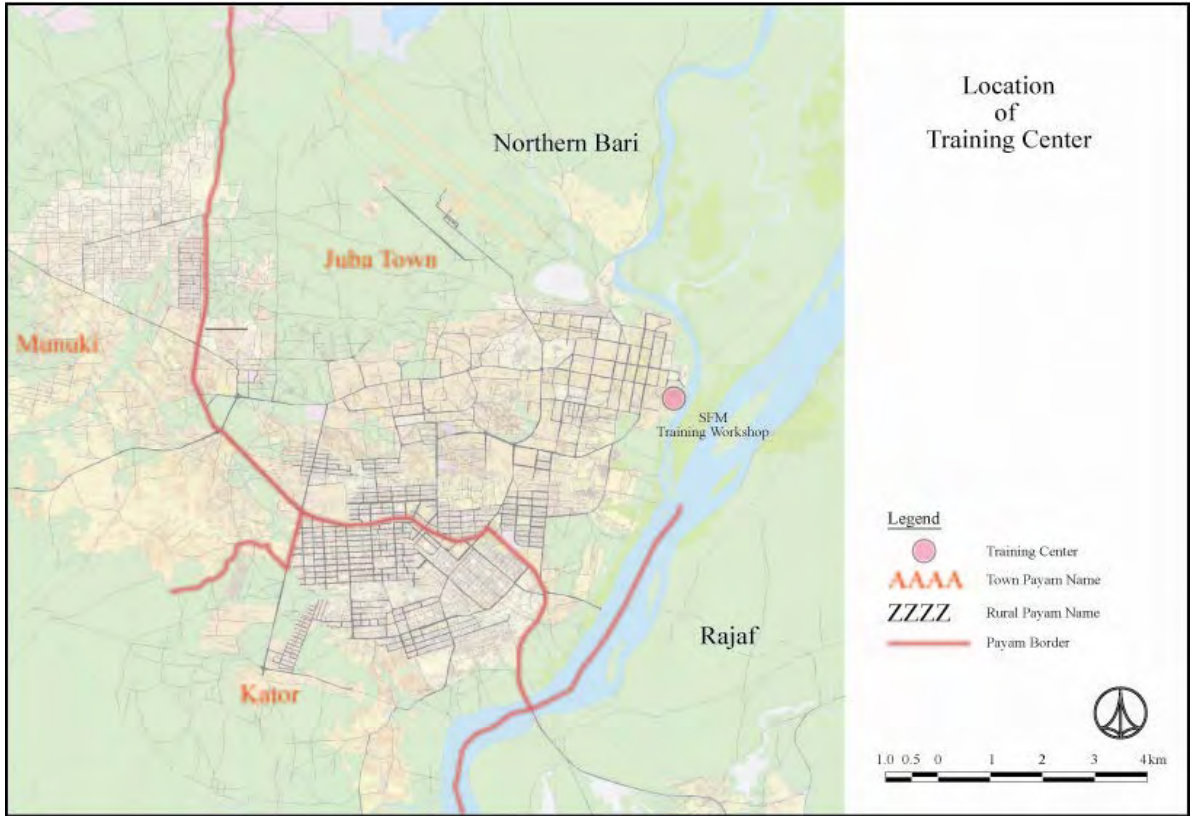


Figure 9.2-1 Location of Training Center

Table 9.2-1 Basic Time Schedule for Skills Training Project for Livelihood Improvement in Juba Urban Area by SFM

Work Item	Year Month	2006						2007		
		6	7	8	9	10	11	12	1	2
PREPARATRY		████████████████████								
Tool Procurement		██								
Material Procurement		██								
Building Construction/ Rehab.		██████████								
Instructors and Staff Recruit		████								
Training Course Prep.		████████████████████								
TRAINING PROGRAM		██								
Participant Recruit		██████								
Basic Training		████████████████████								
Participation to Preparatory		████████████████████								
Specialized Training				██						
PERSONEL ASSIGNMENT										
Project Manager		██								
Logistics/Procurements		██								
Bookkeeper/Cahier		██								
Instructors		██								
Guards		██								
REPORTS			△ Monthly Report	△ Progress Report	△ Monthly Report	△ Monthly Report	△ Monthly Report	△ Completion Report		

9.2.2 Achievement of the Project

The Project have had substantially delayed from the time schedule shown in Figure 9.2-2. The training program commenced on September 11, 2006 with roofed space which is indispensable for training activities especially during rainy season. Delay of commencement is more than one and a half months compared to the schedule specified in the contract. Since completing the training program by original schedule of the middle of January 2007 was not expected to be achieved, the closure of the Project was extended to the end of February 2007.

Essential facilities, machineries, equipment and tools for continuous training program implementation including a training, building structure and a generator were prepared fairly within time. Some items were not placed in time for practical use of the training activities during the Project although they are useful ones for the further training activities.

Considering the original intention, budgetary constraints and actual conditions of procurement and usage, types and specifications of tools and machineries for the training programs were modified. The modification was indispensable since the original procurement plan had to be prepared without assistance of training specialists. The modifications were conducted envisaging the needs for continuous training activities, the needs for the on-going training programs including numbers of trainees in particular training sections, actual prices of the goods, expediency in procurements, and financial limitation.

Training courses were ended with varied training results course by course. Among the registered 87 trainees 60 trainees completed the programs with certain basic skills. Mainly due to performance of the particular instructors and partly due to limited availability of tools and machineries, training practices for Carpentry and Joinery Section and Metal Works Section were not enough.

Delivery of knowledge by lectures faced language problem mainly due to trainees' English illiteracy caused by the former education system employing Arabic as an official language. However, the instructors could manage lectures given in English to be understood by the trainees except the Plumbing Section where instructor's Arabic speaking capability was limited. The language problem less affected the training practices since the trainees could understand the skills and their principles by observations.

(1) Building Construction

Building Structure

The building structure for the training center was completed as the base for the continuous training activities by SFM. Due to the change of the concept from semi-open structure to tightly closed structure considering worsened security situation in Juba, i.e. increase in

burglary/theft. It was also considered to be better for maintaining conditions of machineries to be kept in the closed building than in the semi-open place. Due to this change, the construction cost hiked from original plan's amount of approximately USD 27,000 to more than twice of this amount. This increase in the construction cost was also partly due to foreign exchange fluctuation from USD 1.00 = SDD 225 at the time of original plan to USD1.00 = SDD210 the actual cost calculation for the Project.

Preparatory works for the training space were hampered by mal-condition in transport and accidents relating to transport. By late October 2006 the training space had only basic roofing structures which are placed accordingly to the floor plan of the training center building. This situation continued until the commencement of the training courses on September 11, 2006. Among the additional works required for raising walls, floor making, roof cap placement, room extension construction and other construction works, only the works for raising walls by concrete blocks for the main structure were almost completed by the end of December.

