

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
GOVERNMENT OF SOUTHERN SUDAN**

**EMERGENCY STUDY ON THE PLANNING AND SUPPORT  
FOR BASIC PHYSICAL AND SOCIAL INFRASTRUCTURE  
IN JUBA TOWN AND THE SURROUNDING AREAS  
IN  
THE SOUTHERN SUDAN**

**FINAL REPORT**

**MAIN TEXT**

**MARCH 2007**

**KATAHIRA & ENGINEERS INTERNATIONAL  
JAPAN ENGINEERING CONSULTANTS CO., LTD.  
KOKUSAI KOGYO CO., LTD.**

*Exchange Rates:*

*SDD1.00=USD0.004973*

*SDD1.00=JPY0.58792*

*(As of October 2006)*

## **PREFACE**

In response to a request from the Government of Sudan, the Government of Japan decided to conduct the “Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas in the Southern Sudan” and entrusted the Study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a Study Team headed by Mr. Kunihiko SAWANO of Katahira & Engineers International and consists of Katahira & Engineers International, Japan Engineering Consultants Co., Ltd., and Kokusai Kogyo Co., Ltd. between January 2006 and March 2007.

The Team held discussions with the officials concerned of the Study and conducted field surveys in the Study Area. Upon returning to Japan, the Team conducted further studies and prepared this Final Report.

I hope that this report will contribute to the promotion of projects and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Sudan for their close cooperation extended to the Study.

March 2007

Kazuhisa MATSUOKA  
Vice President  
Japan International Cooperation Agency

Mr. Kazuhisa MATHUOKA,  
Vice President  
Japan International Cooperation Agency

March 2007

Dear Sir,

### **Letter of Transmittal**

We are pleased to submit herewith the Final Report of the “Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas in the Southern Sudan”. The report compiles the results of the Study and includes the advices and suggestions of the authorities of the Government of Japan and your agency as well as the comments made by the Government of Southern Sudan and other authorities concerned.

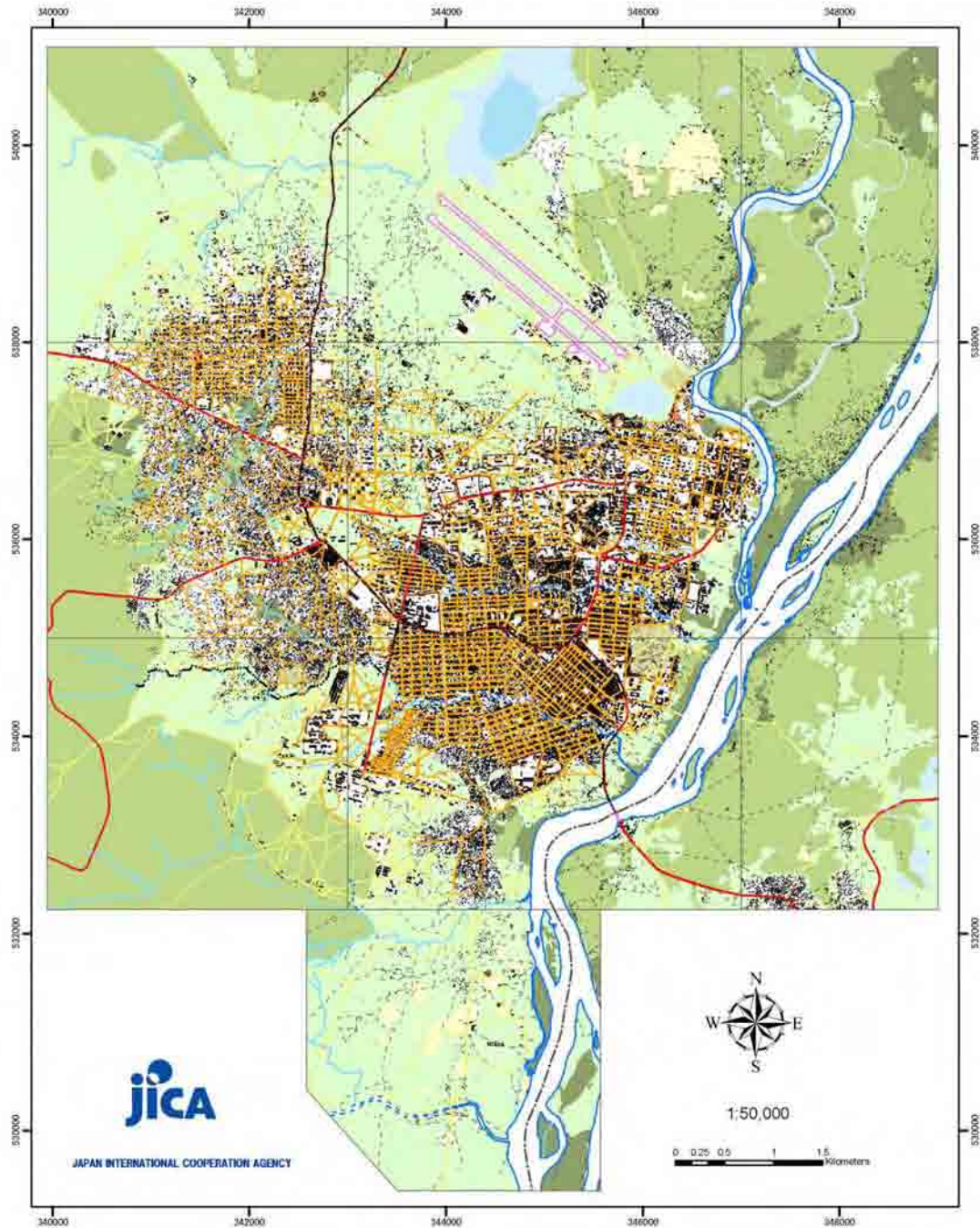
The report analyses the present and future conditions and demand in physical and social infrastructure in Juba Town and the surrounding areas. It presents the master plan from reconstruction/rehabilitation to development of Juba Town and the surrounding areas. In the course of the Study, implementation of pilot projects in transport, water supply and community-based development sectors were also carried out as an example for the following projects.

We wish to take this opportunity to express our sincere gratitude to your agency and the Ministry of Foreign Affairs. We also wish to express our deep gratitude to the Government of Southern Sudan as well as other Governmental Agencies concerned for the close cooperation and assistance extended to us during the Study. We hope this report will contribute to the reconstruction and development of the Southern Sudan.

Very truly yours,

Mr. Kunihiko SAWANO  
Team Leader,  
Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure  
in Juba Town and the Surrounding Areas in the Southern Sudan

# Map of Juba Town and Surrounding Areas



Location Map

# SUMMARY

## BACKGROUND OF THE STUDY

After the civil wars ended, Juba Town became the capital of the Southern Sudan transferred from Rumbek in September 2005. The population of Juba Town is estimated at about 250,000 and expected to drastically increase in the future due to accumulation of urban functions as a capital combined with the IDP returnees. However, since no investment and/or maintenance of urban infrastructure have been carried out for more than 20 years due to civil wars, most facilities are decrepit and in urgent need for rehabilitation or reconstruction. Also in the communities in rural areas surrounding the town, urgent development of basic social services is required to enhance the settlement of the IDP returnees. Under such situation, the Government of the Republic of the Sudan requested the Government of Japan a technical cooperation for the conduct of “Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas”.

## OBJECTIVES OF THE STUDY

The general objective of the Study is to help build a foundation of the sustainable development of Juba. The specific objectives are:

- 1) To formulate a development plan for Juba Town with a target year of 2015, and
- 2) To propose urgent rehabilitation/development programs of basic physical and social infrastructure and to implement pilot projects.

## SOCIO-ECONOMIC FRAMEWORK

		2006	2015	
Population	Population in 2006	250,000		
	Population Increase 2006-2015	Natural Increase		57,500
		Conventional Migration		12,700
		Refugees		94,700
	IDPs		95,100	
	Population in 2015		510,000	
Working Population by Sector	Primary Sector	7,600	13,900	
	Secondary Sector	400	13,900	
	Tertiary Sector	38,700	111,000	
	Total	46,700	138,800	
Unemployment Rate (%)		31	15	
Per Capita GRDP (USD)		184	384	

## LAND USE PLAN

### Land Use Demand

Category	2006		2015	
	ha	%	ha	%
Residence	1,787	37.0	3,290	42.4
Commerce	29	0.6	207	2.7
business	24	0.5	152	2.0
Government	52	1.1	82	1.0
Military	280	5.8	280	3.6
Industry	4	0.1	129	1.7
Institution	46	0.9	182	2.3
School/Clinic	78	1.6	204	2.6
Religion	20	0.4	29	0.4
Recreation/Public Facility	22	0.5	54	0.7
Road	426	8.8	1,488	19.2
Grassland/Agriculture	2,060	42.7	1,662	21.4
Total	4,828	100.0	7,759	100.0

### Main Land Use in Future

Payam	Main Land Use
Juba	<ul style="list-style-type: none"> <li>• Central business district</li> <li>• Central governmental area</li> <li>• High density housing</li> </ul>
Munuki	<ul style="list-style-type: none"> <li>• Housing</li> <li>• Industrial area</li> <li>• Commercial area along Yei Road</li> </ul>
Kator	<ul style="list-style-type: none"> <li>• Commercial/business area with green area along Nile River</li> <li>• Housing</li> <li>• Governmental area along Yei Road</li> </ul>
East Side of Nile River	<ul style="list-style-type: none"> <li>• Housing</li> <li>• Juba University and governmental/cultural area</li> <li>• Industrial/wholesale commercial area</li> </ul>

## BASIC STRATEGY FOR INFRASTRUCTURE DEVELOPMENT

- Urgently meet the basic needs of physical and social infrastructure for both present communities and new settlement of returnees.
- Develop the infrastructure necessary for Juba Town to function as the capital as well as economic development center.
- Consider step-by-step development.

## INFRASTRUCTURE DEVELOPMENT GOAL

Present Situation	Development Goal
<b>Road</b> Inadequate road network in terms of quantity and quality with paved road density of 0.2 km/sq.km.	Improve/construct paved arterial and supplementary roads with a density of 3.5 km/sq.km.
<b>River Port</b> No port facilities for boats and barges.	Construct a river port with 70m long pier equipped with cargo handling facilities.
<b>Water Supply</b> Approximately 50 % of people supplied with water, mainly through common wells with hand pumps with an average volume of 20 /day /person.	Supply 100 % of population with piped water with an average volume of 100 /day/person.
<b>Solid Waste Management</b> No adequate collection system of household solid waste.	Serve 82 % of population with improved solid waste management system.
<b>Sewage Treatment</b> Sewage water amounting to 3,369 cu. meters/year are discharged without treatment.	Serve 82 % of population with improved sewage treatment system.
<b>Education</b> Primary school enrollment ratio is 46 %.	Increase primary school enrollment ratio to 100 %.
<b>Medical and Health Services</b> Average 3.1 beds/1,000 population.	Provide 100 % of population with basic medical and health services with 3.7 beds/1,000 population.

## MAJOR COMPONENT PROJECTS OF BASIC PHYSICAL AND SOCIAL INFRASTRUCTURE DEVELOPMENT PLAN

Project	Major Scope of the Project	Cost (Million USD)			
		2006-2011	2012-2015	2016-2025	Total
<b>Road Transport</b>					
TR-1: Road Rehabilitation Project under Emergency Rehabilitation Work in Juba	Rehabilitation of roads (30km in LOT1 and 30km in LOT2)	24.00	-	-	24.00
TR-2: Road Network Development Project, Phase-1	Class A roads (85km), Class B roads (69km), Class C roads (581km), Non-motorized transport route (60km)	72.68	188.84	-	261.52
TR-3: Road Network Development Project, Phase-2	Urban highway (76km), Interchanges/intersections (25)	9.72	42.52	38.61	90.85
TR-4: Nile River Bridge Construction Project	Phase-1 (1 bridge), Phase-2 (5 bridges)	10.85	53.49	22.16	86.50
TR-5: Transport Terminal Construction Project	Phase-1 (5 bus terminals), Phase-2 (3 truck terminals)	0.24	1.00	-	1.24
	<b>Sub-total Cost</b>	<b>117.49</b>	<b>285.85</b>	<b>60.77</b>	<b>464.11</b>
<b>River Transport</b>					
TP-1: Juba Port Improvement Project (Pilot Project under this Study)	Construction of 35 m pier	1.70	-	-	1.70
TP-2: Juba Port Expansion Project	Expansion of pier to 70 m	1.85	-	-	1.85
TP-3: New Port Construction Project	Construction of new port	-	0.60	12.32	12.92
	<b>Sub-total Cost</b>	<b>3.55</b>	<b>0.60</b>	<b>12.32</b>	<b>16.47</b>
<b>Air Transport</b>					
TA-1: Juba International Airport Rehabilitation Project	Rehabilitation of runway/terminal, Construction of protective fence, Upgrading of air navigation aid system, Procurement of other facilities	1.50	-	-	1.50
TA-2: Juba International Airport Development Project	Expansion of runway to 3,000 m, Improvement of terminal building and control tower	10.30	-	-	10.30
TA-3: New Juba International Airport Construction Project	Construction of new international airport	-	1.26	41.80	43.06
	<b>Sub-total Cost</b>	<b>11.80</b>	<b>1.26</b>	<b>41.80</b>	<b>54.86</b>
<b>Water Supply</b>					
WS-1: Emergency Water Supply Project (Pilot Project under this Study)	2 deep wells with submersible pumps, elevated water tank & transmission/distribution pipes	0.96	-	-	0.96
WS-2: Water Supply Project under Emergency Rehabilitation Work in Juba	Rehabilitation/improvement of existing water supply system getting water from Nile River	10.54	-	-	10.54
WS-3: Urgent Water Supply Project	Rehabilitation of 66 existing wells, Construction of 191 new wells	22.40	4.30	-	26.70
WS-4: Urban Water Supply Project	Construction of new water supply system including intake/treatment plant & transmission/distribution pipes	12.63	40.48	-	53.11
	<b>Sub-total Cost</b>	<b>46.53</b>	<b>44.78</b>	<b>-</b>	<b>91.31</b>
<b>Power Supply</b>					
PS-1: Power Supply Project under Emergency Rehabilitation Work in Juba	Installation of 5 1-MW generators in Juba Power Station	5.30	-	-	5.30
PS-2: Power Supply Development Project	Diesel generators with total capacity of 40 MW	15.43	14.56	-	29.99
PS-3: Hydroelectric Power Plant Const. Proj.	Construction of new hydroelectric power plant	*	*	*	*
	<b>Sub-total Cost</b>	<b>20.73</b>	<b>14.56</b>	<b>-</b>	<b>35.29</b>
<b>Solid Waste Management</b>					
SS-1: Solid Waste Management Development Project	Improvement of waste collection system, Sanitary landfill site development, Establishment of medical waste disposal system	3.52	1.36	-	4.88
	<b>Sub-total Cost</b>	<b>3.52</b>	<b>1.36</b>	<b>-</b>	<b>4.88</b>
<b>Waste Water Management</b>					
SW-1: Sewerage Rehabilitation Project under Emergency Rehabilitation Work in Juba	Rehabilitation of sewerage system (pipe and stabilization pond) for government offices and ministerial houses	4.78	-	-	4.78
SW-2: Sewerage System Development Project	Sewer system (350 km pipe & 2 pump stations), Sewage treatment facility (stabilization pond)	66.33	85.32	-	151.65
SW-3: Human Waste Treatment System Development Project	Construction of 228 public toilets, Collection system (vacuum trucks), Human waste treatment facility	2.25	0.09	-	2.34
	<b>Sub-total Cost</b>	<b>73.36</b>	<b>85.41</b>	<b>-</b>	<b>158.77</b>
<b>Educational Facilities</b>					
FE-1: Primary School Rehabilitation and Expansion Project	Rehabilitation of 92 classrooms, Construction of additional 111 classrooms	8.46	-	-	8.46
FE-2: Primary/Secondary Schools Construction Project	Construction of primary schools (1,992 classrooms), Construction of secondary schools (58 classrooms)	21.58	89.18	-	110.76
FE-3: Teacher Training School Improvement Project	Repair of 2 existing buildings, Construction of 2 additional buildings	1.19	-	-	1.19
	<b>Sub-total Cost</b>	<b>31.23</b>	<b>89.18</b>	<b>-</b>	<b>120.41</b>
<b>Health and Medical Services</b>					
FM-1: Health Center and Hospital Rehabilitation Project	Rehabilitation of health centers and hospitals	4.90	-	-	4.90
FM-2: District Hospital Development Project	Construction of 4 district hospitals	12.19	4.85	-	17.04
FM-3: PHC Center/Unit Development Project	Construction of 30 PHC centers & 146 PHC units	35.93	35.93	-	71.86
	<b>Sub-total Cost</b>	<b>53.02</b>	<b>40.78</b>	<b>-</b>	<b>93.80</b>
	<b>Total Cost</b>	<b>361.23</b>	<b>563.78</b>	<b>114.89</b>	<b>1,039.90</b>

\* Since this project covers the whole Southern Sudan, it is considered to be beyond the scope of the Juba Town Development Plan.

## **PILOT PROJECT IN TRANSPORT SECTOR**

- 1) Selection of the Project
  - Juba Port Improvement Project constructing a 35 m berth located at the present port area is selected.
  - The main design vessels are 35 m long barges.
  - The design cargo handling capacity is 7,500 tons/month against the transport demand estimated at 7,400 to 9,000 tons/month in year 2015, expecting the berth to be expanded to 70 m in near future.
- 2) Scope of the Project
  - Construction of a 35 m long and 16 m wide berth of piled pier type.
  - Provision of a 35 m long and 30 m wide cargo handling yard including the piled pier.
  - Installation of an gantry crane for loading/unloading operation.
  - Installation of 4 bollards for mooring.
  - Construction of a fuel storehouse and a tools storehouse.
  - Improvement of 600 m long access road with pavement and drainage.

### 3) Implementation

Urban Tone Corporation, a Japanese Contractor was selected as contractor combined with the pilot project in water supply sector. The construction was commenced in July 2006 but it has been interrupted since 28 October 2006 due to land right problem.

## **PILOT PROJECT IN WATER SUPPLY SECTOR**

- 1) Selection of the project

A piped water supply system serving 2,300 people in the northern part of Munuki is selected.
- 2) Scope of the Project
  - Construction of 2 deep wells with submersible motor pumps.
  - 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 the public hydrants.
  - Installation of 8 public hydrants with 3 taps each.
- 3) Implementation

Urban Tone Corporation, a Japanese Contractor was selected as contractor combined with the pilot project in transport sector. The construction was commenced in July 2006 and scheduled to be completed in March 2007.