Mainly due to the financial shortage caused by delay in submitting the Progress Report, of which delivery and acceptance by the Team are the conditions for disbursing the 1st progress payment to SFM, construction works were suspended until the end of January 2007. A generator which arrived in early November became available only in late January due to the financial crunch. The construction of the training center structure was completed very end of the Project

(2) Tools and Machinery

Types and specifications of tools and machineries for the training programs were modified considering the original intention, budgetary constraints and conditions of procurement and usage. The modifications envisaged the needs for continuous training activities, the needs for the on-going training programs including numbers of trainees in particular training sections, actual prices of the goods, expediency in procurements, and budgetary constraints.

Although systematic procurement plan of the necessary tools and machineries with quantity and prices was not prepared due to the organizational problem of the training center, the tools and machineries were procured basically according to the instructors' intention. The procurement was implemented following the procurement procedures of SFM and based on instructors' request for purchase except for some items of which procurements were managed by SFM Juba office directly.

In general, the expenditure for the tools and machineries were reduced substantially with due consideration of the factors stated above. The adjustment was made by the following manner in general:

- 1) Reduction of the quantities of the items due to decrease in number of trainees: It was

originally intended to provided to each trainee with tool/machinery. The nominated quantities were 25 to 30 pieces considering the possible maximum number of trainees to be accepted, and wear and tear of tools/machinery. However, the actual number of trainees was 20,

- 2) Adjustment of quantity of items initially intended for shared use, considering the actual needs, prices and available budget,
- 3) Procurement of additional items to meet the actual needs, and
- 4) Abandoning of purchasing of some items included in the original plan considering their practical necessity, importance, and expediency in procurement.

Building Section Tool

Building Section requires basically light hand tools except a concrete mixing machine and a concrete block machine. It is basically manual work-oriented subject. Owing to the characteristics and local availabilities, most of the necessary tools for the training practices were procured as necessary.

Carpentry and Joinery Section Tool

The subject of carpentry and joinery is reliant to tools and machinery i.e. it requires varieties of tools and machineries to produce quality products fallen under the category. This nature requires quality tools and machineries in the trainings for quality of the practices and for continuity. Machineries which require substantial electric power and/or installation works such as a mortising machine, a thickness machine, a belt sander, a circular saw became ready for use lately.

Electrical Installation Section

Tools required for Electrical Installation Section are basically light ones while this training section demands variety of materials which include functional equipment like a motor and a DC/AC inverter. Most of required tools for the practices were purchased except meters which were complemented by the instructor's efforts.

Metal Works Section

For the Metal Works Section, relatively heavy duty machineries including a welding machine, a grinder, a stationary drilling machine are needed while it also requires the basic hand tool oriented skills of filling, cutting and formulating. Tools and machineries required for training practices were purchased and utilized for the practices.

Plumbing Section

Same as Electrical Installation Section, Plumbing Section requires rather light tools which are locally available while they demand variety of materials for practices. For the section, however, many additional items of light tools were procured according to the practical needs. Necessary tools for practices were procured fairly in time for the practices.

(3) Recruitment of Trainee

Recruitment of trainees was conducted in coordination with the Juba County Commissioner's Office. For the selection of trainees, the following criteria were originally planned to be applied in the interview: a) intellectual level equals to the primary school graduates i.e. reading and writing with basic calculation, b) commitment for acquiring skills, c) ordinary youth living in Juba Town area. During the interview the criterion a) was relaxed based on the consensus of the interviewers consisting of SFM-Juba representatives, the Commissioner and commissioners staff, on trade off with applicant's firmer commitment in acquiring skills. In addition to the above, priority was placed on the applicants without job.

By the time of the joint interview session (July 25, 2006), 100 youth residents with 14 additional applicants as reserves have been selected for entire training courses of 5 skill fields. The total quota was 80 people with 16 people quota for each field. The trainees were recruited in excess of the total quota considering some drop-out in early stage. The trainees were supposed to face difficulty in adjusting their life styles from rather self-disposing free one to one which strictly abide to the timetable and activities prepared by the training institute. Recruitment of trainees was delayed by unsuccessful coordination arrangements with the County Office and unexpectedly slow dissemination of the information of recruiting.

In the middle of October 79 applicants were registered for the training program. Among the 79 accepted trainees, 67 which include 10 female trainees have proceeded for the specialized training. At the end of February 2007, the 60 trainees shown in Table 9.2-2 which include all the 10 female completed the training courses.

Table 9.2-2 List of Trainees by Section

<u>Building Section</u>	<u>Carpentry Section</u>	<u>Electrical Installation Section</u>	<u>Plumbing Section</u>
1 Susan Tabu Farjalla (F)	1 Juma Kenyi Mario	1 Duku Oliver Cosmas	1 Agness Atina Clement (F)
2 Hillary Laku Micheal	2 Peter Wani Kulang	2 Makarious Ladu Micheal	2 Stella Siyama Simon (F)
3 Micheal Zakayo Daniel	3 Rose Kojo David (F)	3 Juma Marcelino Sebur	3 Roda Juan Ladu (F)
4 Loice Micah Lodikun (F)	4 Saforoni Ohiri Obeyokok	4 James Cirilos Maring	4 Dina Ayite Joseph (F)
5 Micheal Ladu Michalle	5 Rasas Isac Duke	5 Emmanuel Lubari Christopher	5 Wilson Denis Abini
6 Martin David Wani	6 James Wani Ladu	6 Moris Lokonga Edward	6 Lurwo Shem Bande
7 Jackline Klyona Surur (F)	7 Henry Olimpio Morobe	7 Richard Lomeling	7 Charbonier Night Wydiffé
8 Susan Denis Ladu (F)	8 James Taban Paul	8 Emmanuel Lemi Francis	8 Loding Julious Gale
9 Justin Gore Jeremiah		9 John Kaden Elisa	9 Loksang Samuel
10 Jenario Paul Jada		10 Richard Ladu Massimion	10 Jangsuk Moses Jale
11 Alex Manswa Gwarit	<u>Metal Work Section</u>	11 Gedion Charles Aboro	11 Obira Mathew
12 Leju Moses Edward	1 Taban Moses	12 Moses Korsuk Mathew	12 John Izaru Selim
13 Tom James Samson	2 David Ritti	13 Felix Tombek Peter	
14 Tadeo Ladu Zacharia	3 Samuel Ladu Kamilo	14 Moris Benjamini Ladu	
15 James Pitya Yugusuk	4 Martin Sebit John	15 Charles Chau Thomas	
16 James Lotio Simon		16 Scopas Mule Andrew	
17 Alfred Loro Dario		17 Kenyi Nicholas Simon	
18 Cosmas Lungaju Abraham		18	
19 Mary Kiden Onesimo (F)		19	

(4) Training Program

Training courses of five sections of Building, Carpentry and Joinery, Electrical Installation, Metal Works, and Plumbing were conducted from September 11, 2006 to the end of February 2007. As shown in Table 9.2-2, Building Section produced the maximum number of completed trainees (19), followed by Electrical Installation Section (17). Number of completed trainees of Plumbing Section was 12. Carpentry and Joinery Section and Metal Works Section fostered 8 and 4 completed trainees, respectively.