## **PILOT PROJECT FOR SUPPORTING COMMUNITY**

- 1) Selection of the Project

A skills training project aiming to provide basic job oriented skills which are utilized for envisaged reconstruction works in Juba is selected.
- 2) Scope of the Project
  - Establishment of an executive body of the skills training program.
  - Establishment of a training center with adequate facilities/machinery/equipment/tools/materials.
  - Establishment of training programs.
  - Execution of the initial training courses with 5 subjects, i.e. building, carpentry, electrical works, metal works, and plumbing works.
- 3) Implementation
  - Implementing body : SFM (international NGO)
  - Training Duration : July 2006 - February 2007

## **RECOMMENDATIONS**

- 1) The infrastructure development plan formulated under this Study be authorized as a master plan up to the year 2015 in order to systematically urge the reconstruction/development of Juba integrating all efforts toward the same direction/target.
- 2) Timely conduct feasibility studies to materialize the proposed projects as scheduled.
- 3) Examine and introduce measures for raising funds including promotion of private sector investment, increase in tax revenue and effective utilization of communities' resources.
- 4) Take measures to encourage the adoption of labour-based construction method to increase job opportunities.
- 5) Execute adequate maintenances.
- 6) Promote local construction industries.
- 7) Review and adjust the plan according to future changes in social and economic conditions.
- 8) Conduct social/environmental impact assessments properly.
- 9) Take adequate traffic safety measures.
- 10) Enhance the administrative organization, including establishment of adequate organization, reinforcement of the staff and capacity development of the staff.
- 11) Establish the project implementing system.
- 12) Introduce the taxation preference policy to the imported construction equipment/materials.
- 13) Establish the sound land market.
- 14) Formulate own community's development plans.
- 15) Coordinate with governments in execution of the community development plans.
- 16) Communities actively participate in government-lead projects.



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## ABBREVIATIONS

ACF-USA	: Action Contre le Faim-United States of America
ACORD	: Agency for Co-operation and Research in Development
ADRA	: Adventist Development and Relief Agency
CAA	: Civil Aviation Authority
CBS	: Central Bureau of Statistics
CES	: Central Equatoria State
CPA	: Comprehensive Peace Agreement
CRS	: Catholic Relief Services
DBST	: Double Bituminous Surface Treatment
DDR	: Disarmament, Demobilization and Reintegration
DOS	: Department of Survey
ERWJ	: Emergency Rehabilitation Work in Juba
GONU	: Government of National Unity
GOSS	: Government of Southern Sudan
GPS	: Global Positioning System
GZT	: Gesellschaft fur Technische Zusammenarbeit
HIPC	: Heavy Indebted Poor Country
ICRC	: International Committee of the Red Cross
IDP	: Internally Displaced Person
IOM	: International organization for Migration
JAM	: Joint Assessment Mission
LGF	: Local Government Framework
LRA	: The Lord's Resistance Army
MDGs	: Millennium Development Goals
MDTF	: Multi Donor Trust Fund
MHLU	: Ministry of Housing, Land and Utilities
MOSTE	: Ministry of Education, Science and Technology
MSL	: Mean Sea Level
MT	: Metric Ton
NCA	: Norwegian Church Aid
NGO	: Non-Governmental Organization
NMT	: Non-Motorized Transport
NPA	: Norwegian People Aid
OFDA	: US Office for Foreign Disaster Assistance
PHC	: Primary Health Care
QIP	: Quick Impact Project
RRR	: Return, Reintegration and Recovery
RTC	: River Transport Corporation
SCC	: Sudanese Council of Churches
SFM	: Swedish Free Mission
SMPI	: State Ministry of Physical Infrastructure

SOLUS : Southern Sudan SPLM areas  
SPLM : Sudan People's Liberation Movement  
SRRC : Sudan Relief and Rehabilitation Commission  
SWM : Solid Waste Management  
UNDP : United Nations Development Programme  
UNEP : United Nations Environment Programme  
UNHCR : United Nations High Commissioner for Refugees  
UNICEF : United Nations International Children's (Emergency) Fund  
UNMIS : United Nations Mission in Sudan  
UNOPS : United Nations Office for Project Service  
UPHSD : Umbrella Program for Health System Development  
USAID : United States of America Agency for International Development  
UTM : Universal Transverse Mercator  
WFP : United Nations World Food Programme  
WGS : World Geotech System

# **CHAPTER 1**

## **INTRODUCTION**



# **CHAPTER 1 INTRODUCTION**

## **1.1 BACKGROUND**

Juba Town is located in Juba County of Central Equatoria State (former Bahr al Jebel State). Juba County has an estimated population of about 340,000. Juba Town, which was a fortress town under the control of the Government of Sudan (GOS) during the civil war, came under the control of the Government of Southern Sudan (GOSS) in July 2005 and became the capital of Southern Sudan transferred from Rumbek in September 2005. The population of Juba Town is estimated at about 250,000 and expected to drastically increase in the future due to accumulation of urban functions as a capital combined with the increased IDP (Internally Displaced Person) returnees.

However, since no investment and/or maintenance of urban infrastructure such as government buildings/facilities, roads, water supply system, power supply system, communication system, etc. have been carried out over the past 30 years due to civil wars, most facilities are decrepit and in urgent need for rehabilitation or reconstruction. Especially urban roads and water supply system, which are basic infrastructures for urban life, urgently need to be rehabilitated/reconstructed. Also in the communities in rural areas surrounding the town, urgent development of basic social services including water, sanitation, education and health care is required to enhance the settlement of the IDP returnees.

Under such situation, GOSS requested a technical cooperation from the Government of Japan (GOJ) for the conduct of “Emergency Study on the Planning and Support for Basic Physical and Social Infrastructure in Juba Town and the Surrounding Areas” (the Study). In response to the request, the Government of Japan (GOJ) has decided to conduct the Study and the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the technical cooperation program of GOJ, has organized and dispatched a Study Team for the Study in accordance with the Scope of Work agreed between the Preparatory Study Team dispatched by GOJ and GOSS in November 2005.

## **1.2 OBJECTIVES OF THE STUDY**

The general objective of the Study is to help GOSS build a foundation of the sustainable development of Juba Town that is expected to function as the capital of Southern Sudan through enhancing the capacity of the Juba Town accommodating the IDP returnees.

The specific objectives of the Study are:

- 1) To formulate a development plan for Juba Town with a target year of 2015, and
- 2) To propose urgent rehabilitation/development programs of basic physical and social infrastructure and to implement pilot projects.

### **1.3 STUDY AREA**

The Study shall cover Juba Town and surrounding areas.

### **1.4 STUDY FRAMEWORK**

The Study is carried out in the following three phases :

Phase 1 : 25 January 2006 to 20 March 2006

Phase 2 : 21 March 2006 to 31 May 2006

Phase 3 : 1 June 2006 to May 2007

The Study is divided into the following three components :

- 1) Formulation of Juba Town development plan
- 2) Implementation of pilot projects in transport, water supply and community support sectors
- 3) Common items (report preparation/presentation/discussion)

Work items in each phase are shown in Table 1.4-1. The study flow of the whole work is illustrated schematically in Figure 1.4-1.

**Table 1.4-1 Work Items in Each Phase**

Component Phase	Formulation of Juba Town Development Plan	Implementation of Pilot Projects	Common Items
Phase 1 (25 Jan. 2006- 20 Mar. 2006)	(4) Review of Present Condition of the Study Area	(6) Planning of Pilot Projects - Transport Sector Field Survey and Analysis Demand Forecast Planning of Pilot Project - Water Supply Sector Field Survey and Analysis Demand Forecast Planning of Pilot Project - Community Support Field Survey and Analysis Community Development Plan	(1) Collection of Relevant Data / Information
	(5) Preparation of Simplified Map		(2) Preparation of Inception Report
			(3) Presentation / Discussion on Inception Report
Phase 2 (21 Mar. 2006- 31 Mar. 2006)	(9) Establishment of Juba Town Development Strategy - Identification of Potentialities, Constraints and Problems for Juba Town Development - Forecast of Future Socio-economic Indicators - Establishment of Development Strategy	(8) Preparation of Design and Bidding Documents for Pilot Projects - Transport and Water Supply Sectors Detailed Design Preparation of Construction Plan Cost Estimate Preparation of Bidding Documents - Community Support Selection of Pilot Projects Preparation of Implementation Plan Rough Cost Estimate Preparation of Bidding Documents	(7) Preparation of Preliminary Progress Report (Japanese Version)
	(10) Establishment of Socio-economic Framework		
	(11) Planning of Distribution of Urban Functions - Forecast of Land Demand by Use - Planning of Distribution of Urban Functions		(12) Preparation / Discussion on Progress Report
Phase 3 (1 Jun. 2006- May 2007)	(14) Preparation of Zoning Map	(13) Implementation / Supervision of Pilot Projects - Transport and Water Supply Sectors Bidding / Contracting Construction / Supervision - Community Support Selection of Implementing Body Implementation / Progress Control	
	(15) Preparation of Basic Physical & Social Infrastructure Development Plan - Preparation of Basic Physical & Social Infrastructure Development Plan - Preparation of Profiles of Component Projects		(20) Preparation of Interim Report
	(16) Preparation of Land Use Plan		(21) Discussion in Japan on Interim Report
	(17) Preparation of Implementation Programs of Basic Physical & Social Infrastructure Development Plan		(22) Presentation / Discussion on Interim Report
	(18) Cost Estimate for Basic Physical & Social Infrastructure Development Plan		(24) Preparation of Draft Final Report
(19) Formulation of Juba Town Development Plan	(23) Preparation of Maintenance Plan for Facilities Constructed in Pilot Projects	(25) Discussion in Japan on Draft Final Report	
		(26) Presentation / Discussion on Draft Final Report	
		(27) Preparation of Final Report	

Number in ( ) shows the item number.

Work Items to be carried out in Sudan

Work Items to be carried out in Japan

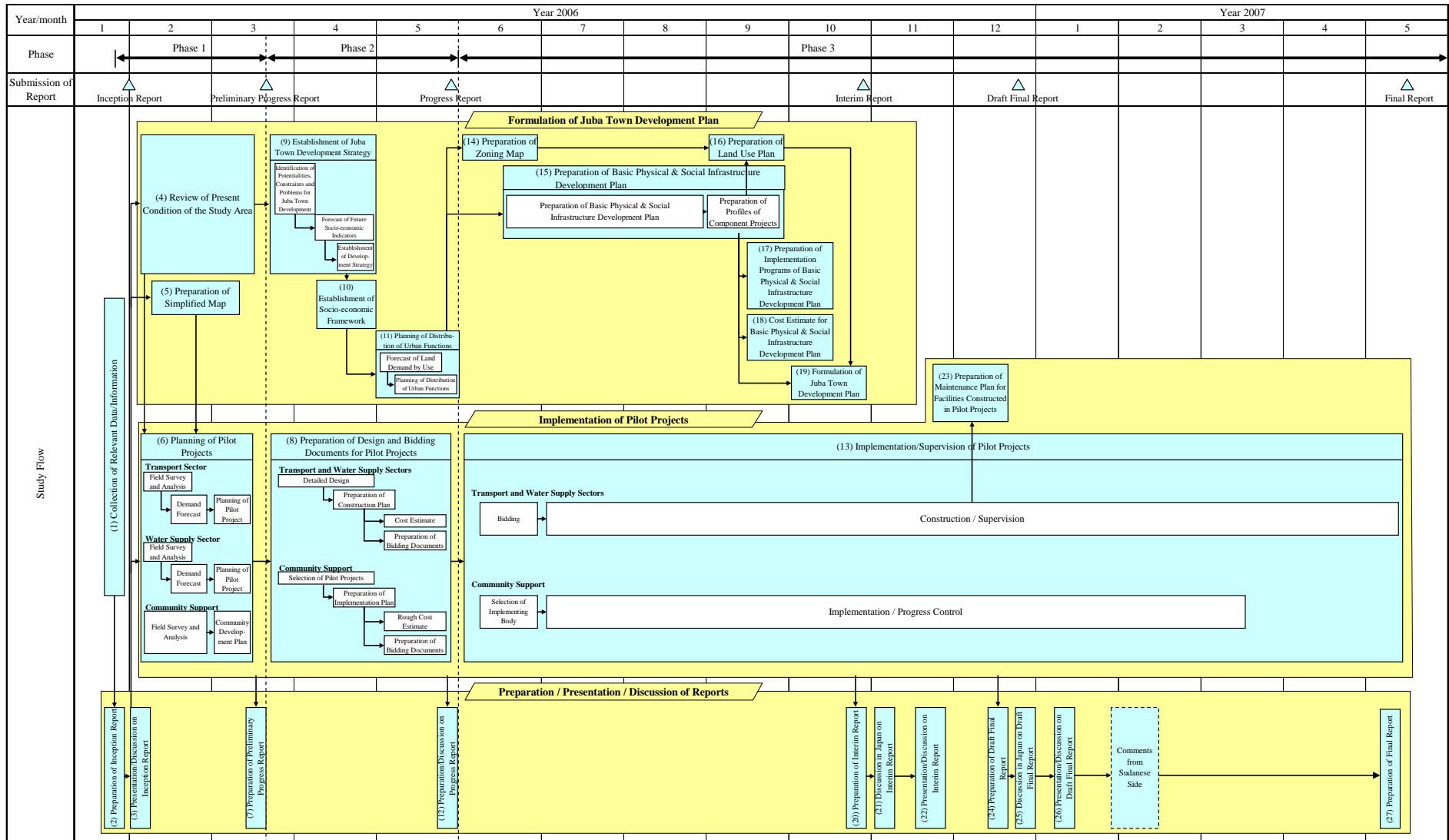


Figure 1.4-1 Study Flow Diagram

## 1.5 REPORTS

The Final Report consists of the following:

- Executive Summary
- Main Text
- Basic Physical and Social Infrastructure Development Plan in Juba

## 1.6 ORGANIZATION OF THE STUDY

The Study is carried out by the Study Team organized by JICA with the guidance and cooperation of GOSS and the Government of Central Equatoria State, under the management of JICA. The members involved in the Study are as follows:

### **JICA**

Mr. Yuichi Sugano	Team Director, Urban and Regional Development/ Reconstruction Team II, Group II, Social Development Department
Mr. Atsushi Hanatani	Team Director, East Africa Team, Regional Department IV
Mr. Naomichi Murooka	Senior Program Officer, Urban and Regional Development/Reconstruction Team II, Group II, Social Development Department
Mr. Kentaro Akutsu	Project Formulation Advisor (Sudan), Regional Support Office for Eastern and Southern Africa
Mr. Isamu Kikuchi	ODA Advisor, Ministry of International Cooperation (MIC)

### **Government of Southern Sudan**

H.E. Dr. Riak Machar Teny-Dhurgo	Vice President and Minister of Housing, Lands and Public Utilities
Col. Deng Deng Akoon	Executive Office Manager, Vice President Office
Eng. Raymond Pitya Mabe	Undersecretary, Ministry of Housing, Lands and Public Utilities
Mr. Tom Carter	Urban Management Advisor, Ministry of Housing, Lands and Public Utilities
Arch. Silvas Clark Amozoy	Chief Architect, Ministry of Housing, Lands and Public Utilities

Col. Eng. Riek Digol Juer	Director, Physical Planning Dep., Ministry of Housing, Lands and Public Utilities
Mr. Charles Mesegbe Libo	Eng. Ministry of Housing, Lands and Public Utilities
H.E. Mrs. Rebeca Garang	Minister, Ministry of Transport, Roads and Bridges
Dr. Daniel Wani	Undersecretary, Ministry of Transport, Roads and Bridges
Mr. John De Tong Kual	Director General, Dep. of River Transport, Ministry of Transport, Roads and Bridges
Mr. Manyok S. Chol	Eng. Dep. of River Transport, Ministry of Transport, Roads and Bridges
Eng. Otim Bong Mike	Deputy Director, Dep. of Urban Roads, Ministry of Transport, Roads and Bridges
Mr. Wonde Ade Kenyi	Director, Directorate of Air Transport, Ministry of Transport, Roads and Bridges
Mr. Lado Togun Tombe	Director, Mechanical Transport Department, Ministry of Transport, Roads and Bridges
Mr. Nhial Bol	Director of Railways, Ministry of Transport, Roads and Bridges
Eng. Duku George Aggrey	Engineer, Ministry of Transport, Roads and Bridges
Eng. Felix Wani	Engineer, Ministry of Transport, Roads and Bridges
Eng. Marko Aleardo Paul	Engineer, Ministry of Transport, Roads and Bridges
H.E. Mr. Arthur Akuuien Chor	Minister, Ministry of Finance and Economic Planning

**Government of Central Equatoria State**

H.E. Major General Clement Wani Konga	Governor, Central Equatoria State
Mr. Mark Logun	Executive Office Manager, Central Equatoria State
H.E. Eng. Alikaya Aligo Samson	Minister, Ministry of Physical Infrastructure
Eng. Lewis Gore George	Director General, Ministry of Physical Infrastructure
Eng. Emmanuel Matayo Wani	Director, Dep. of Housing and Construction, Ministry of Physical Infrastructure
Mr. Semaya Kumba Lako	Deputy Administrator, Ministry of Physical Infrastructure
Eng. Paulino Doggole Tranguilo	Ag. Director, Dep. of Roads and Bridges, Ministry of Physical Infrastructure

Eng. John B.Ladu	Director, Dep. of Roads and Bridges, Ministry of Physical Infrastructure
Mr. Lowis Tombe	Director, Dep. of Survey, Ministry of Physical Infrastructure
Eng. Lino Schebesta B.Kenyi	Ag. Director, Dep. of Communication, Ministry of Physical Infrastructure
Eng. Cornelious Lado	Director, Dep. of Land Planning, Ministry of Physical Infrastructure
Mr. Victor Khamis	Information Officer, Ministry of Physical Infrastructure
Mr. Simon Gama	Director, Construction Department, Ministry of Education
Mr. Charles Hakim	Executive Office Manager, Urban Water Corporation, Ministry of Physical Infrastructure
Eng. Samwel Taban	Engineer-In-Charge, Urban Water Corporation, Ministry of Physical Infrastructure
Eng. Santunino Tongun	Chief Engineer, Urban Water Corporation, Ministry of Physical Infrastructure
Eng. Emmanuel Lado	Director General, Rural Water Corporation, Ministry of Physical Infrastructure
Eng. Pierino Effrem	Director, Rural Water Corporation, Ministry of Physical Infrastructure

### **Study Team**

Mr. Kunihiko Sawano	Team Leader / Urban Development Plan
Mr. Toshio Kimura	Land Use Plan
Mr. Asaichi Miyakawa	Socio-economic Analysis
Mr. Toshinori Toda	Economic Infrastructure Plan
Mr. Hisashi Takada	Social Infrastructure Plan
Mr. Naofumi Sato	Environmental Infrastructure Plan
Mr. Hironori Kuroki	Environmental Study
Mr. Kazuhiro Ishizuka	Map Preparation
Mr. Akio Nakamura	Transport Plan
Mr. Kenji Isomoto	Design/Construction Supervision of Pilot Project in Transport Sector
Mr. Tsuyoshi Yamajuku	Water Purification Facility Plan
Mr. Akira Kadoya	Water Supplying Facility Plan

Mr. Nobuo Yoneda	Design/Construction Supervision of Pilot Project in Water Supply Sector
Mr Kinzo Narita	Hydraulic Analysis
Mr. Takayasu Otake	Community-based Development Plan
Mr. Kiyohito Kobayashi	Cost Estimate
Mr. Minoru Miura	Pilot Projects Implementation Management
Dr. John N. Mukabi	Coordinator



## **CHAPTER 2**

# **PRESENT CONDITION OF THE STUDY AREA**

## **CHAPTER 2    PRESENT CONDITION OF THE STUDY AREA**

### **2.1    NATURAL CONDITION**

#### **2.1.1    Location**

Juba Town is located at 4°52' north of the equator and 31°36' east of eastern longitude, at an altitude of 460m above sea level.

#### **2.1.2    Climate**

In general, the temperature is high throughout the year with distinct characteristics of the dry and rainy seasons.

The monthly average minimum temperatures based on the 1998 to 2004 statistics (excluding 2001) fall in the range of 19.4 and 23.7 whereas the monthly average maximum temperatures for the same period were between 31.5 and 37.9 . The lowest monthly average minimum temperature was mostly recorded in December, while the highest average maximum temperature predominantly occurred either in January or February.

The rainy season usually starts in May and lasts to October. The average annual precipitation level is around 1,000mm. However, occasionally, precipitation levels of more than 1,200mm may be recorded. Most rainfall during the year concentrates in the rainy season, with almost no rainfall observed in the dry season (Figure 2.1-1 and Table 2.1-1).

The prevailing winds are always from the south. Nevertheless, in January and February winds mostly prevail from the north-north-west direction.

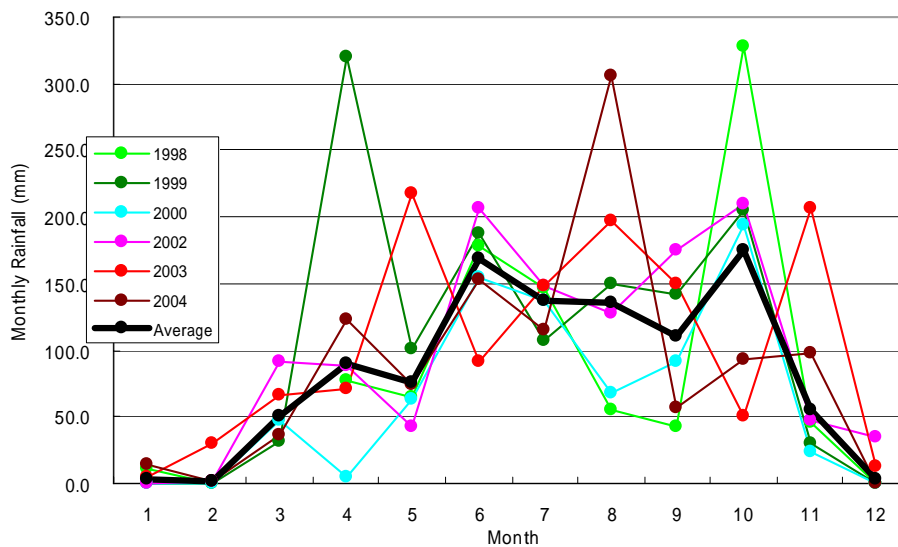
#### **2.1.3    Topography**

Juba Town and the surrounding area is located in the large Bahr al Jebel alluvial plain which inclines from south-southwest to north-northeast direction in general. The White Nile River with an average width between 250m to 600m width, delineates the town boundary in the east.

A gentle slope generally characterizes the area, where outcrops of hard and firm crystalline rocks are found. Among these outcrops of rocks, the most outstanding one is Jebel Krok, with

an altitude of 744m above MSL, 3km width and 1km length, located to the west of Juba Town and forming the natural boundary of the Juba Town area.

In the rainy season, the flooding water affects an area covering almost 50% of the alluvial plain prompting the emergence of the temporal and seasonal rivers flowing into the White Nile River.



Note : Average = average of 4 years excluding minimum and maximum values

**Figure 2.1-1 Monthly Rainfall in Juba**

**Table 2.1-1 Monthly Rainfall in Juba**

	1998	1999	2000	2002	2003	2004	Average
Jan.	10.4	0.0	0.0	0.0	4.0	14.3	3.600
Feb.	0.0	0.5	0.0	1.5	30.0	1.2	0.800
Mar.		32.2	48.0	91.5	66.1	36.5	50.200
Apr.	76.6	320.3	4.8	87.6	71.0	122.2	89.350
May	64.1	100.7	62.5	43.2	218.0	74.8	75.525
Jun.	178.3	188.0	154.9	206.7	91.2	153.5	168.675
Jul.	146.8	106.8	136.9	148.6	148.9	115.1	136.850
Aug.	55.4	149.3	68.5	127.5	197.4	305.2	135.675
Sep.	42.7	142.4	90.9	175.6	149.6	56.5	109.850
Oct.	328.2	205.3	194.4	209.9	50.1	92.8	175.600
Nov.	45.4	29.2	24.3	48.0	206.9	97.3	54.975
Dec.	0.0	0.0	0.0	34.2	12.2	0.5	3.175

Source: "STASTITICAL YEARBOOK for the year 2004", Central Bureau of Statistics

## **2.2 SOCIO-ECONOMIC CONDITION**

### **2.2.1 Administrative System**

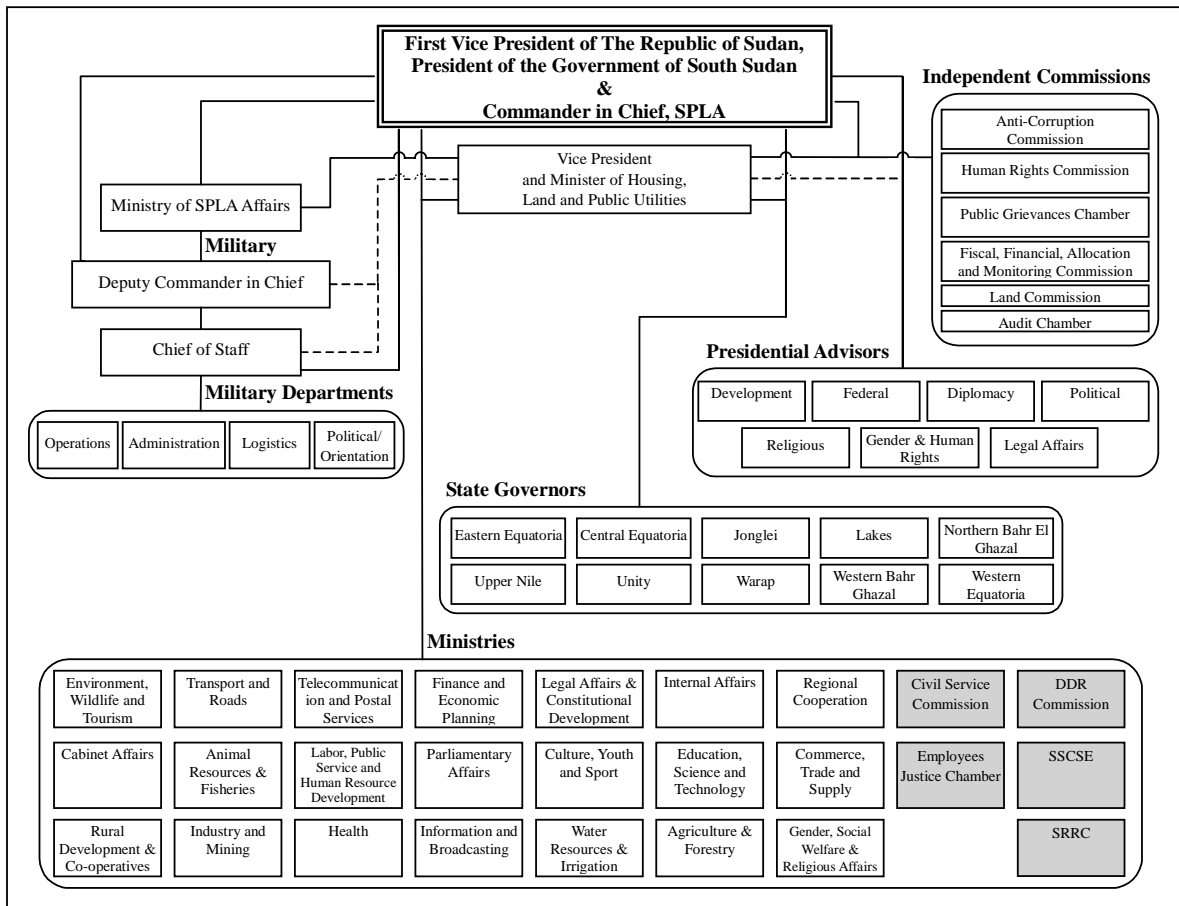
The organizational structures of the Government of Southern Sudan and the State Government of Central Equatoria are shown in Figure 2.2-1 and Figure 2.2-2 respectively.

Bahr el Jebel State was renamed “Central Equatoria” effective as of April 2006. Most administrative systems and organizational structures of the State Government are still under transition. As of 10th of May 2006, the State Government is composed of seven ministries, namely, Ministry of Finance, Economy & Manpower, Ministry of Agriculture and Animal Resources, Ministry of Health, Ministry of Education, Science & Technology, Ministry of Culture and Information, Ministry of Local Government and Ministry of Physical Infrastructure.

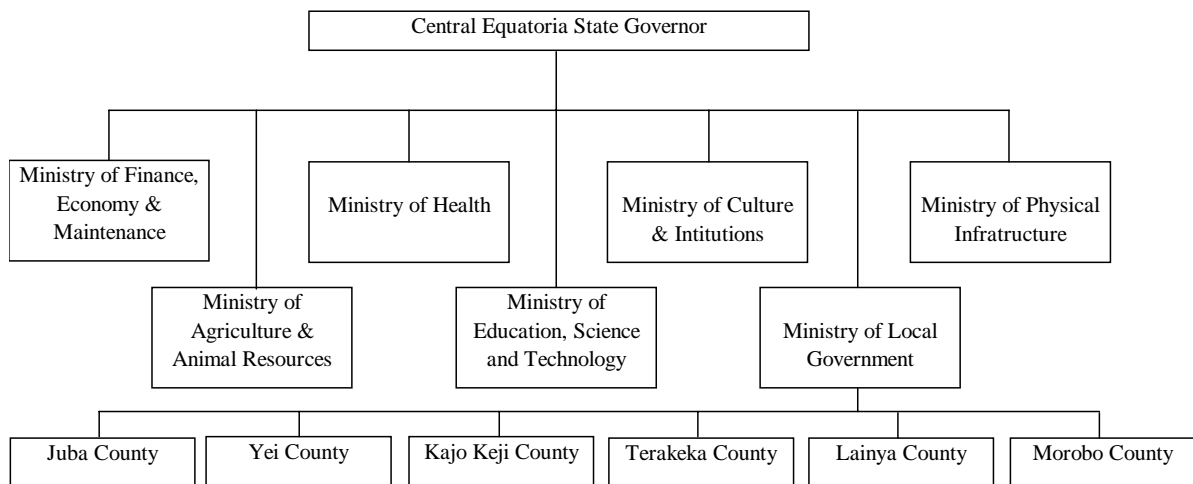
The Ministry of Physical Infrastructure, one of the major counterpart agencies, is composed of various Directorates and Departments such as Town Planning, Survey, Roads and Bridges, Construction, Housing, as well as Urban Water, and Rural Water Development Corporations. Under the current system, the President of the Government of Southern Sudan appoints the State Governor.

The State Ministry of Local Government consists of six county offices headed by County Commissioners who are appointed by the State Governor. However, under the new legal framework, the State Governor and the Commissioners will be elected through the ballot after a period of two years.

Currently, the Central Government of Sudan allocates a budget to the Government of Southern Sudan, and the Government of Southern Sudan then allocates a budget to each governmental organizations and State Governments. The State Government then directly funds each County and Payam. Juba Town, Kator and Munuki are expected to form Juba Municipality. However, the process of forming the municipality is still under way. Other than the above-mentioned funding stream, each respective Government has its own source of revenue.



**Figure 2.2-1 Organization of Central Government of Southern Sudan**



**Figure 2.2-2 Organization of Central Equatoria State**

### 2.2.2 Population

In the “ Local Government Framework (LGF) for Southern Sudan (Fourth Draft, September 2004)”, new local government organization and administration structures were proposed. According to this proposal, former hierarchical system composed of State, Province, Council,

and Locality will be dissolved and new hierarchical governance system of State, County, Payam and Bomas will be established.

According to this LGF, Bahr el Jebel State that includes Juba Town and the surrounding areas was renamed “Central Equatoria” in April, 2006. Central Equatoria is composed of 6 Counties comprising of Juba, Yei, Terakeka, Kajo Keji, Lainya, and Morobo. Juba County comprises of 11 Payams. Out of those Payams, Juba Town, Kator and Munuki are expected to form Juba Municipality. However, the process of forming the municipality as well as the delineation of the Bomas is still under way.

The population of Juba Town was 71,500 in 1977. The United Nations conducted a head-count census in 1994 and estimated the population at 156,000. the Dept. of Planning and Statistics, State Min. of Finance, Economy and Manpower estimated the total population of Juba Municipality, including Juba Town, Kator, and Muniki Payams, at 130,507 with 23,112 households (Table 2.2-1). Another source, “ Juba Assessment Town Planning and Administration”, USAID, Nov. 2005, indicates the total population of Juba Town and the surrounding areas to be approximately 163,000 with 77,000 in Juba Town, 73,000 in Kator and 10,000 in Munuki as of the year 2005. If IDPs are included, the figure of present population would increase to roughly 250,000. It is currently projected to be between 450,000 and 500,000 by the year 2011 considering the recent migration patterns since Juba is an important, yet relatively urbanized destination for the returnees due to its position (one of the major cities along the Nile, proximity to Uganda and capital of Southern Sudan). The numbers of IDPs and refugees in Juba and the surrounding areas are also shown in Table 2.2-2.

**Table 2.2-1 Population Estimate by Administrative unit in Central Equatoria (Bahr al Jebel) State**

County	Administrative Unit (Payams)		Projections 2002				
			H/H	Male	Female	Total	Ave.H/H size
Juba	Juba Municipality	Juba Town	9,701	31,103	24,198	55,301	5.7
		Kator	10,313	31,710	30,172	61,882	6.0
		Munuki	3,098	7,092	6,232	13,324	4.3
		Mangalla	2,467	6,404	6,947	13,351	5.4
		Lirya	2,771	5,436	6,760	12,196	4.4
		Rokon	2,937	9,494	9,602	19,096	6.5
		Lobonok	621	1,607	1,874	3,481	5.6
		Rejaf	4,792	12,593	13,766	26,359	5.5
		Northern Bari	2,869	7,115	7,231	14,346	5.0
		Wonduruba	2,750	7,373	6,654	14,027	5.1
		Lokiliri	2,289	5,674	6,229	11,903	5.2
	Total	44,608	125,601	119,665	245,266	5.5	
Others			122,581	341,987	341,330	683,317	5.6
Total			167,189	467,588	460,995	928,583	5.6

Source: Ministry of Finance, Economy and Manpower, Bahr al Jebel State Government

According to available statistical data, the population of Juba Town registered an increase of approximately 7.7% from 2002 to 2005. This drastic increase is attributable more to the socio-dynamic patterns than to natural causes.

Such drastic increase of population in a newly designated capital city is not unique to Juba Town. Another case of a city which exhibited similarly drastic population increase is seen in Kazakhstan. Due to the drastic migration following the transfer of capital from Almati to Astana in 1997, a sharp increase of population of 15.58% p.a. occurred in Astana during 1998-1999. However, for the period 1999-2000, the rate of increase in population drastically dropped to mere 1.07%.

The average rate of increase in population of the whole Sudan for the 10 years 1973-1983 recorded a high value of 3.9%. However, due to the civil war, this rate dropped to 2.2% for the period 1983-1993, to 2.8% in 1993-2002 and to 2.6-2.7% in 2002-2004.

The population of the three Equatorial states in Southern Sudan, increased by 6.5% p.a. from 1973 to 1983, but dropped to -2.0% from 1983 to 1993 due to the conflict. The population growth rate recovered to 2.0% from 1993 to 2002, and to 1.5% -2.0% from 2002 to 2004. In general, population increase rates show a declining trend.

On the other hand, urban populations of the three states are gradually rising, though they are lower than those of the whole Sudan. The growth rate of urban population of Equatoria to which Juba belongs was 27.9% in 2004 compared to approximately 36.2% for the whole Sudan.

Relocation of workers, employment, marriage, and school admission are among the major factors of social population migration to the urban areas. Relocation of capital, and financial institutions and other servicing industries, as well as construction industries geared for reconstruction, following the relocation of the capital, are major the causes for the relocation of workers and employment.

**Table 2.2-2 IDPs by Area and Refugees by Ethnic Group (as of 2005)**

**IDPs**

Central Equatoria	SRRC	WFP	UNHCR
1 Kator	-	1,992	
2 Kuda	1,412	1,412	
3 Sermoni	540	540	
4 Merekio	992	992	
5 Bungu	1,538	1,342	
6 Jebel Kujur	1,445	1,433	
7 Mafau	3,708	-	
8 Mogairi	956	829	
9 Gumba/Rajaf	2,607	-	
10 Lologo			3,570(transit)
Sub-total	13,198	8,540	3,570
11 Kajojeji	1,336		
12 Lainnya	1,415	1,301	
13 Rokon	2,929	-	2,110
14 Jambo	2,776	-	
15 Yei	2,103	2,217	
16 Kuku	-	1,336	
17 Kagwada	1,471	1,667	
18 Kaltok	-	6,245	
19 Terakeka	2,589	2,514	
Total	27,817	23,820	5,680

**Refugees**

Ethnic Group	Population
Ethiopian Anuaks	211
Congolese	1,680
Total	1,891

Source: UNHCR

Note: Data differ by data source.

### 2.2.3 Economy

Figures of working population by industry in Juba Town for the recent years are not available as yet. Therefore, working population by industry in 1973, out of a population of 56,000 persons, is shown in Table 2.2-3 below as a reference.

Approximately 45% of the working population are engaged in public sector, whereas those in the primary industry account for 15%, manufacture for 6%, and transport and warehousing activities for 8% respectively.

Composition of the working population is clearly characterized by the high percentage of the public sector and low percentage of industrial and commercial activities.



**Table 2.2-3 Working Population by Sector in Juba Town, 1973**

Agriculture, hunting, etc.	Mining and quarrying	Manufacturing	Electricity, gas and water	Construction	Wholesale, retail	Transport, storage	Finance and business	Community services	Activities not defined	Total
2,735	2	1,148	74	1,297	1,711	1,433	25	8,278	1,525	18,228
15.0%	0.0%	6.3%	0.4%	7.1%	9.4%	7.9%	0.1%	45.4%	8.4%	100.0%

Source: Southern Sudan 1973 CENSUS

High dependency on the public sector has positive impact on stabilization of the labor market on one hand, and higher living standard as a result of high consumption level on the other.

Agriculture remains at a non-sustainable production level. As a result, incessant import of food from other regions and north Sudan for supporting the population in Juba Town area is inevitable.

Except for the processing industry of tobacco, coffee and tea, modern industries are not yet rooted. Most processing industries of agricultural products are operated in a traditional manner and only in a small scale. Industries are basically limited to food and clothes to satisfy the basic need of the inhabitants of Juba and surrounding areas.

Main economic activities in Juba Town and surrounding areas are commerce, transport and public services, and activities by international organizations such as United Nations (UN), World Food Program (WFP), and UN Mission in Sudan (UNMIS), and bilateral cooperation agencies including United States Agency for International Development (USAID) and JICA. Other various NGOs have emerged specifically to enhance and support special procurement activities for those industries as well as the donor agencies.

About 9 markets listed in Table 2.2-4 are located in Juba Town and surrounding areas. Except Gumba and Custom Markets, the markets were publicly established. Business in most shops is conducted in small and simple frame huts and stalls within an area of some 15 sq.m. However, a small number of shops are operated in rows of permanently built structures.

Although the scales of the markets differ considerably from one to another, the items and varieties of commodities are quite similar. Comparison of the IKONOS satellite imaginary taken in January 2004 with the Quickbird's image taken in August 2005, portrays a remarkable expansion of the Custom Market along Yei Road.