Training programs cover the topics and skill practices as described in the syllabi shown in Table 9.2-3. Delivery of knowledge by lectures faced language problem mainly due to trainees' English illiteracy in general, according to the instructors opinion. Instructors could, however, manage this problem by complementing explanation in Arabic although it was burdensome for the instructors. The instructor for Plumbing, the sole instructor for the section, did not have sufficient Arabic command and had to rely on English. These have been confirmed by trainee interviews conducted by the Study Team.

This language problem of English literacy was caused by the former education system employing Arabic as an official language. Most of the target populations of the skills training in Juba Area whose ages are ranging from 18 to 35 are educated in Arabic. Daily conversations in the society are dominated by Juba style Arabic. Even the trainees educated in English are not able to speak fluently and comprehend poorly since they rarely had chance to use English.

Numbers of completed trainees by Section seem to have correlation with trainees' satisfaction levels to the courses they belonged. All the 11 trainees of Building Section and another 11 trainees of Electrical Installation Section inquired for their impression/assessment regarding instructors and lecture/practice answered their satisfaction for the training. Among 10 trainees of Plumbing Section, 6 referred to the language problem and 5 mentioned inappropriate time management of leaving trainees without assignment.

All the 8 completed trainees of Carpentry Section mentioned irregular attendance of one of the two instructors. According to the trainees all the training practices were conducted by the other instructor. Mostly due to this instructor formation, 6 out of 8 trainees are not satisfied by training practices including roof, door, window, and cabinet makings, and timber preparation in association with use of tools and machineries. Three (3) trainees among four (4) of Metal Works Section were inquired for their satisfaction and results varied except for the one instructor's irregular attendance to the training.

Although it was difficult for the instructors to conduct training lectures and practices in parallel with their training preparatory works, and procurement and construction works, they succeeded to deliver basic knowledge and skills in their fields. Preparation of curriculum were ready by the middle of January. The instructors prepared the curricula based on their own idea on the program referring the example offered by the JICA Team. The training programs were conducted in accordance with the training plans prepared by the instructors. There could be some confusion among the instructors on how to decide definite targets regarding skills and knowledge suitable for the trainees. This was due to the fact that the trainees had already been recruited and the trainees' capabilities in literacy, calculation and general understanding including the knowledge regarding the subjects were significantly diverse. Flexible adjustment of the training programs was required for the instructors to modify the teaching contents to make them suitable for their trainees.

It was too much demanding to conduct income generation activities during this training period. Some of the reasons seem to be that the instructors were too busy in their training and preparatory activities, and also lacked interest for income generation. Awkward procurement processes and delay of the construction might affect negatively to the aspect by imposing additional burden to the instructors.

Provision of foods through the "Food for Training" by WFP has been regularized in December after mishandlings and misunderstandings in the initial stage. The scheme greatly helped the trainees to continue their trainings.

Descriptions of each section's training are as follows:

Building Section

Building Section conducted lessons and practices regarding brick laying and concrete works. It provided basic knowledge regarding material, measuring and calculation, skills necessary for building structure construction by bricks and/or concrete. It had intensive practices of brick laying and utilized the opportunities of construction of the training center building for concrete practices. Procurement of the tools and machineries, and materials did not substantially affect the training.

19 completed trainees including 5 females were well coordinated by the instructors for their practices as recognized by the trainees of the other sections. Satisfaction level of the trainees is high as described in the above. It embraced 4 trainees without primary education. Although 13 among 19 trainees do not understand English and 3 understand English little, the language was not a big problem in the section. All the completed trainees acquired "Pass" or better grade, while the paper examination had to be conducted with oral explanation for questions and for multiple choice answers.

Electrical Installation Section

Electrical Installation Section conducted pragmatic lessons and practices required for mainly in house wiring including general fittings such as switches, lightings, sockets and so on. It covered wiring from a ordinary generator and solar panel system connections including inverter. Most of the trainees are ready for conducting these works relating to the electricity supply and use. However, the practice regarding the three-phase motor re-assembling was not implemented due to lack of the procurement of the material.

Among the 17 completed trainees, 6 did not understand English and 5 could understand little. Although there was little language problem in delivery of knowledge and skills, the instructors had to explain questions of paper examination in Arabic and a few trainees who can write only in Arabic had to explain their answers orally since the instructors could not read Arabic. The trainees are all male and most of them were personally interested in the field of electricity. All the completed trainees attained their grades as “Pass” or better.

Plumbing

The Section well provided knowledge of plumbing as a part of the water supply and drainage system. It covered essential practices for plumbing skills for water supply and drainage within buildings with common water use fittings such as a kitchen sink, a shower outlet, a wash basin and so on, and flush toilet system installation. It lacked, however, practices using real water.

The language problem was substantial in this section due to the instructor’s poor command of Arabic. Six (6) trainees out of 10 inquired pointed out this problem. In the examination 3 trainees who can write only in Arabic returned the paper without answer. Since the instructor encountered problem in the written examination, he conducted the oral complementary examination for these student to secure the trainees’ equity in assessment. Among the 12 completed trainees, 3 trainees were graded as “Fail”.

The other issue raised by the completed trainees is the time management. The instructor sometimes left the trainees without assignment for his other duties than lecture and practice. More practices could have been given, if he provided assignments although it is well understood that it was difficult for him to do so. The Section secured the partly use of working gears such as eye protection glasses, helmets, and dust protection masks.

Carpentry and Joinery Section

The Section well covered the topics in the field through its lessons which include raw materials, explanation of tools and machineries, joints, makings of roof, door, window and floor, and cabinet and table makings. The practices, however, were limited to the works related to the basic joints which require hand tool works basic to the field including sawing, planning, chisel works, jointing, and finishing.

The trainees were frustrated with the gap between the lectures given and the practices done. It was partly due to the late arrival of the machineries together with the instructor's approach in practices and the other instructor's less contribution caused by irregular attendance. Out of 8 completed trainees 6 are willing to have more opportunities in the above mentioned practices and in use of lately arrived machineries. They have acquired, however, basic knowledge and skills in the field through the program. Only one trainee among the completed trainees was graded as "Fail".

Metal Works Section

The Section's achievements in practices were not satisfactory to the completed trainees mainly due to the instructor's irregular attendance. The lectures which looked difficult to the trainees in the beginning were understood by most of the trainees as the program proceeded. Practices in welding and sheet metal works were supplemented by the outside technical experts in the occasion of the construction works.

Although all the completed trainees acquired the basic skills in metal works, one of them graded as "Fail" due to his unsatisfactory results in the paper examinations. There is a possibility of language problem while his attainment of skills was fairly lower than the other 2 trainees who obtained Pass status.

Table 9.2-3 Training Syllabi

Items	Details	Items	Details
Building Section			
Craft Theory Introduction	Safety Introduction to Building Trade Parties Concerned with Construction of Building Preliminary Site Operation Block laying and Concrete Tools Walling Material Bonding Foundation Wall Construction Floor Construction Finishes for Block Walling Openings in Wall Scaffolding	Technical Drawing	Scales and Plan Interpretation Building Layout Plans Projection Views Plane Geometry
		Workshop Practice/ Site Visit and Work	Stretcher Bond English Bond Flemish Bond Header Bond Cavity Wall Brick Cutting Block Bond Broken Bond Footing Course Bridge Openings Chimney Breast and Flues Molding Pre-cast Units Attach Piers Visiting Existing Building Construction Visiting New Building Construction Identification of Deffects on Old Constructions Report Writing
Craft Science/ Construction Material	Cement Lime Aggregate Mortar Concrete Damp Proof Membrane Plastering and Rendering		
Craft Calculation	Measurement Scales Calculation Ratio, Average, Percentages		
Carpentry and Joinery Section			
Safety	Protective Clothing Harmfull and Dangerous Materials Tools and Equipment Work at Height General Site Work Tools and Equipment Life on Site	Wood Works	Basic Joints Door Frames and Linings Traditional Casement Windows Center and Form Works Timber Ground Floor Timber Ground Floor Traditional Casement Windows
Tools for Carpentry and Joinery	Tools for Marking Cutting Tools Boring Tools Percussion Tools Screw Driver and Pincer Workshop Equipment	Wood Work Machine	Safety Regulations Sawing Machines Planing Machines Mortcising Machines
		Wood Working Materials	Adhesives Fasteners
Raw Materials	Trees Commercial Timber Conversion of Timeber Seasoning of Timber Timber Decay Timber Defect Fungal Attack Insect Attack Preservative Treatment Veneers and Man Made	Workshop Drawing	Setting Out Cutting List Marking Out Main Requirements
		Technical Drawing	Types of Drawing Isometric Projection Orthographic
		Applied Mathematics	Simple Addition Fraction Percentage
Electrical Installation Section			
Safety Regulations	Safety Regulations Use of Equipments Danger Associated with the Use of Materials Personal Hygiene	Magnetism	Electro-Magnetism Simple Magnetic Circuit Resistance and Reluctance DC Circuits Capacitors and Capacitance
Electrical Generation and Distributions	Career of Electricity Electrical Supply and Distribution Systems	Electrical Materials	Construction Materials Conducting Materials Semi-Conducting Materials Resisting Materials Insulating Material
Electrical Application	Wiring Systems Current Using Apparatus Faulty Finding		

Items	Details	Items	Details	
Electrical Measurements	Electrical Measuring Instruments Electric Meters Testing and Inspection Methods	Mathematics	Arithmetic Simple Algebra Simple Geometry	
Electrical Machines	Types of Electrical Machines Simple Construction Connection Maintenance and repairs	Business Management	Entrepreneurial Awareness Entrepreneurial Opportunity Small Business Planning Small Business Planning	
Electrical Drawing	General Matters Concerning Drawing Instrumental Drawing Methods Electrical Symbols Machinery Drawing Sketching and Drawing of Electrical Appliances Drawing of Electrical Wiring Diagram	Safety in Practices	Safety Regulations	
		General Fittings Practices	General Fittings Practices	
		Electrical Measuerment Practices	Electrical Measuerment Practices	
		Electrical Wiring Practices	Electrical Wiring Practices	
		Electrical Machines Practices	Electrical machines Practices	
Metal Works Section				
Safety and Hygine	Personal Safety Safety Regulations Sfety of Tools and Equipment House Keeping	Welding Theory	Introduction to Welding Safety Introduction to Welding Tools and Equipment Types of Welding	
Workshop Calculations	Units General Simplification Rates and Proportions	Business Management	Entrepreneurial Awareness Entrepreneurial Opportunities Small Business Planning and Management	
Drawing	Lives and Lettering Solid Geometory Isometric Projection of Circles Development	Pracitcal Safety	Bench Work Welding	
		Bench Work Practices	Workshop Safety Measuring Marking Cutting Filling Finising	
Materials	Types of Metals Properties of Metals Metals Protection	Sheet Metals Practices	Workshop Safety Measurement Cutting Forming	
Bench Work Theory	Personal Safety Introduction to Tools Measuring and Marking		Welding Practices	Workshop Safety Arc Welding
Sheet Metals Theory	Safety of Sheet Metal Work Tools and Equipment Types and Uses of Sheet Metal Forming Process Types of Shee Metal Joints			
Plumbing				
Introduction to Plumbing	Safety in Plumbing Plumbing Tools Print Reading Sketching Rigging and Hoisting	General Drainage System with Practices	Principle and Types of Drainage systems Below Drainage Systems Site visit / Study Tour Above Ground Drainage Systems Site Visit / Study Tour Drainage pipes and fittings Waste and Soil Water Disposal Units Magures Rules Inspection Chamber/ Manhole Construction Study Tour Septic Tanks Study Tour	
Plumbing Trade Calculation	Mathmatics for Plumbers		Problems in Plumbing System	Repairing Sater Supply System
Water Supply in Plumbing	Water Supply		with Practices	Problems in Water Supply Systems Problems in Drainage Systems
Theories with Practices	Site Visit Types of Water Supply in Domestic Dwellings Hydraulics Water Treatment Site Visit Water Supply Pipes Fittings and Materials Valves and Meters Water Supply Pipes Installation Site Visit		Plumbing Career Development	Job Orientation
			Hot Water Supply in PlumbingTheories	Principle of Hot Wtaer Systems
Plumbing Design and Installation Practices	Installing Plumbing Fixtures and Faucets Appliances			

(5) Organizational Establishment

Although recruitment of project staff and trainers was harder than expected by the relevant people, all the project members planned by SFM were in position by the middle of October to be in accordance with the project organization shown in Table 9.2-3. Scarcity of human resources around Juba became apparent especially for the positions with higher qualification. The government sector are gathering these personnel with good salaries. There had been rapid increase of job opportunities under foreign related activities which require high qualification.