**Table 2.2-4 Markets in Juba Town Area**

Market	No. of shops	No. of trucks (veh./day)	Remarks
1. Juba Town Market	50-60	3-5	200 shops outside of market in Juba Payam
2. Konyo Konyo Market	675	35	
3. Custom Market	1,500	100	Located at Juba University land
4. Munuki Market	100	5	
5. Malakia Market	300	15	
6. Gabad Market	70-80	10	Private, near airport
7. Gumba Market	-	-	On the eastern side of White Nile River
8. Lologo Market	25	2	Private
9. Ardep Market	20-30	2	Shops are being located.

Note: Number of trucks indicates the total of pickups, medium and heavy trucks.

#### **2.2.4 Land Use**

A zoning system for Juba Town area to regulate land use and induce the proper use of land for building and other purposes is not established as yet. Currently, a land administrative unit of Juba issues consent in an ad hoc manner for each land use.

Due to the lack of a proper land use zoning system, Juba Town area is characterized by its low density urban area where houses, shops and small business intermingle.

The commercial area in Juba Town Payam has been formed around the historic blocks. The commercial and business areas are centered at the old port and are spreading out from the historic old blocks. The high class housing areas form parts of the those commercial and business blocks.

Kator Payam is located in the southwest of Juba Town Payam, where markets, old Arab houses and merchant houses intermingle. Informal settlements with traditional round houses (tukul) intermittently exist outwards.

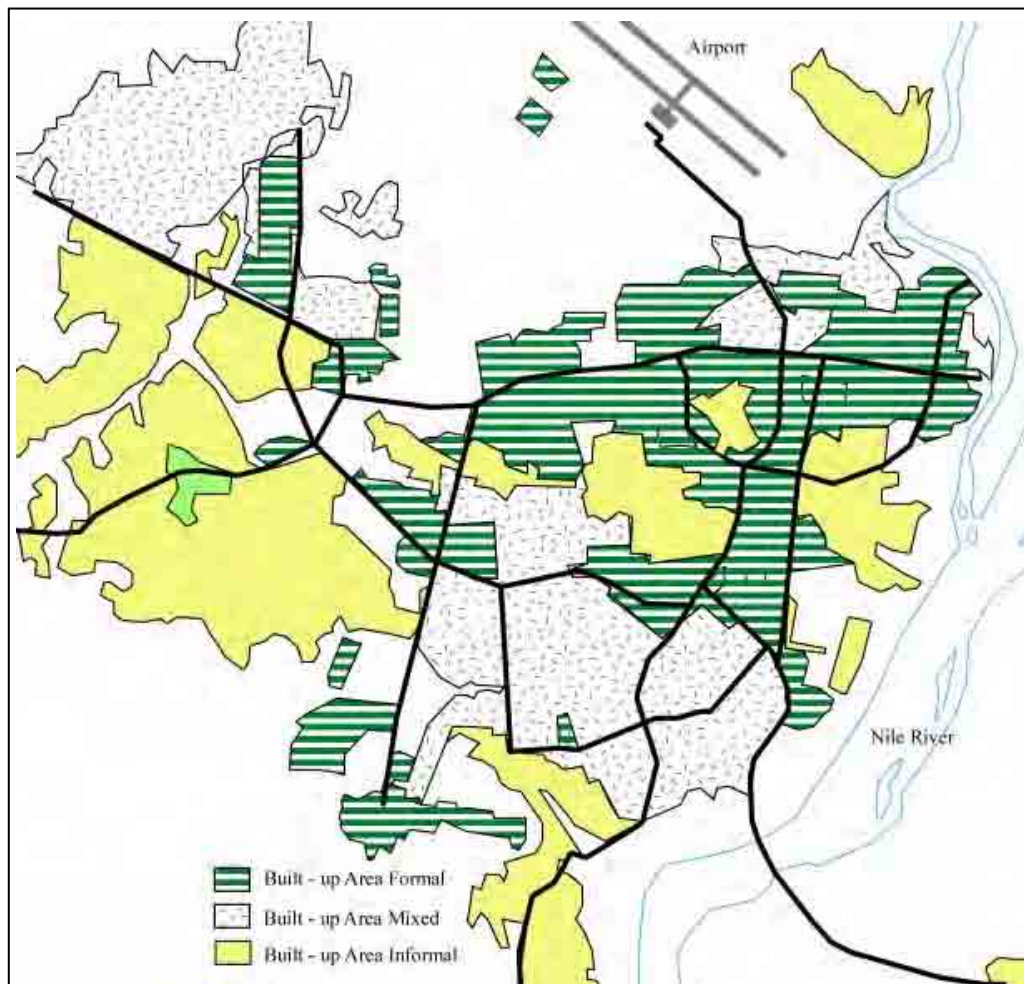
Munuki Payam is located in the northwest of Juba Payam beyond the ministry complex of the Government of Southern Sudan. It is also characterized by the houses of the relatively low income groups and IDPs.

In the past 25 years, urbanization took place towards the northwest along Maridi Road. Urbanization has also occurred along Yei Road. Gudele area covering an acreage of about

700ha is one of the sites for new housing development and is located next to Munuki development areas. However, there are still very few houses as of today.

In Juba Town area, some 30,000 plots are provided as formal settlements accommodating some 86,000 households.

Housing areas in the center of Juba Town area are mainly composed of first class plots (see Subsection 2.2.6 for classification of land), while temporary houses and traditional Tukul style houses are predominant in the informal settlement areas away from the center. In the outskirts of the town, traditional agricultural villages exist in the areas outside of the informal settlements. Once these informal settlements are classified as Class 4 residential areas, they will be dissolved for the promotion of the construction of planned permanent buildings and enhancement of certified landownership.



**Figure 2.2-3 Land Type in Juba**

## **2.2.5 Urban Infrastructures**

### **(1) Roads**

#### **1) Urban roads**

Arterial roads and bridges in the central area of Juba Town, as well as secondary roads servicing the commercial areas, are generally in poor condition due to the lack of proper rehabilitation and/or maintenance. Almost all sections of the roads once asphalted have also deteriorated extremely to the condition of gravel roads and certainly require reconstruction.

The average width of the asphalt pavement road sections, between Mudria Intersection and the Assemble Intersection, and between the old port and the State Police Headquarters through Mudria Intersection, fall into the range between 6 to 10m. These paved roads are mainly characterized by immense potholes and extensively damaged shoulders that are filled with sand and/or gravel without asphalt or bituminous materials.

The widths of other unpaved roads are about 9.0 m on the average. At the markets and in the central commercial areas the encroachment of stalls and shops on to the road areas are a major obstruction to the traffic.

Aggravation of the poor state of the roads is largely attributable to the lack of maintenance coupled with the gross effect of heavy rainfall. Sections that are impassable for vehicles usually emerge after heavy rainfall.

#### **2) Regional Artery**

Five regional arterial roads, formed in a radial pattern, connect Juba Town with neighboring regions and countries. Presently, Juba is narrowly linked with Uganda and Congo via Yei, and Kenya through Kapoeta. In order to improve the state of some of these roads, WFP has been implementing Emergency Road Repair Programmes in phases [Phase I (Oct. 2003-Dec. 2004) and Phase II (Oct. 2004-Dec. 2005)]. Funding and implementation for Phase III (Oct. 2005-Dec. 2006) has yet to be realized. Although the WFP road projects are emergency repair works to gravel standards, they have played a major role in improving these roads to at least basic international road transport conditions.

A summary of the general road conditions of some of the major routes is given below.

Juba-Nimule Section (border town to Uganda)

Repair of this section is not yet completed and passage is almost impossible.

#### Juba-Torit Section (to Kenya via Kapoeta)

Repair of this section is scheduled in Phase III of the WFP projects. However, the road is reportedly passable despite the existence of landmines. Furthermore, due to the threat of Lord's Resistance Army (LRA), the traffic volume is quite little with an average count of 6 to 10 trucks a day in both directions.

#### Juba-Yei Section (to Uganda and Congo)

This road traverses Yei and connects to Uganda and Congo. Repair works by WFP have already been completed. Up to now the road is virtually the only international road to cater for international freight movement on land. The traffic volume on this road is between 70 and 150 trucks in both directions.

#### Juba-Mundri Section (to Rumbek)

This section is not yet repaired. The repair work is scheduled to be implemented under Phase III of the WFP Programmes. Impassable bridges and residual buried landmines greatly hinder the passage of vehicles.

#### Juba-Bor Section (to Khartoum and Port Sudan)

This section of the road yet to be repaired and passage of vehicles is reportedly impossible. The road condition becomes considerably worse in the rainy season because it passes through swampy areas. Security problems and residual landmines are also the other obstacles.

Minivans are used as means of public transport within Juba Town by the inhabitants. For long distance trips, river transport along the Nile and air transport services are provided. UN-operated planes supplement commercially operated carriers including Sudan Airways of freight services for goods and passengers between Khartoum and Juba. Commercial airlines mostly start from and are destined for Nairobi, Dubai and other major Cities in Africa. Recently, the number of passengers particularly to/from Nairobi is rapidly increasing.

JICA Study Team conducted traffic count survey on the main roads in Juba Town from 6 a.m. to 7 p.m. for three successive days from 1st to 3rd of August 2006. The survey results are shown below.

Heavy traffic was observed in the center of town on May Street and the road to Juba International Airport.

Traffic volume on the road to temporary port that is to be rehabilitated in the course of the Study was some 600 pcu for 13 hours from 6 a.m. to 7 p.m.

High percentage of bicycles was observed on all roads.

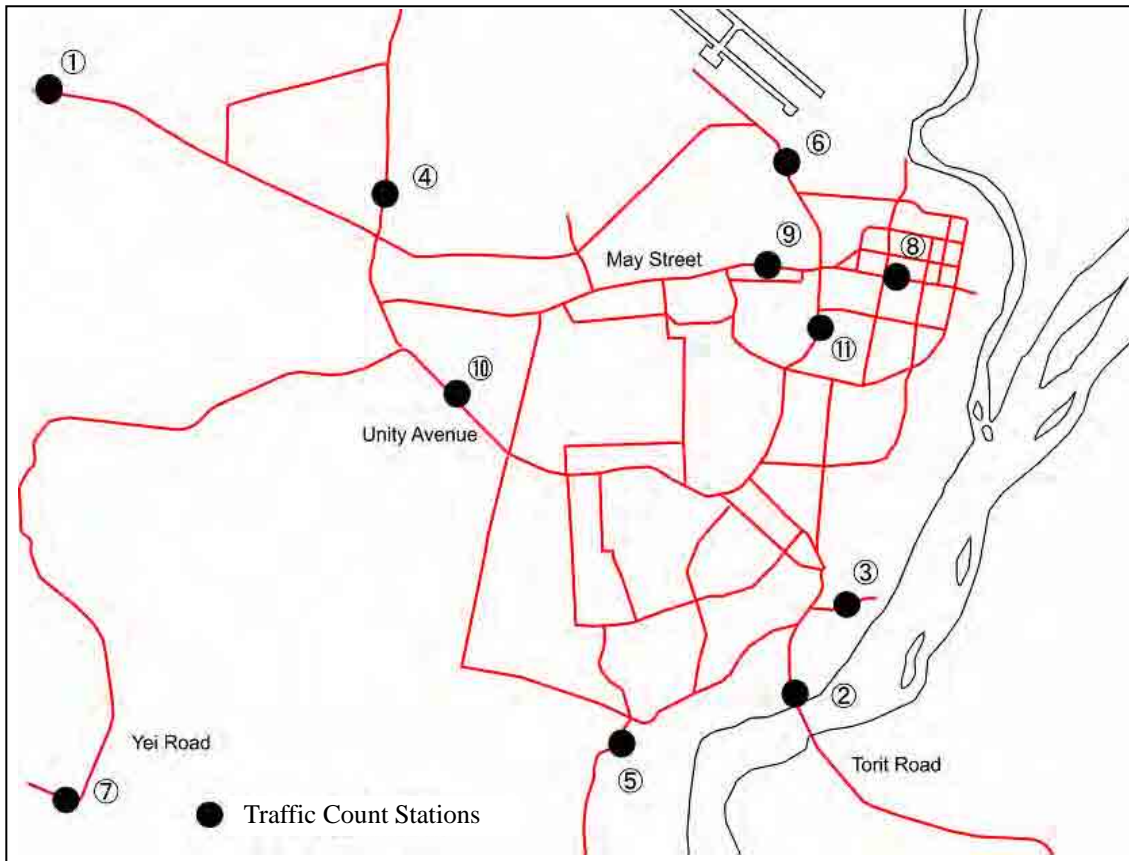
**Table 2.2-5 Present Traffic Volumes, 2006**

Location	Pedestrian	Bicycle	Motocycle	Passenger Car	Mini Bus	Bus	Picup	Light Truck *	Medium Truck **	Heavy Truck/Trailer ***
1 Gudele Road	1254	631	265	1205	15	0	770	138	21	0
2 Torit Road	2106	863	250	384	581	0	282	573	217	76
3 Temporary Port Road	746	154	92	85	24	0	114	75	116	10
4 Munuki Road	1282	862	355	837	53	0	510	127	22	2
5 Lologo Road	904	737	340	460	27	0	146	135	39	13
6 Airport Road	2036	1604	918	1060	1457	0	1554	1375	222	743
7 Yei Road	1670	551	279	420	119	7	301	331	145	53
8 May St. to Juba Market	1179	656	595	2349	262	0	1400	133	256	130
9 May Street	4419	1446	1077	4483	162	14	2122	373	49	15
10 Unity Ave. near Custom Mkt.	3021	680	527	1878	1532	16	1976	1146	681	135
11 Unity Ave. opposite Hospital	3021	966	567	1415	2817	0	1348	425	305	160

\* Capacity 1.5t

\*\* Capacity 1.5 ~ 10t, 3 Axles

\*\*\* Capacity > 10t, Axles > 3



**Figure 2.2-4 Location of Traffic Count Stations**

## (2) Bus Services

The three main bus terminals are located in the markets in Juba Town Payam and adjacent to the boundary Juba Town Payam, namely, Juba Town, Custom, and Konyo Konyo Market. The public transport services between the bus terminals and other parts of Juba Town are provided by minivans. Although the private sector is the main operator of the bus services, the State government also provides services through the operation of some 16 buses.

**Table 2.2-6 Bus Services provided by Private Sector**

Route	Number of vehicles operated	Number of buses operated ( both direction )
Custom - Munuki	10 vans (14 passengers)	80/day
Custom - Juba	35 vans	240/day
Custom - Yei	60vans	120/week
Custom - Yei	8 buses (65 passengers)	16/week
Custom - Konyo Koyo	20 vans	160/day
Konyo Konyo - Lologo	10 vans	80/day

## (3) Electricity

Juba Power Generation Plant was constructed in the 1980s and five power generators (two made in China and three made in Germany), each with a 1,360KVA capacity, were installed. Power supply to Juba Town Payam is provided by two China-made power generators. The total power production is estimated to be 1.6MW covering 75% of Juba Town area. Since these power generators have been poorly maintained, they have deteriorated mechanically and stop working frequently. As a consequence, interruptions of operations occur frequently resulting in the higher running costs. Although there was a plan to rehabilitate one out of the three German-made generators, the actual works have not yet been implemented due to lack of the necessary spare parts and tools.

Power is transmitted at 11kV and supplied at 415V to consumers whose power demand is large. The total grid network length of the 11kV is 15km, and 32 units 11kV/433V transformers are being used. Out of these transformers, 10 transformers listed below are heavily damaged.

- Old Power Plant transformers
- Jalabar transformer ( power supply to Juba Hotel and UN compound )
- Airport 1 transformer ( power supply to airport )
- Juba University transformer (Poland-made)
- Military transformer ( Romania-made )
- Atlabara transformer (power supply to communities)

Lack of sufficient power supply in Juba Town and the surrounding areas is causing the following problems.

- Heavy dependence on kerosene for lighting at a relatively high cost as alternative energy
- Constraint of radio usage leading to the restriction of access to information on job opportunities, education status and leisure activities
- Low efficiency and productivity in commercial activities
- Security problems during dark hours

#### **(4) Public Buildings**

Public buildings were built in 1940s, 1950s and 1970s, and are owned by the Government. Altogether, 650 public buildings are located in Juba Town occupying a total area of approximately 172,632 sq.m.

The public buildings constructed in 1970s were built mainly by a Yugoslavian construction company with basic construction features of a flat roof and monotonous but uniform appearance and structure.

Some of the public buildings being utilized by the Government of Southern Sudan have been damaged due to lack of periodic maintenance, subversive activities and partially due to the impact the of conflict.

Public buildings built in 1940s and 1950s are currently used as houses for government officials, as well as general residential houses, and hospitals. Corrugated iron sheets or asbestos slates were used for roofing, while concrete blocks or kilned bricks were used for wall construction. These buildings are also in a very poor condition due to lack of maintenance and aging.

Cavities made by termites and other insects, leakage of rainwater and erosion are some of the most common problems that affect all such public buildings.

#### **(5) Water Supply**

The Urban Water Corporation intakes water from the White Nile River, purifies and distributes it in the central area of Juba Town. On the other hand, the Rural Water Corporation develops boreholes in the peripheral areas.

Demarcation concerning the water source and areas to be supplied with water for these two corporations have been made up to date. Namely, the Urban Water Corporation is in charge of the central area using mainly surface water, while the Rural Water Corporation is in charge of the peripheral areas using groundwater. In addition, borehole development by NGOs and



water trading are also undertaken by private sector, sourcing the water from the River Nile and transporting it by trucks.

The Urban Water Corporation takes water from the Juba Tributary of the River Nile to the filtration plant near the river, subsequently pumping it up to pressurizing tanks. Water is distributed to the eastern part of the town and sent to three steel water tanks at the hospital in the center of the town from a water filtration plant. From that level, the water is pumped again to the water tank near the ministry complex. The water supply network comprises of 51 km of piping and has 2,045 water taps in total. Different water billing systems are applied depending on the land classes but a flat rate is applied for the same land class.

A deteriorating water plant and other facilities coupled with water leakage are some of the main problems of the water supply system. In addition, inappropriate technical considerations of the three water tanks, lack of spare pumping capacity, lack of suitable water gauges and intermittent power supply are also cited as major stumbling blocks.

#### **(6) Public Health Facilities**

Collection and disposal of solid waste, and sewerage disposal, which used to be in practice, are now a thing of the past.

In the management of most facilities, environmental impact is hardly considered. Solid waste is neglected and left uncollected along the road side and within the peripherals of seasonal rivers. In the rainy season, the solid waste is washed away into the White Nile River. The sight of heaps of solid waste is phenomenal along the Yei Road only 3.5km away from the center of the town.

Regular disposal is not removed until the latrines and/or septic tanks become full resulting in the emission of foul smell and immense sanitation and hygiene problems. Once, faeces and urine collection vehicles used to be working. However, no such collection services are provided due to the lack of vehicles. This situation is deemed to have negative impact on the quality of the groundwater in the boreholes. It is very likely that the rapid increase in population further aggravates the hygiene situation and problems.

A random sampling survey on the water quality of boreholes and the River Nile revealed that the water of these sources is hardly safe.

The current administrative and management policy of Juba Town is to handover the management of sewerage disposal to the Urban Water Corporation.

## 2.2.6 Land Tenure

Land classes are characterized by the size of plot, land rent, tax, and building materials. Plots in Juba Town Payam are divided into grid patterns along the roads. Plots in such layouts are rented to individuals under various terms of contract corresponding to the land class.

At the moment, a comprehensive land registration system including provision of land rights and allocation of land to individuals, is not yet established. Up to 1970, a land registration system used to actually function. However, such records were abandoned or lost during the conflict. It is therefore said that past land rights much depend on the memories of the individual leaseholders, tenants, inhabitants or personnel who worked at the local governments.

According to the information from the State Government, it was stipulated in the Land Ownership Law that the lands within the Town Boundary defined in 1972 belong to the Government and the government can take privately owned land rights for public use with compensation in cash or provision of alternative land right.

The Juba Town Boundary was defined apart from the administrative boundary for the urban development.

**Table 2.2-7 Classification of Lands**

	Class 1	Class 2	Class 3/4	Informal Tukul Zones
Population density (person/ha)	128	200	266	532
Minimum parcel size	25x25m	20x20m	20x15m	-
Term of lease	50 years	30 years	20 years	
	Renewable once per 30 years	Renewable once per 20 years	Renewable once per 10 years	
Annual fees per parcel (approx.) (USD)	50	37.5	25	
Characteristics	- Permanent - Upper class - Colonial English homes with historic value - Access to services	- Basic - Middle class - Cottage homes with simple construction - Some w/sanitation	Removable Low-income class - Mix of permanent and temporary materials - Limited or no sanitation	Tukul

## 2.2.7 Community

### (1) Communities in Juba Town area

Juba Town area comprising of Juba Town, Kator and Munuki Payam, consisting of 46 residential quarters in total. In each residential quarters, a Chairman, who works for the neighbourhood self-governing group, is appointed.

The old district and government office quarters are located in Juba Town Payam that cover the land along the White Nile River up to the bailey bridge.

Kator Payam is located in the southwest of Juba Town area with the largest Catholic Cathedral, which is used by the dominant sect in the Southern Sudan. Recently, most shops in the old district moved to the Konyo Konyo Market in Kator Payam.

Munuki Payam spreads out in the west of the ministry complex. Returnees, including refugees and IDP have been occupying this area since the stabilization of the political condition. Custom Market at the start/end point of Yei Road in the Munuki Payam is still growing because of the population increase of Munuki Payam and international freight movement along Yei Road which links Juba and Uganda as the only international route on land.

The war-torn old port adjacent to the old district has been closed without rehabilitation. An alternative temporary port was established at the northern part of the old ferry site facing the main stream of the White Nile River. Being near to the market is one of the reasons for the location of the temporary port.

## **(2) Characteristics of Communities**

The communities in Juba Town area have characteristics of urbanized ones. Although most residents are Christians, Moslems and people of indigenous religions are living together in the same community without any conflict. The same can be said of the ethnic groups: while the majority of the residents are of the Bari tribe, who are indigenous in Juba, Sudanese of Arab origin and other tribes are living together.

The types of occupation of the residents are diversified but the variation among the communities is small except those housed in official residential areas. On the other hand, the situation of the variation of living standards among communities is somewhat different. Low income groups are mainly found in the communities with a relatively large number of new immigrants. Such new immigrants usually live in the periphery of the Juba Town area. However, some of them occupy the land in the central area such as Game Community in Juba Town Payam. It was observed that immigrants before CPA were living in Juba Town Payam and Kator Payam. Accurate data pertaining to the numbers and locations, and willingness to return to their home land of such immigrants are hard to obtain.

It is said that, after the CPA, a considerable portion of IDPs were allocated land in Munuki and other areas. However, accurate figures and circumscribing conditions have yet to be established.

### **(3) Living Condition**

The conditions of living in Juba Town are generally poor. The areas with piped water supply are limited and most people depend on boreholes with hand pumps provided by international donor agencies and NGOs or water tank lorry operated by water vendors. The residents in the areas near the White Nile River take the water from river directly.

Solid waste collection services by vehicles are not provided. The county office set up the schedule for solid waste collection whereby the staff of local administration are required to partake the job. However, this interferes with their other, normal, routine works resulting in the low efficiency. Sewerage facilities are not available and septic tank utilization is very limited. Despite the fact that some of the households have electrical power connection, they opt to use kerosene lamps for their lighting considering the problems of cost (bill) and stability of the power generation.

As discussed and presented in Chapter 6, most new immigrants to Juba Town area build their own houses by applying their own traditional skills. These houses referred to as Tukuls, are mostly round or rectangular in shape and built with walls of sun-dried bricks and a roof frame structure fabricated from thin, round timber trusses and thatched by grass. Clay is then usually pasted on the bricks.

## **2.3 PREPARATION OF SIMPLIFIED MAP**

### **2.3.1 Specification of Simplified Map**

A simplified map covering the Study Area was produced by adjusting the satellite imaginary data with geo-rectification method using the data obtained through conventional survey. The satellite imaginary data used for the mapping and the main specification of the simplified map are as follows:

#### **(1) Satellite Imaginary Data**

##### **1) IKONOS Data**

Type of Satellite Image:	IKONOS (Geo Image use)
Type of data file:	geo tiff
Resolution:	1 meter
Covering Area:	Juba Town and its surroundings with area of 121sq.km
Photographing Date:	4th January 2004

##### **2) SPOT Data**

Type of Satellite Image:	SPOT (Geo Image use)
Type of data file:	geo tiff
Resolution:	1.5 meter
Covering Area:	Juba Town and its surroundings with area of 729sq.km
Photographing Date:	31st December 2005

#### **(2) Main Specification of Simplified Map**

Map Projection:	UTM (Universal Transverse Mercator) Zone 36 North
Reference System and Ellipsoid:	WGS 84 (World Geodetic System 1984)
Elevation System:	MSL (Mean Sea Level)
Map Scale:	1:5,000 level
Mapping Area:	729 sq. km

## 2.3.2 Field Verification

### 2.3.2.1 Ground Control Points

The ground control points (hereinafter referred to as GCP) necessary for the geo-reference of the mapping have been observed from their positions in the fields using the Portable GPS (Trimble: Geo Explorer 3) by the method of single positioning.

The following 16 points were identified and pricked on the satellite images at a scale of 1:5,000.

**Table 2.3-1 Coordinates of GCP**

Point No.	Northing (m)	Easting (m)
CP-1	540894.5	343534.4
CP-2	539664.8	340961.7
CP-3	539990.2	345511.2
CP-4	538193.5	343276.6
CP-5	535422.4	340080.2
CP-6	532646.7	340335.5
CP-7	537888.9	340271.2
CP-7'	537528.3	340200.8
CP-8	534203.4	350418.4
CP-9	532389.5	348363.4
CP-10	532566.9	346135.7
CP-11	532801.9	344139.0
CP-12	536298.1	342796.4
CP-13	537295.8	348157.9
CP-14	537737.4	346494.8
CP-15	535158.7	346278.5

### 2.3.2.2 Land Mark Survey

This survey was done in accordance with the “Feature List of Map Symbol” to be prepared for this mapping. The main items identified on the satellite image are as follows:

- Administrative boundaries and name
- Main road
- Government/administrative offices
- Hospitals, schools, churches, mosques, etc.
- International assistance organizations

Existing ground control points and bench marks  
Parks, cemeteries, public markets, etc.  
Land classification of vegetation

### 2.3.3 Simplified Mapping

#### 2.3.3.1 Geo-rectification

“Geo-rectification” is the process to correct error and distortion of horizontal positions of objects on the satellite Geo-Image. Geo-rectification was done using a software based on “Affine Transformation” and coordinate data of GCP.

The result of standard/max residual for the whole GCP (16 points) is as follow:

**Table 2.3-2 Result of GCP Residual**

	DX (m)	DY (m)	Root (DX <sup>2</sup> +DY <sup>2</sup> ) (m)
Max Residual	2.597	2.477	3.589
Standard Residual	1.401	1.324	1.928

#### 2.3.3.2 Plotting and Compilation

The plotting was done based on the adjusted satellite image which was projected on UTM coordinates, using the software of Auto CAD (Autdesk).

In the plotting and compilation, the field data obtained by the Land Mark Survey have been reflected on the simplified map. After the plotting, the compiled map with a scale of 1:15,000 was prepared by reducing the whole data files.

**Notes:**

- 1) The area plotted by the adjusted satellite image is divided into 9 sheets (Sheet No.1 to Sheet No.9). The area of Sheet No.10 was plotted by using an existing urban map with a scale of 1:5,000 in Juba Town.
- 2) It is not possible to plot contour lines using the satellite Geo-Image. Therefore contour lines with 5-meter interval were plotted using the data generated expediently from the DEM (Digital Terrain Model) downloaded from SRTM (Shuttle Radar Topography Mission).

### **2.3.4 Final Results**

The following maps were prepared:

Simplified map at a scale of 1:5,000: 10 sheets

(Type of data file: dxf, ver.11)

Compiled map at a scale of 1:15,000: 1 sheet

(Type of data file: jpg/pdf)

Simplified map at a scale of 1:10,000: 10 sheets

(Type of data file: dxf, ver.11)

Compiled map at a scale of 1:30,000: 1 sheet

(Type of data file: jpg/pdf)



## **CHAPTER 3**

# **DEVELOPMENT PLANS AND PROGRAMS**

## CHAPTER 3 DEVELOPMENT PLANS AND PROGRAMS

### 3.1 DEVELOPMENT PLANS/PROJECTS OF THE GOVERNMENT

#### 3.1.1 Development Plan of the Government of Southern Sudan

##### (1) Policy Statement for the Year

The Government of Southern Sudan has not yet formulated National Development Plan following the realization of the CPA. Instead, Policy Statement for the Year was formulated in April 2006. In the Statement, it was stressed that the manner of implementation should be in conformity with the Interim National Constitution, 2005 and the associated law.

The economic strategies to be adopted by the Government are to address such main issues as eradication of poverty, attainment of the Millennium Development Goals (MDGs), ensuring equitable distribution of wealth, rendering imbalance of income and achieving a decent standard of life for the people of Southern Sudan.

**Table 3.1-1 Direction of Development by Sector**

Sector	Direction of Development
Agriculture and forestry	<ul style="list-style-type: none"> <li>- Driving force of national socio-economic development</li> <li>- Strategic mechanization for productivity of labor and land</li> <li>- Establishment of food processing and marketing facilities in the rural areas</li> <li>- Micro financing</li> <li>- Reforestation</li> </ul>
Cooperatives and rural development	<ul style="list-style-type: none"> <li>- Development of a co-operative movement</li> <li>- Provision of potable water supply system</li> </ul>
Commerce, trade and supply	<ul style="list-style-type: none"> <li>- Exchange of technical and commercial information on the expansion of trade transaction</li> <li>- Joint venture production in all trade sectors</li> <li>- Marketing research</li> </ul>
Investment	<ul style="list-style-type: none"> <li>- Incentives to prospective private foreign investors</li> </ul>
Industry and mining	<ul style="list-style-type: none"> <li>- Investigate the 10 old industry projects (incl.Mangala Industrial Complex)</li> <li>- Evaluation of new industrial projects</li> <li>- Establishment of oil refinery</li> <li>- Transportation of oil fuel products by river</li> <li>- Hydroelectric power projects (south f Juba)</li> </ul>
Housing, road network and telecommunications infrastructure	<ul style="list-style-type: none"> <li>- Construction of internal and international roads for meaningful development (incl. road from Renk to Malakal and Bor,to Juba)</li> <li>- Road repair works (1,718km plus 2,000km)</li> <li>- Railway rehabilitation and construction (Wau-Juba, Juba-Mombasa, Juba-Yei-Lasu)</li> <li>- Repair of all major airports</li> <li>- Upgrade of Juba International Airport</li> <li>- Public building maintenance and rehabilitation</li> <li>- Water supply F/S (incl.Juba)</li> <li>- Rehabilitation, and construction of power supply system</li> <li>- Supervision and revision of maps and master plans for 10 towns</li> <li>- Modernization of telecommunication infrastructure</li> </ul>

Specific emphasis was put on housing, road network and telecommunications infrastructure, areas targeted to realize an immediate change in the lives of the people of Southern Sudan.

## **(2) The Six Year Plan of Economic and Social Development 1977/78-1982/83**

In 1977, “The Six Year Plan of Economic and Social Development 1977/78-1982/83” was prepared. Although the date of the preparation is old, the development directions to utilize local resources and construct infrastructure are still meaningful.

The gists of “The Six Year Plan of Economic and Social Development 1977/78-1982/83”, prepared by the Regional Ministry of Finance and Economic Planning, Democratic Republic of the Sudan Southern Region, 1977 are following.

### **1) Long term strategy of development (extracted)**

Maximizing resource utilization in the production of both commodities and services and ensuring continued growth.

Creating conditions where the national products are equitably distributed among the people.

Mobilizing and utilizing internal resources, including the labour force to the maximum. Self-help activities will, therefore, be an important instrument for speeding up socio-economic development of the country. This will eliminate the heavy dependence of the Region on external assistance in development efforts, in a as short time as possible.

Organizing economic activities in a manner in which the means of production are owned and operated in the interest of society as a whole and in a process involving as many people as possible in decisions regarding investment, production, employment and income distribution.

Decentralizing socio-political administration of the Region to enable socio-economic development to take place in a regionally balanced growth.

Establishing economic organization in line with the socio-economic requirements and political philosophy of the country, namely to achieve the aims of socialism. Cooperative movement will be an important aspect of such organization, especially for accelerating integrated rural development.

### **2) Objectives of the Six-Year Plan**

The strategy of development gives highest priority to the development of agriculture, animal production, forestry and fisheries. The plan also gives top priority to the development of transport and communication facilities in the Region since this is the essential pre-condition for the development of all the other sectors, including agriculture. The objectives and strategy are directed towards achieving a growth rate of 4.5% to 7% per annum, in the regional economy.

### **3) Objectives by sector**

#### Industrial development

The overall strategy for industrial development in the Region is to coordinate and integrate industrial development in the country as a whole. The central place in the strategy will be agro-industries utilizing the potentially abundant agricultural raw materials proposed to be developed and industries fabricating agricultural implements and machinery as well as selected consumer goods and handicrafts industries.

#### Development in communications and transport

The development is seen in the context of a large and broad regional development perspective which should link the East African Region with the north Sudan through the areas of high development potential in the Southern Region and eventually exploit the economic complement of the various sub-regions comprising east and central Africa, Sudan and spreading into the Mediterranean and Middle East areas.

#### Development of trade and commerce

The Regional Government proposes a strategy for stimulating trade and commerce in the Region for intra-regional trade, trade with other areas of the Sudan and for broader and foreign trade. The Regional Government also accepts the strategy implications of trade and commerce links spreading into rural areas for maximizing economic development through monetization of the economy.

#### Agriculture

The objectives of development of the agricultural sub-sectors are based on the need for; (i) increasing food production in the Region in order to achieve self-sufficiency in food supplies in the shortest possible time, (ii) production of food and cash crops to enable traditional farmers to back away from subsistence patterns of production or (iii) encouraging commercialization of the traditional agricultural sector so that over a period of time the Region will become a net exporter of raw and processed agricultural products.

### **3.1.2 Development Plan of the Government of Central Equatoria State**

Though development plans of Southern Region and Juba Town were prepared in 1970s no concrete development plan has been formulated after the implementation of the CPA. In 1970s, centrally planned economy was oriented in Sudan and reflected in the goals and objectives of development plans. Crude oil productions and outbreak of IDPs and refugees were not

foreseen in the plans. As a consequence, the pre-conditions assumed in the plans of 1970s greatly deviate from the prevailing conditions of the present.

Enhancement of industrial development was stressed in the “Regional Development Plan Vol.1 General Report, Democratic Republic of the Sudan Southern Region, 1978”. The outline of some of the major proposed projects are as summarized below.

**(1) Export-oriented projects:**

Modern operations that need advanced technological processes: The aim of these projects is to achieve products that are mostly oriented for the foreign or extra-regional markets.

Note: The main projects proposed in the agricultural sector were covering the production of peanuts, pineapple, tea, cacao, tobacco, sorghum, cattle-raising centers and allied industrial processing plants, sheep raising centers and allied industrial processing plants, production centers for broilers, as well as egg production centers.

**(2) Regional market oriented projects:**

Operations that need less capital and a greater labor supply: These products should be for widespread consumption within the population of the Region and reduce the amount of intermediate goods that have had to be imported.

In the agricultural sector, projects for milk and beef production for the urban population including forage production on artificially irrigated meadows were proposed.

In the industrial sector, projects for building component industries, building material industries, wood processing industries, bicycle assembly plants, soap manufacturing units, manufacturing matches, and manufacture of leather products were proposed.

**(3) Local market oriented projects:**

Small scale operations essentially for the local market using relatively simple processes that can be easily copied. Those projects essentially concern the production of materials to be used by the construction industry and the production of non-food consumer goods.

### **3.1.3 Development Plan of Juba Town**

Town development plan of Juba Town is now under way by GOSS along with 9 other major towns of Southern Sudan under the consultancy of GIBB Africa. “Juba Town Assessment”,

funded by USAID, has already been prepared by CAII. The Master Plan formulation work by GIBB Africa was expected to be completed by the middle of 2006. (The work is being interrupted for some reason.) The latter has proposed some development concepts worthwhile to be considered in the formulation of the Master Plan in this JICA Study. These development concepts will be described later.

The most recent Juba Town Development Plan was formulated in 1978, long before the CPA.

In the “URBAN PLANS OF JUBA, WAU, MALAKAL, BOR, RUMBEK, YAMBIO ( Vol.1: Objectives and Criteria of Urban Planning, Vol.2: Urban Plans)”, 1978, long-term structure plans and short-term development plans (master plan) were proposed. The outline is as follows.

### **(1) The future role of Juba in the national, regional and development plans**

Roles in the process of development

#### Functions:

- of support to productive activities and to the traditional sectors present in the urban areas, and in particular to the enterprises that the Six Year Plan intends to establish in Juba or in its immediate surroundings,
- of stimulus for new activities and economic enterprises whose scope is to substitute imports, to transform regional products or to improve local resources,
- of forming a new labour force that will present itself on the market and the requalification of the present labour force in order to satisfy the greater demand for specialized personnel in productive sectors and public administration, and
- of coordinating the various enterprises that are promoted, both at the local level and at the level of other urban or rural centers, for the development of the productive sectors, for a greater integration between the various economic activities and for a broadening of the productive base of the region.

Roles in the urbanization

#### Actions to:

- contain the process of allowing the economy of the city to become tertiary by discouraging enterprises that are not productive,
- render the tertiary sector more functional and qualified in relation to the greater needs caused by the socio-economic development of the area, and
- qualify the activities of the public administration with a more efficient organization of public services and a better connection between the various ministries and regional

authorities component in the field of economic development.

Roles in the economic structure

- regulating the growth of modern sectors in function with some of the resources which are most available in the area, e.g., the availability of energy, the female labor force, some specific technical services, etc.,
- favouring those activities, which are carried out at purely traditional levels with minimum employment, nevertheless present a high capacity of integration with the economic fabric of the city and whose re-conversion would not require high investment, and
- facilitating the change over from forms of production connected mostly with self-consumption to production forms that are more remunerative and therefore more exchangeable.