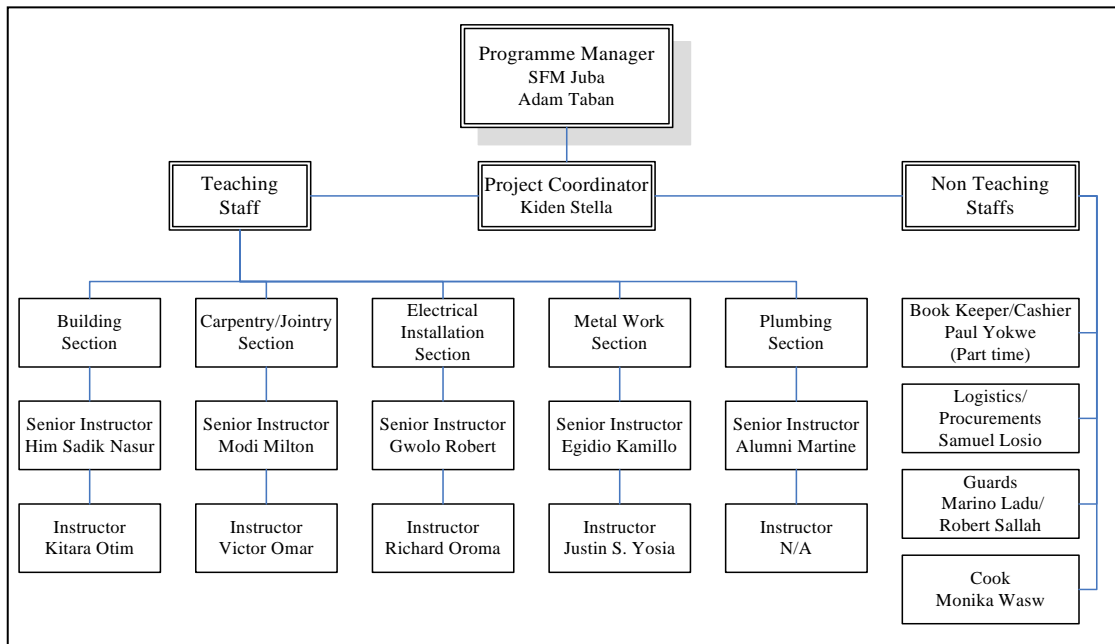
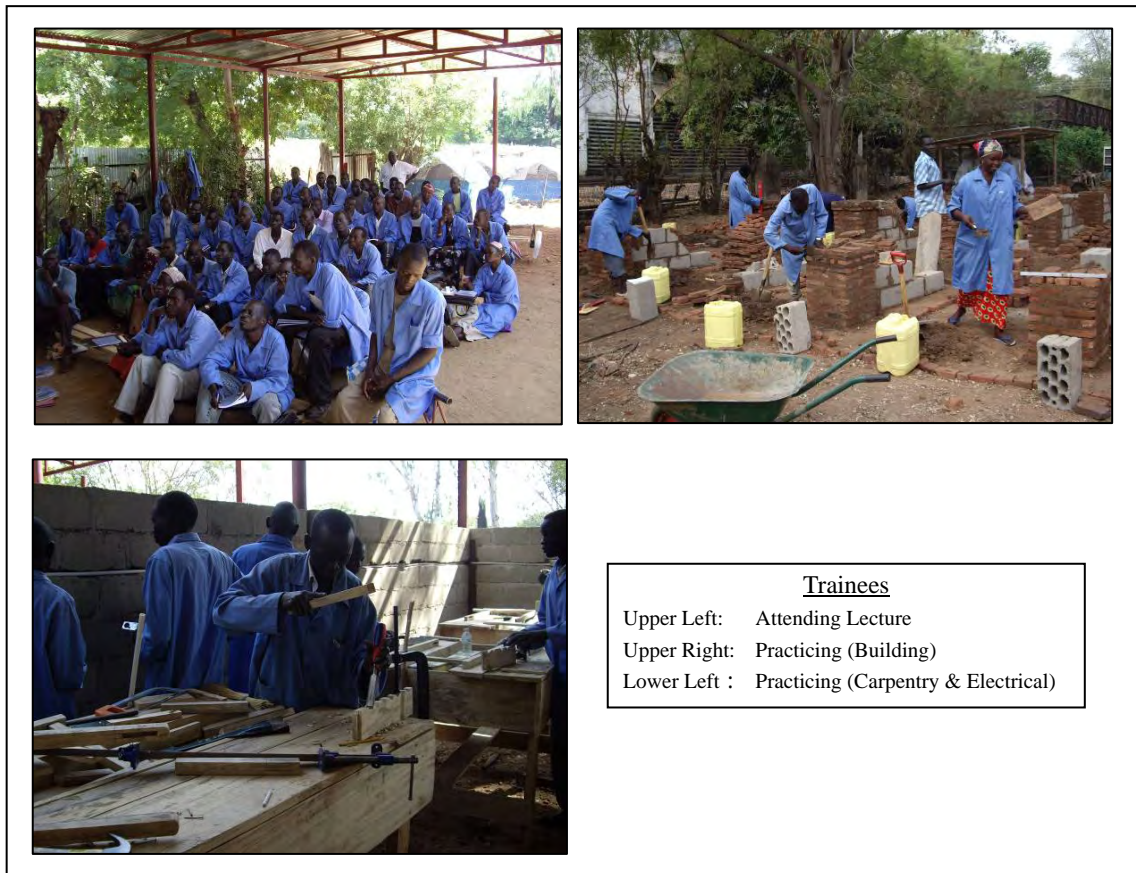


Figure 9.2-2 Project Organization Chart

With facilitation by the Team member, the SFM’s project organization, which was dormant with regard to logistics, started functioning for logistic works necessary for the execution of the training program in late October. It became stagnant in December again mainly due to poor management the fund/disbursement.

Staff including the Project Coordinator, who was responsible for the project operations, were provided with complete job description for their duties and initial briefing. However, insufficient capacity of the Non Teaching Staff of the SFM’s project organization hampered smooth implementation of the training programs, although the this was overcome to considerable extent by the effort of the Teaching Staff, as described in Section 9.3.