## (2) Socio-economic frame

**Table 3.1-2 Urban Population and Employment**

	1973	1978	1983 (proj.)	1995 (proj.)
Urban Pop.	57,000	77,000	132,000	384,000
Rate of employment	30%	30%	30%	34%
Total employed	17,100	23,100	39,600	130,560

**Table 3.1-3 Employment Distribution by Sector**

	1973	1983 (proj.)	1995 (proj.) (%)
Agriculture, hunting, etc	15.0	13.0	9.0
Manufacturing	6.3	8.0	11.0
Electricity, gas and water	0.4	0.5	1.5
Constructon	7.1	9.0	12.0
Wholesale, retail	9.4	10.0	10.0
Transport, storage	7.9	9.4	11.0
Finance and business	0.1	0.1	0.5
Community services	45.4	45.0	42.0
Activities not defined	8.4	5.0	3.0
Total	100.0	100.0	100.0

## (3) Land use plan

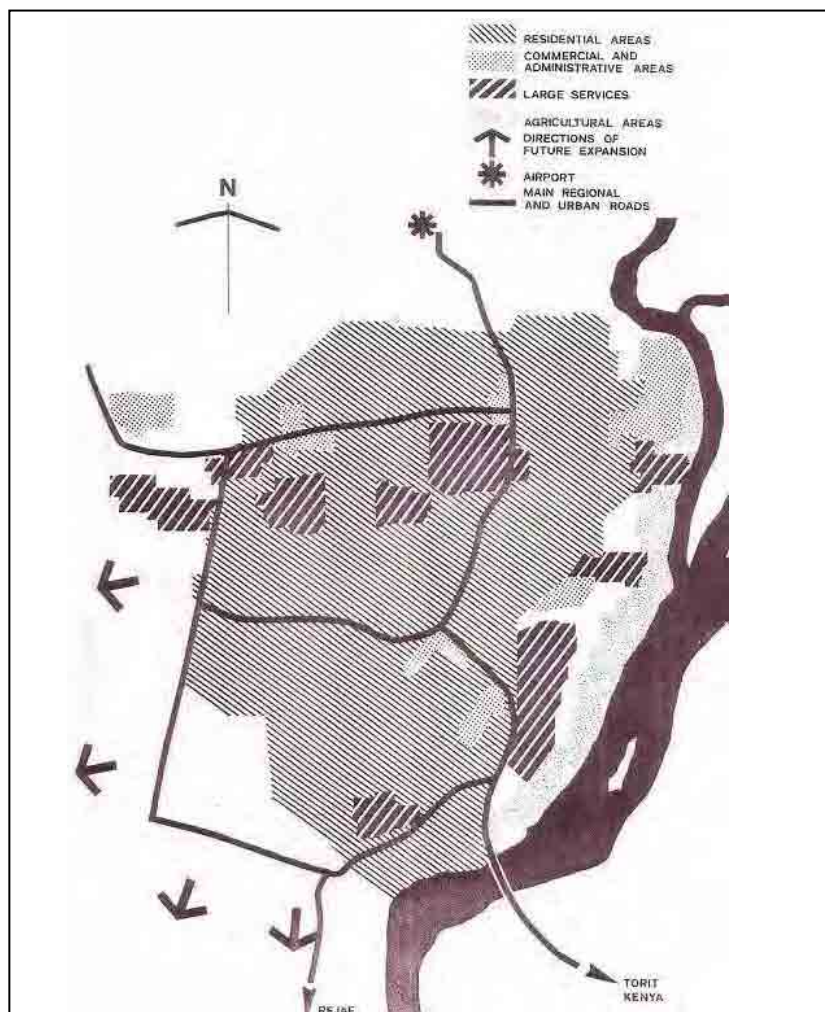
Based on the estimate of land requirement in 1983, the development direction of land use and road network was proposed.

**Table 3.1-4 Land Requirement in 1983**

Type	Area	Requirement
Utilized and unutilized areas inside city limits ( surface area estimated at 1,720ha )	Within the classified and recognizable residential zones	143ha
	Outside the classified and recognizable residential zones	117ha
Areas of possible expansion	To the west	415ha
	To the south	370ha
Total		1,045ha

The Short Term Scheme showed the following development principles.

- The expansion of the present city towards the west and south
- Realization of a primary road system based on the north-south (three lines) and east-west axes
- Downtown of Juba: Only operations for the conservation and re-qualification of buildings were proposed. The possible uses are residential, administrative and light commercial works by improving public utilities and traffic circulation.
- Present residential zones: Operations to improve living conditions both with respect to public utilities and to housing itself under the form of investment, redevelopment or re-planning, etc.
- Industrial-handicraft-commercial areas: They concern both areas inside and outside the city
- Strip between the city and the river: Possible uses are tourism, recreation, sporting and protection of nature. Agricultural uses compatible with these are also allowed:
- New zoo and wildlife reserves: On the right bank of the White Nile River
- Forest area: To the west for reforestation and production of timber



**Figure 3.1-1 Future Development Direction**



The Long-Term Structure Plan showed the following

- The development of the city is mainly to the south following a linear type of urbanizing scheme.
- Formation of north-south transport axes and east-west axis
- Industrial, commercial and agricultural service development on both sides of the Nile River
- Agricultural development along the River, towards north, east, southwest and forestry development in the east

### 3.1.4 Juba Rehabilitation Projects by the Government

Based on the "City of Juba - Urgent Infrastructure Needs Assessment" prepared in September 2005, rehabilitation programmes were prepared and a series of rehabilitation projects started funded by GOSS. Already, the following projects are on-going (Table 3.1-5).

- Water supply project
- Power generation and distribution project
- Buildings rehabilitation project
- Roads rehabilitation project

**Table 3.1-5 Juba Rehabilitation Project by Southern Sudan Government**

Description	Area (s.q.m)	Unit cost(USD)	Total (USD)
Works to be funded out of the MDTF (South)			
Buildings			
Lot 1	Assembly & President		
1.1	Assembly building	8,910	2,516,144
1.2	Presidents Office	1,424	836,130
1.3	Presidents Palace	800	487,967
1.4	House Type P	550	225,477
1.5	Presidents Cottage	550	224,377
		12,234	4,290,095
Lot 2	Group 1 GOSS Ministries Buildings		
2.1	Housing and Public Utilities	1,726	847,946
2.2	Communication	1,444	737,724
2.3	Culture and Information	1,444	737,724
2.4	Cooperative and Rural development	1,284	653,172
2.5	Health ad Social Services	1,284	653,172
2.6	Education and Guidance	1,284	653,172
2.7	Agriculture and Natural Resources	1,284	653,172
		9,750	4,936,082
Lot 3	Group 2 GOSS Ministries Buildings		
3.1	Administration and Local government	1,728	850,793
3.2	Finance and Economic Planning	1,444	737,724
3.3	Public Service and Administration Reform	1,284	653,172
3.4	Commerce and Supplies J140	929	720,849
3.5	Industry and Mining	1,194	920,503
3.6	Legal Affairs - CCSS	728	415,645
3.7	Engineering Affairs	532	298,420

Description		Area (s.q.m)	Unit cost(USD)	Total (USD)
Works to be funded out of the MDTF (South)				
3.8	Farmer Loans and Credit	500	282,970	
		8,339		4,880,076
Lot 4	Group 1 GOSS Houses			
4.1	Newer Houses			
4.1.1	Minister's Houses Type Mx12 (Yugoslav)	5,388	1,605,400	
4.1.2	Secretary General House	450	120,581	
4.1.3	Director Generals House Type D (Yuhoslav)	4,290	1,128,092	
4.2	41J Type	10,508	2,345,450	
		20,636		5,199,523
Lot 5	Group 2 GOSS Houses			
5.1	25 Senior Officials Houses	7,230	1,597,900	
5.4	Other Housing	29,445	4,073,420	
		36,675		5,671,320
Lot 6	Group 3 GOSS Houses			
5.2	25 Senior Standard Houses	44,440	1,136,936	
5.3	Middle and Junior Standard Houses	24,640	4,792,353	
		69,080		5,929,289
Hospital				
6.1	Hospital Infrastructure and Essential Building Works	6,300	4,000,000	
		6,300		4,000,000
Water Supply, Sewage, Sanitation and Solid Waste Disposal Systems				
6.2	Water Infrastructure		10,543,110	
6.3	Sanitation Infrastructure		4,784,943	
Roads, Drainage and Street Lighting				
Lot 1	30km of Urban Roads		12,000,000	
Lot 2	30km of Urban Roads		12,000,000	
				24,000,000
Works to be funded by GOSS alone				
Power Generation and Distribution				
Lot 1	Generation		3,500,000	
Lot 2	Distribution		1,800,000	
				5,300,000
Prefabricated Accommodation for 200 people in Hostel Type				
	Prefabricated Accommodation for 200 people in Hostel Type		2,400,000	
				2,400,000
Sub-total				85,934,438
Design and Supervision (including accommodation)				8,593,444
Grand Total				94,527,882

## 3.2 DEVELOPMENT ASSISTANCES BY VARIOUS DONORS

### 3.2.1 JAM Report

The Sudan Joint Assessment Mission (JAM) was carried out jointly by the World Bank and the United Nations, with the full endorsement, guidance and preparation of the Government of Sudan (GOS) and the Sudan People's Liberation Movement (SPLM). The report presents the reconstruction and development requirements for the consolidation of peace, and for attaining

broad-based growth, poverty reduction and sustained human development towards the Millennium Development Goals (MDGs), firmly grounded in the historic CPA.

The programmes under the Government of Southern Sudan are built around the following key elements as laid out in the framework for war-to-peace transition.

- Developing physical infrastructure;
- Prioritizing agriculture, and promoting private sector development;
- Restoring peace and harmony (including through access to basic services);
- Re-generating social capital; and
- Developing institutional infrastructure for better governance.

**(1) Developing physical infrastructure**

The goal is to rapidly overcome the isolation of Southern Sudan, and to build road links as soon as possible with Uganda, Kenya, DRC and Ethiopia, as well as with the North and the Three Areas in conflict (Southern Kordofan, Blue Nile and Abyei).

The JAM Action Plan for Infrastructure in Southern Sudan envisions several priority programmes, in two phases. By 2007, a basic transport infrastructure network mainly involving roads, river transport and aviation will be in place in the South.

**(2) Prioritizing agriculture, and promoting private sector development**

The strategies proposed under the JAM are designed to increase productivity and environmental sustainability and thereby combat chronic food security. Priorities for agriculture that have been identified and costed include;

- A cadre of extension specialists to provide leadership in the training and development of many teams of extension officers throughout Southern Sudan;
- Access to improved production technology through support services for key sub-sectors, including agriculture, livestock and fishing;
- Support to local market centers, and access to regional and international markets;
- Sound, sustainable services;
- Activities to disseminate available technology to farmers as soon as possible, and to create mechanisms for dissemination of future technologies; and
- Targeted initiatives to improve the investment climate, particularly for small and medium enterprises.

**(3) Restoring peace and harmony, including through access to basic services**

Expanding access to education, health, and water and sanitation will be a critical component of the peace dividend.

- More than double primary school coverage by 2011, from 20 to 55 percent

- Expansion of girl's enrolment from 11 to 40 percent and increased focus on women's adult literacy campaigns
- Expansion of learning opportunities for those young people and adults who are now beyond the age of normal entry to basic education
- Doubling access to health care -- reaching 50 percent access by 2011
- Raising awareness and protecting the rights of Southern Sudanese living with HIV/AIDS
- Increasing access to safe water and sanitation (doubling rural safe water and sanitation access in 2011 from the 2004 baseline of 25-30 percent, and new construction and rehabilitation of schools and health facilities having access to a safe water point within 100 meters)

**(4) Regenerating social capital**

Beyond enabling safe transit of the returning population, there are humanitarian and development needs to be addressed, linked to broader programmes for community-driven recovery. The programme includes enabling 90 percent of refugees and at least three-quarters of IDPs to return to their communities on a sustainable basis, with a focus on unaccompanied children.

**(5) Development of institutional infrastructure for better governance**

Building efficient and decentralized governance structures to meet the needs of the people is a precondition to successful implementation of the GOSS strategic objectives to accelerate growth and expand service delivery.

- By 2011, the full range of policies, systems and institutional structures should be in place, in line with the decentralization frame work.
- Enforcement of anti-corruption measures
- Creation and strengthening of public institutions, from construction to training and technical support
- Establishment of public financial management and procurement systems
- Improvement of gender equity
- Substantial investments in information required to support decision-making and enable programme and policy monitoring

**Table 3.2-1 JAM Costs for Southern Sudan by Cluster (Phase I)**

(USD.mil.)

	2005	2006	2007	Phase I Total (%)
Capacity bidg & institutional dev.	107	236	268	611 17.2
Governance & rule of law	30	67	46	144 4.1
Economic policy	1	2	2	4 0.1
Productive sectors	55	120	133	308 8.7
Basic social services	138	415	442	995 28.0
Infrastructure	197	260	556	1,013 28.5
of which national infrastructure	120	159	339	618 17.4
Livelihood and social protection	76	177	194	446 12.6
Information and statistics	5	13	13	31 0.9
<b>Total</b>	<b>608</b>	<b>1,290</b>	<b>1,655</b>	<b>3,553</b> <b>100.0</b>

**Table 3.2-2 JAM Needs and Proposed Allocation of GOSS Budget**

	2005	2006	2007	Phase I Total
Total Revenue (wealth sharing)	1,095	1,470	1,650	4,215
Poverty Reduction (JAM total)	608	1,290	1,655	3,533
of which GOSS own poverty reducing spending	345	780	1,011	2,116
Other non-JAM needs	750	710	639	
DDR	TBD	TBD	TBD	
Total need (JAM +other )	1,358	2,000	2,294	5,652
Financing gap	263	530	644	1,437
Poverty reducing (JAM total) per capita (USD)	67	135	161	
Financing gap per capita	29	55	62	

Source : "Synthesis Framework for Sustained Peace, Development and Poverty Reduction", Vol.I, March 18, 2005  
 "SPLM Strategic Framework for War-to -Peace Transition", SPLM Economic Commission, New Site, Aug., 2004

GONU and GOSS are committed to fund two-third of the costs of recovery and development requirements outlined in the JAM. On the basis of "Six Year Framework for Sustained Peace, Development and Poverty Eradication in Sudan" USD. 4.5 bil. was pledged in April 2005, in Oslo.

### 3.2.2 United Nations

#### (1) United Nations Work Plan

According to the “United Nations & Partners 2006 Work Plan for Sudan”, United Nations, Nov. 2005, humanitarian and recovery programming by United Nations and partners is focusing mainly on;

- support for the safe, voluntary and dignified return and reintegration of IDPs and refugees;
- humanitarian assistance in Darfur and other areas of conflict;
- responding to food insecurity in areas of drought and crop failure; and
- assistance to recovery and development in Southern Sudan, of Abyei, Blue Nile and Southern Kordofan.

In addition, the passage of UN Security Council Resolution Number 1590, provided the mandate for the UN Mission in Sudan (UNMIS) to support the implementation of the CPA and the implementation of the 2005 UN and Partners Work Plan for Sudan.

Total recorded funding towards international assistance to Sudan in 2005 by international organizations including United Nations, bilateral donor countries and other agencies amounted to more than USD 1.3 bil.

**Table 3.2-3 Sector Funding Requirements vs. Sector Funding Contributions, 2005**

(USD.mil.)			
Sector	Requirement	Contribuions <sup>*1</sup>	Coverage
Food aid	908	617	68%
Health	138	46	33%
Rehabilitation of transport infrastructure	126	84	66%
Food security and livelihoods	102	29	29%
Water and environmental sanitation	99	35	36%
Rule of law and governance	97	12	13%
Coordination and common services	93	44	48%
Education and training	90	21	23%
Shelter and non-food items	90	15	16%
Protection	83	12	14%
Cross-sector support for return and reintegration	73	14	19%
Mine action	64	24	38%
Nutrition	14	4	26%
Unspecified <sup>*2</sup>	-	81	-
<b>Grand total for work plan</b>	<b>1978</b>	<b>1039</b>	<b>53%</b>

Note: \*1: Registered funding at November 2005

\*2: Un-earmarked contributions not yet allocated to specific projects

**Table 3.2-4 Regional Funding Requirements vs. Regional Funding Contributions, 2005**  
(USD.mil.)

Work Plan Region	Requirement	Contributions <sup>*1</sup>	Coverage
Southern Sudan	685	306	45%
Darfur	864	545	63%
Rest of Sudan	164	37	22%
National Programs	265	152	57%
Grand total for work plan	1,978	1,039	53%

Note: \*1: Registered funding at November 2005

\*2: Un-earmarked contributions not yet allocated to specific projects

### 1) Programmes for Sudan

Emphases are put on DDR (Disarmament, Demobilization and Reintegration), Protection, Mine Action, RRR ( Return, Reintegration and Recovery ) and Non Food Items, Common Service and Coordination.

### 2) Programmes for Southern Sudan

Humanitarian programmes focus on support to returnees, expanding humanitarian activities in underserved areas and support to SRRC (Sudan Relief and Rehabilitation Commission) to take a lead role in humanitarian coordination.

Recovery and development programming focus on the establishment of a responsive and accountable government, a deepening respect for the rule of law and human rights, an improvement in basic services and in economic opportunities, the disarmament and reintegration of ex-combatants, the destruction of landmines and Unexploded Ordnance (UXO) and peace reconciliation and trust-building initiatives.

Major projects are as follows.

- Basic infrastructure and settlement development
  - Airport extension of the 28ha airport in Rumbek (2005),
  - Construction of 870km road ( Yei-Juba, Nimule-Juba, Kapoeta-Juba, Juba-Mundri )
  - Construction of 1,500km all weather roads (Juba - Yei- Kaya – Nimule, Torit - Kapoeta – Lokichoggio, Yei - Mundri - Rumbek - Wau - Abyei)
- Purchase of 8 barges and two pusher boats
- Construction of 5 bridges, culverts and reclamation of 2,500km of wetland roads in North Bor
- Capacity building of GOSS engineers to construct and maintain roads as well as providing on the job training for 1,200kms of road
- Development of urban management framework for GOSS and municipal authorities

The above projects are to be operated by WFP and other agencies.

- Support for returnees
  - improvement of access to health, water, education and food security
  - institutional improvement of local governments
  - improvement of job opportunity
  - education and vocational training
  - construction of schools, improvement of facilities and construction of Community Girls' School
  - food security

**(2) UNDP**

**1) Programmes by Trust Fund Management Unit**

A Trust Fund Management Unit within the UNDP manages two major programmes, namely, “Sudan Post-Conflict Community Based Recovery and Rehabilitation Programme” ( five year implementation period funded out of USD 67.5mil. by EC and USD 6.2 mil. by UNDP ) and “Prevention and Control of Tuberculosis as well as Control of Malaria and Prevention of HIV/AIDS” by the Global Fund in the South.

**2) Post-Conflict Community Based Recovery and Rehabilitation Programme**

UNDP manages the fund. Considerable number of boreholes are to be developed.

Note: Water supply in urban areas is not excluded. OFDA ( US Office for Foreign Disaster Assistance )and USAID are also supposed to implement water supply projects in town.

**(3) WFP**

WFP operates food assistance operations in Sudan including “Food Assistance to Population Affected by Conflict (Emergency Operation 10503.0)”, “Food Assistance to Eritrean Refugees in Sudan (Protracted Relief and Recovery Operation 10122.1)”, and “Improving Food Security in Sudan (Country Programme 10105.0)”

In 2005, WFP transported 87,000MT (metric ton) of food to Southern Sudan, Southern Kordofan and Blue Nile by air and 15,000MT by river transport. The transport volume is to be revised through “Annual Needs Assessment” and by “Crop and Food Supply Assessment Mission”.

Other than food assistance, WFP implements special operations to secure the transport routes. In the “Emergency Road Repair and Mine Clearance of Key Transport Routes in Sudan in Support of the Emergency Operation (SO 10368.0)”, securing the supply routes of food and commodities to Southern Sudan on land is hailed as the main objective. Within these programmes, the roads are basically to be rehabilitated to gravel standards. Currently, Phase II and Phase III are underway.