Majority of the instructors seemed to understand importance of coordination and cooperation among the organization members, self-reliant approaches supported by the instructors, and positive actions for taking broader responsibility to fill the responsibility gaps occurring in reality with the discussion among the Team member and them. These issues are essential for the further expansion and the improvement of the training center activities overcoming the situation of just implementing the existing training programs.

Financial management in terms of cash disbursement was properly conducted while there was initial delay of recording the account for approximately four months. With the help, and provision of the tools for the purpose, by the Team, the registering and the journalizing started to be conducted on time since December. These delays in disbursement adversely affected smooth implementation of the training programs.

(6) Supporting Activities for the Completed Trainees

SFM-Juba is planning to support the completed trainees for their job acquisitions by offering job opportunities under SFM-Juba’s construction and production activities. A health center construction project in Terekeka under SFM is scheduled to offer jobs for the trainees who

completed the Building Section program. Other activities for welding by SFM are under consideration to offer job opportunities to the trainees of Metal Works Section. Electrical installation works to be attained by SFM network would be other opportunities. A plan for wood work production which is under consideration would be the opportunities, too.

For the above mentioned supporting activities SFM-Juba has established closer relationship with the completed trainees.



Graduation Day (6 March 2007)

9.3 EVALUATION AND RECOMMENDATION

9.3.1 Evaluation

The Project fairly achieved its purpose to establish the continuous training programs contributing livelihood improvement of the Juba people with a physical base consisting of a training center building and necessary machineries and tools. Its achievement in physical preparations such as building construction and machinery procurements, however, were delayed substantially.

The training center organization was established only to implement existing training programs with necessary physical facilities. The level of organizational capability is not sufficient for the envisaged expanded and improved activities. Performance of the initial training programs is assessed as fairly achieved although the number of completed trainees (60) is smaller than the targeted number of 80. Effectiveness of the programs for letting the targeted people attain basic skills seems to be proved.

(1) Overall Assessment/Achievement of the Project Purpose

The Project Purpose of “establishment of training programs to provide basic job oriented skills, which are able to be utilized for envisaged reconstruction works of the Town of Juba as the Capital of the South Sudan, to community people in Juba Town and surrounding areas for their livelihood improvement” has been basically achieved with the building structure completed in general and with major machineries installed by the end of the Project.

The training center is reasonably ready for the implementation of the further terms of the training programs with the financial and technical supports by the contract under the JICA’s Project on Improvement of Basic Skills and Vocational Training in Southern Sudan. It seems that SFM have gained capacity to implement training programs by itself with its effort to obtain financial support from the donors for NGOs. Recruitment/appointment of a competent personnel for the position equivalent to the current coordinator who can manage the training center organization is indispensable for the further expansion and improvement of the center’s activities.

(2) Organizational Establishment (Output 1 and 2)

Basically adequate organizational structure has been established for the implementation of the training program while the training organization has not been functioning as expected as described in 9.2.2 (5). The existing budget management capabilities of the project organization and SFM-Juba are assessed to be sufficient to manage regularized activities such as implementation of existing programs. Further, they seem to be reasonably sufficient to execute

the new, large scale establishment of an institute with construction of associated physical facilities and preparation which involves massive procurement.

In association with the training center building structure furnished with basic training facilities and electricity supplied by the generator, the organizational establishment of the implementation of the training programs is assessed as fairly materialized. There are necessities for both the training center and SFM-Juba to further improve management procedures and capacities for effective and efficient implementation of the programs and organizational operations.

(3) Performance of the Training Programs (Output 3 and 4)

Although the performance of the training programs should be gauged by the completed trainees' performance in their own business or employment, the level of acquired knowledge and skills in respective fields by the completed trainees is evaluated to satisfy minimal standard described in 9.2.2 (4). The number of the completed trainees of 60 against the intended 80 is judged to be fairly satisfactory level as the initial pilot training.

There must be many points for improvement of the training programs since this initial term's trainings have been conducted with constraints of availability in physical facilities, text books, diversion in initial capabilities of trainees, and the language problem, while the minimum quality of the program seem to be attained. It is assessed that the basic effectiveness of the training programs has been proved.

9.3.2 Recommendation for Further Terms of Training Programs

Followings are recommended for the implementation of the training programs for the next and further terms, and for the expanded activities.

(1) Recruitment of Competent Key Personnel

As described in 9.2.2 (5) and 9.3.1 (2) insufficient capability of the key persons considerably hampered the organizational performance. Recruitment/appointment of competent personnel for the key positions is indispensable for efficient implementation of the training programs and for further substantial expansion.

(2) Improvement in Financial and Budgetary Management

Current financial and budgetary management capacity of SFM-Juba which is responsible for financial management for the Project is assessed as adequate only for the SFM's own

regularized activities as described in 9.2.2 (5). Enhancement of the financial management capacity especially for precise and quick journalizing of expenditures is desired for the expected new contract with the other JICA team. Budgetary management capacity improvement is imperative to implement expanded activities of the training programs with external financial resources.

(3) Continuous Improvement of the Training Program

Preparedness for the Training

Since the Project commenced rather abruptly for SFM, there was not enough time for SFM to prepare specific training programs including curriculum and teaching materials in advance. As a result, training programs including curriculums had to be prepared in parallel to the implementation of the training resulting in constraints regarding availabilities of facilities, equipments, and machineries, and teaching materials including text books. For the further terms of the training program implementation, preparedness in these aspects are desirable as well understood by the related people. (See 9.2.2 (4))

Balanced Approach in Training Program Design

Identification of the targets for the skills and knowledge to be obtained by the targeted trainees within the 6-month training period is critical. The balanced approach in terms of the three factors, the attainment targets, the trainees' characteristics, and the training duration, is important to design adequate training programs. Furthermore continuing effort for adjustment and modification of the training programs to reflect rapidly changing prevailing technology in the society is indispensable to maintain efficacy of the programs.

Systematic Approach for Language Problem in Training Delivery

Continuous need for the training for the people without ability to read and write English is expected in the current environment of Juba as described in 9.2.2 (4). Development of systematic approach to facilitate the training is recommended if the targeted trainees include those who are illiterate in English.

(4) Enhancement of the Instructors' Capability

Instructors who joined to the Project are basically qualified in their educational background and practical experiences. Although they possess basic qualifications as trainers, they need further trainings as instructor ("training of trainer") considering their teaching experiences and limited opportunities in Juba as well as exposure to advanced and broader technical practices. Instructors themselves admit the above mentioned shortcomings and desire for enhancing their capacities.

(5) Incorporation of Income Generating Activity into the Training Program

Importance of income generation activities is well recognized by the both sides. It may help sustainability when the income is reserved for a revolving fund. It can be utilized for the expenses required for supporting trainees to start their own business after the completion of the training by means of providing necessary tools and machineries and/or of providing or lending required fund. Furthermore it can be utilized for incentive for trainers and trainees as their extra incomes.

Allocation of generated income in the following manner is recommended as example: 1) decide target amount for the revolving fund to cover the required expenses for three months and allocate money primarily, 2) calculate required amount required for the completed trainees support expenses and allocate money secondary, and 3) provide residue to the trainers and/or trainees.

(6) Recruitment Process of the Trainees

Criteria for the trainee selection have to be reflection of deliberated training targets described in previous subsection (3). In addition, self-reliant approach is better to be taken for recruitment of trainees.

(7) Employment of Staff and Trainers

There is scarcity in human resources with higher education and experiences in Juba. Job opportunities of the people with higher qualification, especially for Sudanese, are soaring. Salary standard is also soaring. Consideration of incentive other than amount of salary is necessary for maintaining its human resources to secure the sustainability of the training activities.

(8) Concentration in Enhancement of Management and Organizational Capacity

Overall it is recommended to SFM and the training implementing organization that their efforts are better to be momentarily concentrated in enhancement of their management and organizational capacity rather than expanding training activities. The expected contracted training activities with the other JICA team shall be a good opportunity for their enhancement.

CHAPTER 10

RECOMMENDATIONS

CHAPTER 10 RECOMMENDATIONS

10.1 RECOMMENDATIONS RELATED TO PLANNING/IMPLEMENTATION

(1) Authorization of the Master Plan and Reflection into National/Regional Development Plan

It is vital for the Basic Physical and Social Infrastructure Development Plan formulated under this Study to be authorized as a master plan for short and medium terms up to the year 2015, in order to systematically urge the reconstruction and development of Juba Town suitable to function as the capital of the Southern Sudan, integrating all efforts toward the same direction and target. The authorized development plan shall be given force as a guidance for all development activities and investments by not only public sectors but also private sectors.

The projects/programs in the Development Plan should be included in the National/Regional Development Plans to make sure the implementation of the Plan with budgetary arrangement.

(2) Timely Conduct of Feasibility Studies

The master plan gives only concepts and rough features of the projects. The details of the projects will be determined by feasibility studies, including the project scope, construction method and schedule, cost, and technical/economical/financial/environmental analyses. To materialize the proposed projects as scheduled, feasibility studies shall timely be conducted.

(3) Securing/Raising of Funds

Realization of the development plan requires a huge amount of fund. Presently overseas development assistance and oil revenue are the major sources of the Government income. The prospect of the future amount of the official development assistance after the reconstruction period is, however, obscure. Also much is not expected to 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 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.

To promote the private sector investment in the form of PPP or other similar scheme 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.

Such policies 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 operation, management and maintenance funds. Since in Juba, general people are not well aware of the beneficiary-pay principle for public services due to the past customary access thereto, the beneficiary-pay principle should be carefully introduced because it is apt to be against low income group to access to 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 fund rather than raising the fund as well as in redistributing wealth.

(4) Adoption of Labour-based Construction for Job Creation

Since presently in Juba, job opportunity is very limited except employment of the Governments, creation of job opportunities is of vital importance, especially for IDP returnees who are expected to increase in number. One of the practical ways is to absorb unemployment population in the construction industry. A way of increasing job opportunities in the construction project is to introduce the labour-based construction method. 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 10.1-1 shows the characteristics of the labour-based construction method as compared with other methods.

Table 10.1-1 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.

(5) Execution of Adequate Maintenance

Adequate maintenance is very important. The purposes and effects of the maintenance are as follows:

- To keep the facilities in good operational condition, otherwise the expected benefits are not fully gained.
- To prevent the facilities from deteriorating to the condition requiring extensive rehabilitation or to the extent that they cannot be economically rehabilitated.
- To prolong the usable life of the facilities.
- As a result, to minimize the life cycle cost of the facilities.

(6) Promotion of Local Construction Industries

No local construction company has so far been involved in rehabilitation projects in Juba. All money thereof is going to foreign construction companies except payment to locally hired unskilled workers. 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 :

- Consulting engineering company (undertaking consulting services such as feasibility study, detailed engineering design, construction supervision, etc., solely or jointly with foreign consultants)
- Construction company (contracting to carry out construction works, solely or jointly with foreign construction companies)
- Construction material supplier (supplying crushed aggregate, cement, pre-mixed concrete, pre-cast concrete product, pre-mixed asphalt concrete, etc.)
- Engineering survey company (contracting to carry out topographic survey, geotechnical investigation, material quality/strength tests, etc.)
- Educational service company (rendering educational services such as skill training on construction equipment operation, etc.)
- 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 :

- Equipment owned : None
- Construction/management technique : No skills
- Financial capacity : No operation money borrowed from bank
- Credibility : No guarantee by bank

As a result, no local construction industry is presently active except being hired as unskilled workers. To improve this situation and develop local construction industry, the following government interventions are desirable :

- To establish a construction equipment lease market system
- To provide bond facilities to locally based enterprises of small to medium size
- To establish a financing system to locally based enterprises
- To conduct skill trainings and establish an official qualification system for special technicians, mechanics, equipment operators, etc.
- 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, then gradually increase the share of local firms, as shown in Table 10.1-2.

Table 10.1-2 Target Market Share in Construction Industry

Category	2006 Share	2015 Target Share	Nature of Work	Example of Work
Solely Foreign Firm	100%	30%	Large scaled projects, Projects needing high technique	Dam construction, Bridge construction
Foreign Firm and Local Firm JV	0%	30%	Conventional Projects	Highway construction, Class A/B/C road const.
Solely Local Firm	0%	40%	Low mechanized construction method applicable projects	Class D road const., Road maintenance

(7) Amendment of the Plan According to Situation Changes

The master plan is formulated on the assumption of the future social and economic condition 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 condition.

10.2 RECOMMENDATIONS RELATED TO SOCIAL AND ENVIRONMENTAL CONSIDERATIONS

(1) Conduct of Social and Environmental Assessments

Environmental laws have not been well formulated yet in the Southern Sudan but those are to be formulated by the end of 2006 with the official assistance of the United States. Such comprehensive environmental laws shall be promptly applied to the project implementation, especially for environmentally critical projects such as transport, water supply, sewerage, solid waste treatment, power supply, resettlement of inhabitants, etc.

In the process of conducting the environmental impact assessment, public consultation or stakeholder meetings and information publication are important to build a public consensus on the project.

(2) Considerations for Traffic Safety

When roads are constructed/improved, vehicles tend to run at higher speed resulting in increase in traffic accidents, especially in the areas where people are not accustomed to such condition as vehicles run at high speed. Safety measures are necessary to be taken, including installation of safety facilities, safety education and strengthening of traffic enforcement.