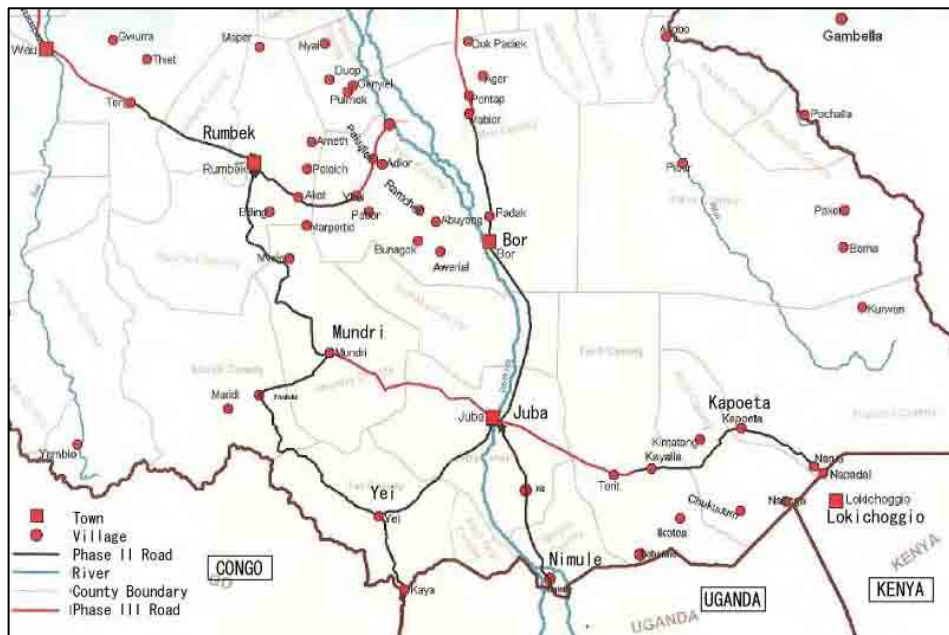
**Table 3.2-5 Supply Volume to Southern Sudan by WFP (2005)**

Origin	Mode	Transport Volume (MT)
El Obeid	Air	28,472
	Road	26,804
	Sub-total	55,276
Kosti	Road	565
	Barge	15,105
	Sub-total	15,671
Lokichokio	Air	40,003
	Road	16,136
	Sub-total	56,139
Koboto	Road	17,930
Total	Road	61,435
	Air	68,476
	Barge	15,105

Source: WFP

**Table 3.2-6 Supply Volume to Juba Area by WFP by Transport Mode (2005)**

Transport Mode	Transport Volume (MT)
Air	1,382
River	3,594
Road	979
Total	5,955



**Figure 3.2-1 Emergency Road Repair Programme in Southern Sudan by WFP**

**Table 3.2-7 Phases of Emergency Road Repair Programme in Southern Sudan by WFP**

	Cost USD	Received	Activity	Status
Phase I (Oct. 2003-Dec. 2004)	21,450,000	18,366,926	<ul style="list-style-type: none"> <li>• Undertake survey of mine risks and road repair requirements</li> <li>• Conduct repair of 3 trunk roads</li> <li>• Feeder road spot repairs with food-for-work</li> </ul>	Finished
Phase II (Oct. 2004-Dec.2005)	89,154,897	89,154,897	<ul style="list-style-type: none"> <li>• Repair 2,198km of worst sections linking North to South; east to west ; Kenya, Uganda, and Ethiopia to Sudan, and River Nile to road network</li> </ul>	on-going
Phase III (Oct. 2005-Dec. 2006)	93,427,026	13,120,340	Extension of Phase II stretches	on-going

Other than above, the operations presented in the table below are also proposed.

**Table 3.2-8 Operations Proposed in Addition to Those in Table 3.2-7**

Operation	Cost USD	Received	Activity
Emergency Repairs and Upgrading of River Transport Infrastructure in Support of WFP Food Aid operations in the Sudan (SO 10412.0) (Mar. 2005-Dec. 2006)	13,000,000	None	<ul style="list-style-type: none"> <li>• Purchase of two pushers and eight barges</li> </ul>
Provision of Humanitarian Air Service (SO 10181.3) (Jul. 2004-Dec. 2006)	27,000,000 (2006)	None	<ul style="list-style-type: none"> <li>• Purchase of helicopters and aircrafts to enhance transport rapidity and capacity.</li> </ul>
Emergency Infrastructure Improvement of Sub Offices and Airstrips in South Sudan, in Support of EMOP 10503.0 (SO 10428.0) (Jan. 2006-Dec. 2006)	12,000,000	None	<ul style="list-style-type: none"> <li>• Upgrading seven sub offices</li> <li>• Upgrading of key air strips</li> </ul>
Expansion of VAM Capacity in Support of WFP Food Aid Operation in Sudan (Mar. 2005-Mar. 2007)	7,000,000	5,800,000	<ul style="list-style-type: none"> <li>• Expansion of analytical and food security monitoring systems</li> <li>• Lead and coordinate efforts in annual and periodic emergency food needs assessments</li> </ul>
Logistics Augmentation in Support of EMOP in Darfur	63,000,000	41,000,000	<ul style="list-style-type: none"> <li>• Augmentation of WFP's transport fleets to include 200 long haul trucks and 120 6x6 trucks of 18MT capacity</li> </ul>

### 3.2.3 World Bank

The World Bank is in charge of the Multi Donor Trust Fund (MDTF)-Southern Sudan primarily focusing on:

- government capacity building;
- aid management;
- rule of law;
- health;

- education;
- water and sanitation;
- infrastructure development (including transport); and
- the census

The project agreement should have been signed by the GOSS by the end of November 2005. By the end of 2005 and into 2006, it was expected that programmes and projects in basic social services (water and environmental sanitation (WES), health and education), rule of law, rural development, transport (national), census (national) and DDR in the north and south will also be taken forward through the MDTF mechanisms.

GONU and GOSS are committed to fund two-thirds of the costs of recovery and development requirements outlined in the JAM.

**(1) Sudan Emergency Transport and Infrastructure Development Project**

This project, as summarized in the table below, is basically to be undertaken by GOSS and MDTF is only mobilized to supplement its implementation.

**Table 3.2-9 Outline of Sudan Emergency Transport and Infrastructure Development Project**

Applicant:	The Government of Southern Sudan
Brief Description:	Emergency Transport and Infrastructure Development Project to address immediate basic needs in the transport and urban infrastructure sectors and provide for institutional development and capacity building.
Project Development Objective:	The project development objective is to rehabilitate and develop critical road and transport infrastructure, improve critical urban infrastructure in the major towns of Southern Sudan and build capacity for planning, construction and sustainable operation, maintenance and management of the infrastructure.
Sector:	Transport and Urban Development
Location:	Southern Sudan.
Total Project Cost:	Total – US\$777 million, of which MDTF US\$250 million and GOSS US\$527 million equivalent including US\$4.5 million from USAID.
Implementing Agency (ies)	Formerly Secretariat for Physical Infrastructure and Town Planning and now the Ministry of Transport and Roads (MTR) and Ministry of Lands, Housing and Public Utilities (MLHPU) through a Project Management Team (PMT), with project coordination and oversight under an inter-ministerial Project Steering Committee (PSC).
Implementing Period of the Project	January 2006 to December 2010.

”Juba Immediate Infrastructure Rehabilitation” is to be implemented in Juba Town as Phase 1 project. This phase consists of immediate rehabilitation of basic infrastructure and services in Juba to allow it function, involving;

i) Rehabilitation of priority government/public administrative buildings and houses, hospital infrastructure and provision of prefabricated accommodation; ii) rehabilitation of water supply system of Juba including installation of distribution network and installation of packaged water treatment plants in strategic locations; iii) rehabilitation/installation of liquid and solid waste management systems (collection, treatment and disposal); and iv) rehabilitation and improvement to a network of 60km of urban roads in Juba to asphalt standard, including drainage systems and street lighting.

**(2) Multi -Donor Education Rehabilitation Project - Phase I**

The outline of this project is shown in the Table below.

**Table 3.2-10 Outline of Multi-Donor Education Rehabilitation Project – Phase I**

Applicant:	Ministry of Education, Science and Technology (MOEST), Government of South Sudan (GOSS)
Brief Description:	<p>Consolidating peace and putting Sudan on a sustainable path to poverty eradication requires investing in immediate needs, urgently strengthening capacity, and reorienting policies and programs. In education, the project aims at the following:</p> <ul style="list-style-type: none"> <li>• Approximately 20 County Multi-purpose Education Centers (CEC) have been built and approximately 4,000 teachers provided with in-service upgrading.</li> <li>• Minimum 50,000 demobilized soldiers, IDP's, overage learners, females and other non-formal learners have participated in alternate learning programs, basic skill training or designed to enable them to integrate more effectively into a post-conflict society</li> <li>• Schools in war affected areas have been rehabilitated to provide an improved learning environment</li> <li>• MOEST capacity has been strengthened in the areas of policy formulation, education system management, curriculum development and learning assessment.</li> <li>• Planning for implementation of Phase II of the Education Sector Development program has been completed</li> </ul>
Project Development Objective:	The project development objective is: "Primary school students, IDP's, demobilized soldiers, and other non-traditional learners have improved access to enhanced quality of education, alternate learning opportunities, development of life skills and basic occupational skill training."
Sector:	Education
Location:	South Sudan states of Aweil, Warap, Western Bahr el Ghazal, Lakes, Western Equatoria, Eastern Equatoria, Bahr el Jebel, (Central Equatoria, Jonglei, Unity (Bentiu) and Upper Nile
Total Project Cost:	\$472,696,580 of which GOSS contribution amounts to \$380,786,580; MDTF contribution for Phase I of the Education Sector Development Program amounts to \$50,538,000; and estimated unconfirmed contribution of \$14,682,000 from USAID and \$26,690,000 from the UN.
Implementing Agency:	Ministry of Education, Science and Technology (MOEST)
Implementing Period:	2006-2008

### (3) Rapid Impact Emergency Project

Table 3.2-11 shows the outline of the project.

**Table 3.2-11 Outline of Rapid Impact Emergency Project**

Applicant:	The Government of Southern Sudan (GOSS)
Brief Description:	Rapid Impact Emergency Project will address emergency needs of the Government of Southern Sudan in the health, education, and public service sectors through (i) the provision of pharmaceuticals for health facilities, textbooks for primary students, equipment for the President's, Vice President's, 22 Ministries and the Governor's Office in 10 States, and (ii) selection of procurement and accounting service providers to assist GOSS in discharging its fiduciary responsibilities.
Project Development Objective:	The project development objectives are to (i) restore livelihoods resulting from the long term civil unrest; (ii) restore basic services to the affected population; and (iii) jumpstart the recovery process in Southern Sudan through the emergency provision of goods and services to improve government functionality.
Sectors:	Health, Education, Public Services
Location:	Southern Sudan.
Total Project Cost:	Total – US\$ 27.25 million of which MDTF US\$20.0 million and GOSS US\$ 7.25 million equivalent.
Implementing Agency (ies)	GOSS will be the recipient of the Grant Agreement. GOSS will contract with UN Agencies as procurement agents to procure/supply and distribution of pharmaceuticals, textbooks, equipment for the ten states and government office buildings and renovate governor's offices in the ten states.
Implementing Period for the Project	December 2005 to June 2006 for all components except for Component 3 (procurement agent) that will be implemented over two years.

### (4) South Sudan Umbrella Program for Health System Development

Table 3.2-12 shows the outline of the project.

**Table 3.2-12 Outline of South Sudan Umbrella Program for Health System Development**

Applicant:	Government of South Sudan (GOSS) Ministry of Health
Brief Description:	This three-year program focuses on development of core capacities and components of the health system (Track 1) at the same time as supporting rapid expansion of service delivery and selected high-impact preventive health interventions (Track 2). The program will: i) Develop core institutional capacities of the public health administration; ii) Implement a phased infrastructure and equipment investment plan; iii) Invest in human resources for health; iv) Develop the pharmaceutical management, supply and distribution system; v) Expand the coverage of health service delivery; vi) Support selected high-impact health interventions; vii) Ensure effective project implementation by the Ministry of Health; and viii) Develop monitoring and evaluation capacity, including measurement of the performance of this project.
Project Development Objective:	To develop core health sector systems and capacities and increase the population's access to basic health services and interventions.
Sector:	Health
Location:	South Sudan
Total Project Cost:	Year 1 US\$ 60 million (MDTF US\$ 20. million, GOSS US\$ 40 million) Total for 3-years: US\$ 225 million (MDTF US\$ 75 million, GOSS US\$ 150 million)
Implementing Agency (ies)	GOSS MOH, private for- and non-profit organizations, UN agencies
Implementing Period:	3 years

### 3.2.4 USAID

The following projects are funded by USAID.

- (1) **Preparation of maps for 10 state capitals based on the Quickbird satellite imagery map data which has already been prepared based on Shp files.**

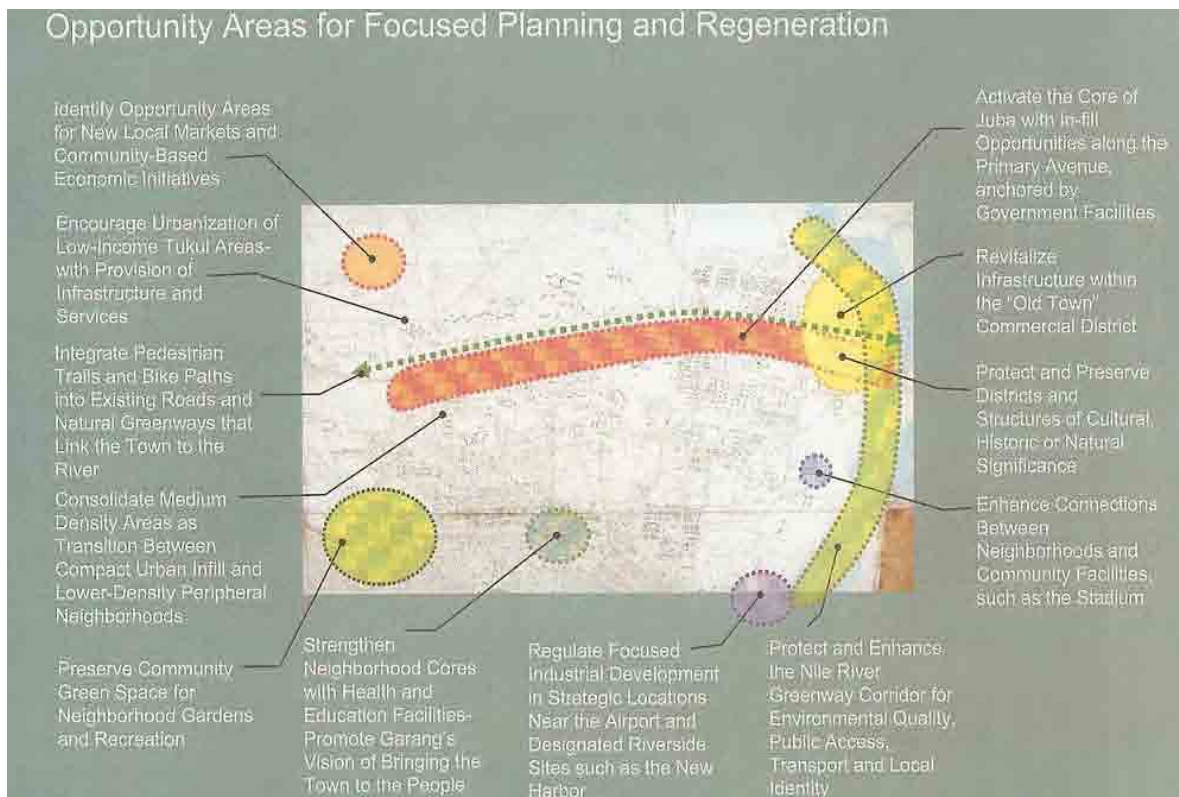
- (2) **Juba Town assessment**

Conceptual development images are proposed in “Juba Town Assessment for Town Planning and Administration”, Nov. 2005. Although the proposed images need to be further discussed, preliminary images worthwhile to consider in the Master Plan are depicted in Figure 3.2-2.

- (3) **Water supply project in Juba**

- (4) **Sudan infrastructure program capacity building component**

The capacity building component in the initial start-up is designed to help establish the private and public institutions to undertake and manage the construction, rehabilitation, operation and maintenance of transport infrastructures over the next decades.



**Figure 3.2-2 Development Images in the Central Area of Juba**  
( Source: “Juba Town Assessment Town Planning and Administration” )

### 3.3 ACTIVITIES OF NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

The following international NGOs are listed as working entities in Juba Town for community based development.

ACF-USA: Action Contre le Faim -United States of America

ADRA: Adventist Development and Relief Agency

CRS: Catholic Relief Services

SFM: Swedish Free Mission

Other than the above, ACORD ( Agency for Co-operation and Research in Development ) is listed as a local NGO. However, further investigations are still being made for details concerning their line of activities, sponsorship etc. Activities of ACF are currently supported by USAID and those of SFM are supported by the Swedish Government.

The main activities of NGOs in Juba Town are as follows.

- Water supply including borehole drilling and provision of hand pumps (accomplished in most areas mainly by ACF and SFM)
- Installation of septic tanks to each housing plot (underway by ACF)
- Construction and operation of health centers and education of health and sanitation (underway by ACF)
- Construction of schools and training of teachers
- Earning power reinforcement for those belonging to poverty groups ( on-going by ACF: training on skills of bakery, deep frying, charcoal production, know-how of managing accommodation facilities, restaurant, grocery shop, education of entrepreneurship and provision of materials and equipment for new business launching
- Education of development ( underway by SFM: Transferring the knowledge and views for social development through participatory training )

NGO activities are prevalent all over the Southern Sudan more than in Juba Town, seemingly due to the commitment to enhance the living conditions of the rural population in areas including water supply, health/medical care, and income generation. Practical measures of improving the means for livelihood are training to instil skills and knowledge concerning agriculture, husbandry, and apiculture.

### **3.4 SUMMARY OF EXISTING PROJECTS**

The projects currently under way in Juba Town and surrounding areas are shown below.