Safety facilities include segregation of vehicles and pedestrians (installation of sidewalk), directionwise segregation (installation of median), installation of guardrails/guard fences, improvement of intersection (signalization, channelization, etc.), installation of traffic signs and pavement markings, provision of lighting and delineators, etc. as well as road alignment design taking the traffic safety into consideration.

Safety education includes education in primary schools, periodic education for drivers at license renewal and traffic safety campaign for public.

The traffic enforcement is also indispensable since the observance of traffic regulations is basic to traffic safety.

10.3 RECOMMENDATIONS FOR INSTITUTIONAL MATTERS

(1) Enhancement of Administrative Organization and Capacity Building

Present problems in administrative organization are as follows :

- Demarcation of roles and duties between the government of Southern Sudan and State Governments as well as among Ministries is in the transitional period and often ambiguous.
- Staffing is inadequate in number to fully perform the duties of ministries/departments/bureaus.
- Many staff members except high officers are unfamiliar with their works. Furthermore, the staff need to be increased but it will be difficult to employ experienced personnel.

Under the above situation, definition of the roles and duties of the relevant organizations, strengthening of the staff and capacity building of the staff are urgently needed.

For establishment of adequate organization, first things to be done are identification and definition of all requirements imposed on the Governments, covering general affairs, accounting, personnel management, project planning, project implementation, operation and maintenance, etc. Work loads to fulfill the defined duties are estimated and then necessary positions and personnel are decided. Thus, necessary organizational structure is established.

Comparing the necessary staff for the established organization and present staff, additional personnel to be supplied are decided and recruited.

Since most of the present staff are not familiar with their works and recruitment of competent personnel is difficult, the capacity development of staff is urgently needed. The capacity development shall be done by various means such as appointment of advisors/in-house consultants, on-the-job training through collaborative works with foreign experts in the project implementation, training of the staff in foreign countries, etc. as well as implementation of capacity development programs.

(2) Establishment/Improvement of Project Implementation System

In addition to the establishment of the government organization for project implementation, methods to secure the lands necessary for projects should be established, including relevant laws, standard procedure and responsible/implementing bodies. Especially, present laws on land ownership and right are old and ambiguous, and therefore should be reviewed and improved. At the same time, land market should be properly developed as stated in item 13) bellow.

(3) Taxation Preferences to Construction Equipment/Materials

In the present situation showing high demand for rehabilitation/construction but lack of construction equipment/materials, project costs are excessively high due to hyper-escalation of the prices of the equipment/materials mainly caused by high costs for their transportation. As a way to mitigate such escalation, it is desirable to reduce both physical and institutional barriers to the imported equipment/materials. In addition to the physical measures mainly attained by improvement of transport routes, it is recommended to introduce the taxation preference policy, adopting tax and duty free policy in some cases.

(4) Establishment of Land Market

At present, a land registration system including ownership, surface right and leasehold is not well established. Although up to about 1970 a land registration system functioned as such, the records were abandoned or missing during the civil war. It is therefore said that land rights much depend on the memories of individual lease holders, inhabitants or personnel who worked at the local governments. After CPA, Government of the Southern Sudan, state governments, communities and individuals are proclaiming the land rights from each standpoint inviting another chaotic disputes.

Establishment of sound land market reflecting the economic value of land is essential not only for infrastructure development, but also for restriction/inducement measures for realizing the land use plan, and introduction of private sector investments. Therefore, development of the land market shall be a matter of urgency through review of relevant laws and identification of land rights including ownership, surface right and leasehold.

Current laws relevant to land, real estate and urban planning in the Southern Sudan are as follows:

- The Constitution, 1998
- Land Resettlement and Registration Act, 1925
- Land Acquisition Act, 1930
- Unregisterd Land Act, 1970 (repealed)
- Civil Procedure Act, 1983
- Civil Transaction Act, 1984 and its Amendment, 1990
- Urban Planning and Land Disposal Act, 1994
- Investment Act, 1999
- Local Government Act, 2003 and 1998
- SPLM, Civil Procedure Act, 2003

10.4 RECOMMENDATIONS FOR COMMUNITY DEVELOPMENT

(1) Formulation of Own Community Development Plan

Government should establish definitely the policy and strategy for community development, demarcating the roles of the governments and community (residential quarter is considered to be a community unit in the Southern Sudan), and take necessary measures for enhancement of the implementing capacity of the community, i.e. capacity development.

It is desirable for each residential quarter to prepare its own community development plan along the government's basic policy for community development. The community development plan will be prepared through the following procedure :

Identification of problems/challenges

Formulation of projects/programs to solve the problems

Planning of implementation way of individual projects/programs (including managing/ implementing bodies, project/program type, funding way, etc.)

Consideration on urgencies/priorities of the projects/programs

Preparation of an implementation program including the implementation way and schedule of component projects/programs

The plan may include both community's own projects/programs such as construction/ improvement of community facilities, and government-lead projects/programs such as development of infrastructure.

(2) Coordination with Governments in Implementation of Community Development

The community development should be urged in coordination with governments of the Southern Sudan, State, County and Payam. Each level of the government and residential quarters have the individual roles. In preparation of the community development plan, the community will partition plans/projects into those to be done by the governments, those to be done by the community itself, and those to be done jointly by both. In relation with the governments, the community should do the following :

- Actively request the governments to forward the government projects related to community development,
- Closely negotiate with the governments on the joint projects, and
- Request to the governments the possible support for the community's own projects.

(3) Communities' Participation in Government Projects

In case of infrastructure development project which is a typical government-lead project, the

community can participate in the following forms :

- Planning Stage

Infrastructure development projects should be planned well reflecting the opinion/desire of community. The community should indicate its opinion actively at the project planning stage.

- Construction Stage

It is possible for the community to participate in the projects at the construction stage in the following ways.

- Provide the labor force (both unskilled and skilled) for construction.
- Organize a construction unit in the community and make a construction contract with the government as an implementing body. For realizing it, trained man-power and procurement of equipment are necessary. This idea will be applicable to small-scaled projects.

- Operation/Maintenance Stage

For water/power supply projects, the community can directly manage the operation by creating the proper organization like a water management union in the community and being entrusted by the government for the operation.

For maintenance work, the community can participate in the projects in similar way to the construction, i.e. providing labor force for maintenance work and/or organizing a maintenance unit in the community and being entrusted for the maintenance work. Creation of the maintenance unit will be easier than creation of the construction unit.

Likewise, for other projects than infrastructure, the community should actively participate in the government projects.