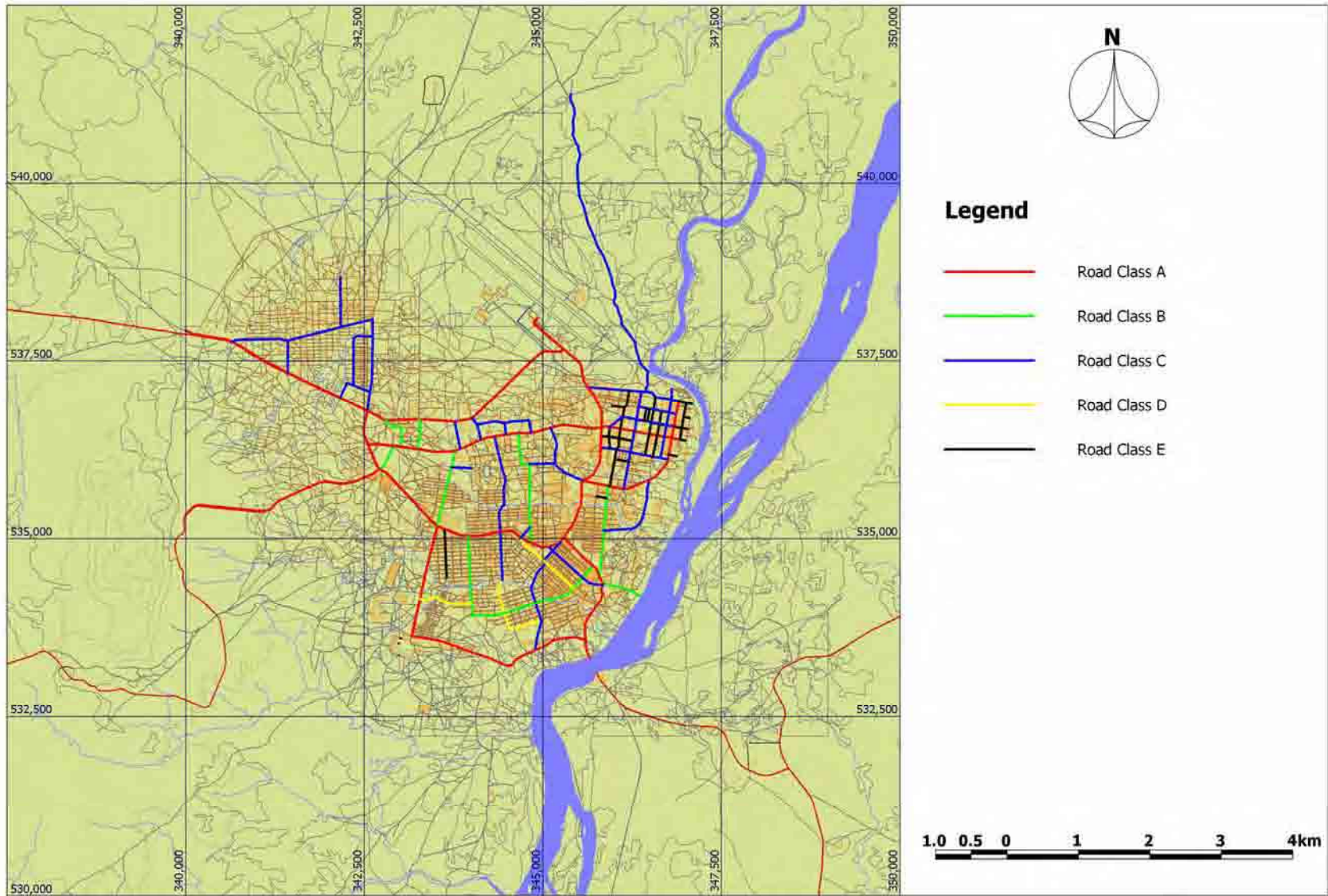


Figure 3.4-1 Emergency Rehabilitation Work in Juba (Road)

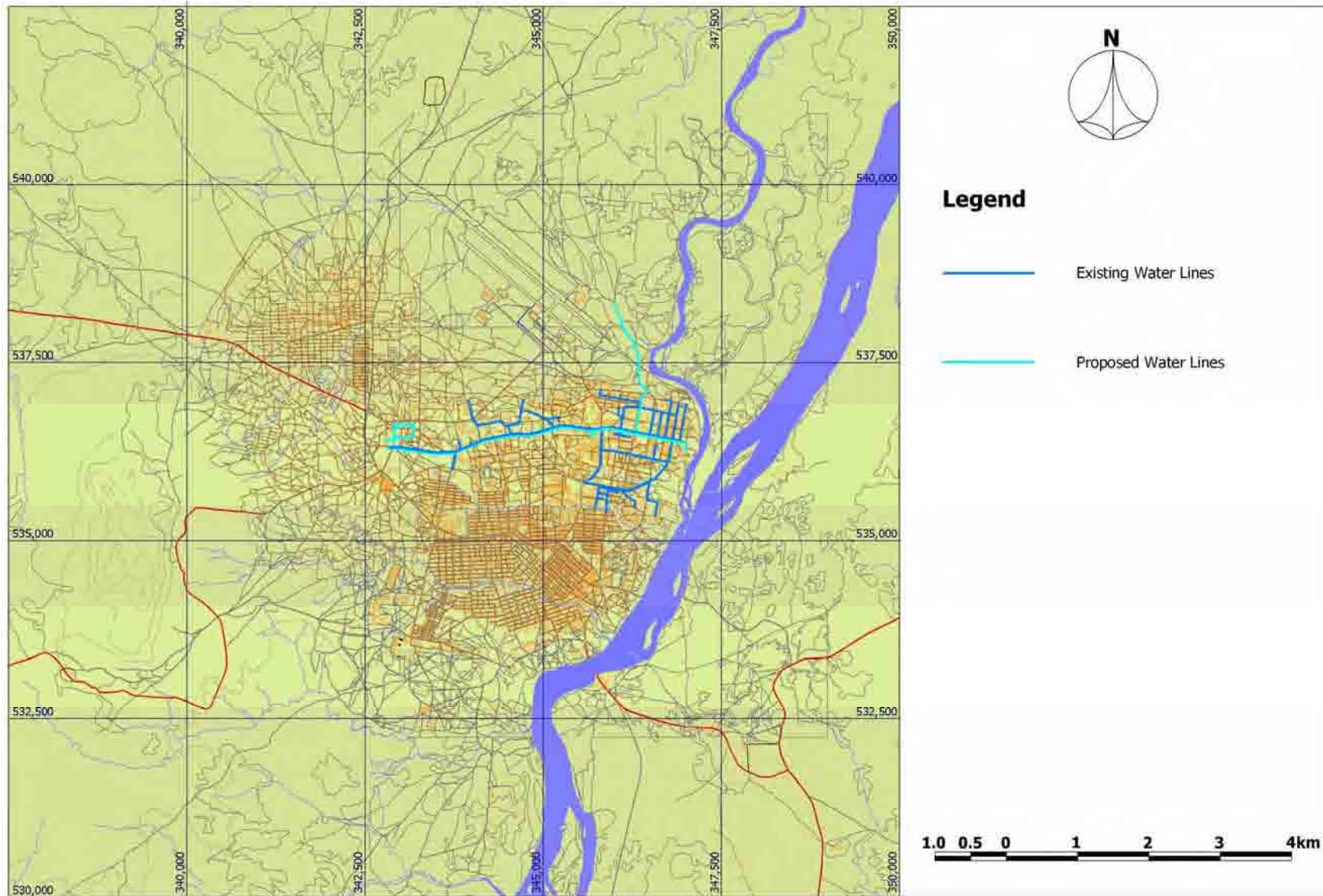


Figure 3.4-2 Emergency Rehabilitation Work in Juba (Water Supply)

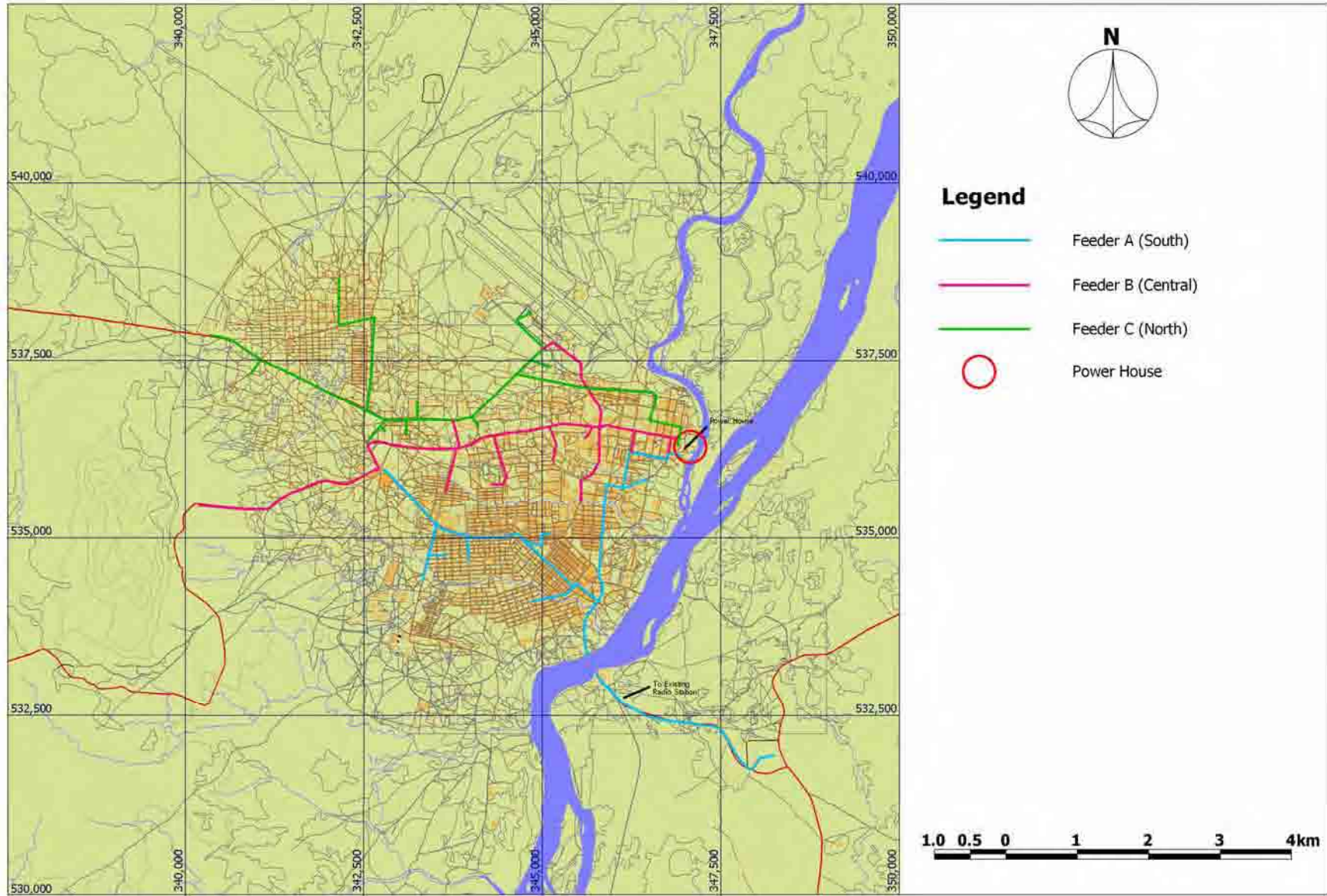


Figure 3.4-3 Emergency Rehabilitation Work in Juba (Electricity)

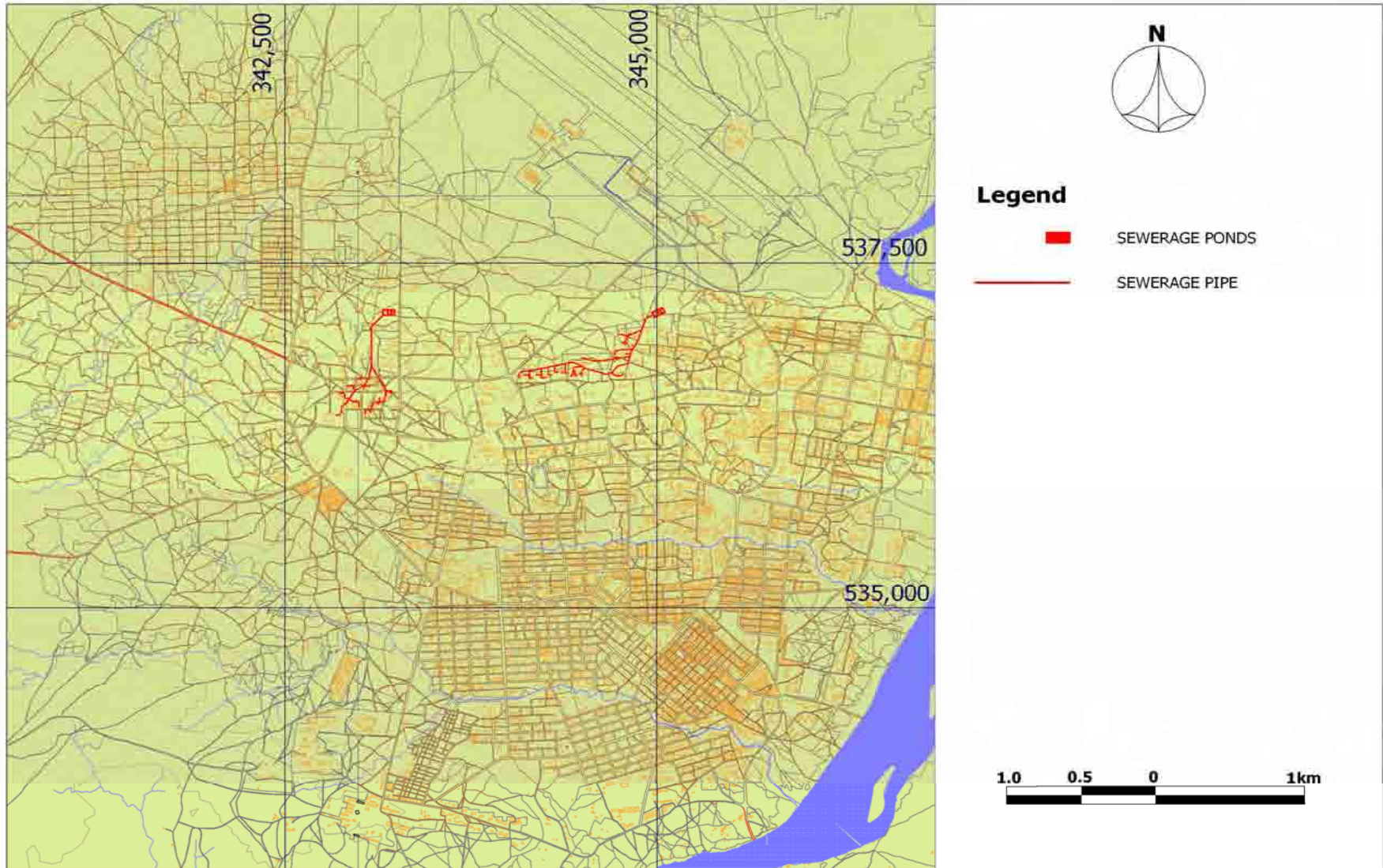


Figure 3.4-4 Emergency Rehabilitation Work in Juba (Sewerage)

## **CHAPTER 4**

# **JUBA TOWN DEVELOPMENT STRATEGY AND SOCIO-ECONOMIC FRAMEWORK**

# **CHAPTER 4 JUBA TOWN DEVELOPMENT STRATEGY AND SOCIO-ECONOMIC FRAMEWORK**

## **4.1 JUBA TOWN DEVELOPMENT STRATEGY**

### **4.1.1 Position and Role of Juba Town**

Juba Town area is not only a core town in the region but also the centre of policy making, economic activities and cultural diversity of Southern Sudan. In this context, the following roles are identified for the preparation of a Master Plan.

#### **(1) Roles of a Capital City**

The roles of Juba Town area as a capital city may be cited as follows.

- To promote the reinforcement and support of central political functions and realize efficient political and public services through the mutual relationship among GOSS, State, Juba Town and GONU.
- To disseminate the latest international and domestic information, culture, and education in the vast area of Southern Sudan through the improvement of information systems, universities and other organizations.
- To realize a preferable urban environment as the capital of GOSS through landscaping, development of amenity facilities and other public utilities, expansion and enhancement of the quality of the road network and public transport system, etc.

#### **(2) Roles as an Economic Development Center**

Steady and consistent economic development protracted for the long range shall be realized against a momentum of economic vitalization in order to cope with immediate rehabilitation and relocation of capital. As a driving force of the economy in Juba Town area, food, textile and beverage industries were flourishing in the Region before the conflict. Financial business, trading, telecommunication, retailing and whole trade business, as well as transport/warehousing, are deemed promising based on the post-CPA Government Policy Statement. However, the need to foster industries to earn foreign exchange is still a most essential component following the boom of construction mainly related to the rehabilitation projects.

The roles of Juba Town area may be summarized as follows.

- To improve economic infrastructure for development of factories and business entities through the reinforcement of the power supply systems, improvement of the transport network, and the development of the industrial estates.
- To promote a soft-type industrial environment for investment and introduction of modern technology for fostering and developing industries utilizing the local resources such as

crude oil with comparative advantage whilst ensuring the sustenance of labour intensive industries.

- To encourage and reinforce the function of a regional logistic centre by improving the river transport, international roads and international airports geared specifically for the expansion of international and domestic markets to realize efficient business and production activities.
- To improve telecommunication and information exchange systems including internet and archives for the easy and voluminous exchange of bulk and diverse information in the market to strengthen the business and commercial functions as a centre of Southern Sudan.
- To promote the generation and qualification of work force to meet the requirements of the available job opportunities both in the public and private sector.

#### 4.1.2 Development Goals

The Master Plan formulated and Pilot Projects implemented in this Study aim to attain the higher goals identified within the Millennium Development Goals (MDGs).

MDGs were established in 2001 by SPLM and GOSS with the primary objective of seeking to combat poverty, hunger, disease, illiteracy, discrimination against women and environmental degradation by 2015. They include:

- MDG1: Eradicating extreme poverty and hunger
- MDG2: Achieving universal primary education
- MDG3: Promoting gender equality and empowering women
- MDG4: Reducing child mortality
- MDG5: Improving maternal health
- MDG6: Combating HIV/AIDS, malaria, and other diseases
- MDG7: Ensuring environmental sustainability
- MDG8: Developing a global partnership for development

The development goals pursued in this Study after rehabilitation and reconstruction by 2015 keeping respect for above were set as follows:

**Table 4.1-1 Development Goal by Sector**

Sector	Sectoral Goal
Road	AC paved arterial and supplementary arterial road network density of 3.5km/sq.km on the average
River Port	Main river port with 70m length pier
Airport	International airport with 3,000m runway
Water Supply	One hundred (100) % of population in Juba can access urban water.
SWM	Eighty two (82) % of population in Juba can access improved SWM.
Sewage Management	Eighty two (82) % of the population in Juba can access improved Sewage Management.
Education	One hundred (100) % of eligible population in Juba can access primary education.
Medical & Health Service	One hundred (100) % of population in Juba can access basic medical & health services.

### 4.1.3 Development Issues and Directions

Development directions in formulating master plan are summarized below, based on the analysis of present situation, identified problems and issues of Juba Town area.

**Table 4.1-2 Present Situation, Key Issues and Direction of Development**

Present condition and problems	Keys to solution	Issues to be considered in M/P
<b>1. Population &amp; movement</b>		
<ul style="list-style-type: none"> <li>• Rapid population increase in Juba Town area</li> <li>• Large inflow of Returnees (IDPs and refugees)</li> </ul>	<ul style="list-style-type: none"> <li>• Large amount of vacant lands within urbanized area</li> <li>• Low density expansion of urbanized area</li> <li>• Vast vacant lands outside of Town Boundary (incl. Kandokoro and eastern bank of the River Nile)</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of supplying good housing area in the periphery</li> <li>• Promotion of dense habitation</li> <li>• Study on the development of eastern bank of the White Nile and Kandokoro Island</li> </ul>
<b>2. Industry and employment</b>		
<ul style="list-style-type: none"> <li>• High dependency on primary industry</li> <li>• Undeveloped secondary industry</li> <li>• High dependency on public sector</li> <li>• Lack of economic infrastructure</li> <li>• Lack of skilled technicians, engineers, and skilled office workers</li> <li>• High dependency on foreign companies</li> <li>• Labour surplus</li> </ul>	<ul style="list-style-type: none"> <li>• Concentration of commercial and business functions entailed by the relocation of capital</li> <li>• Expansion of construction and relevant works for reconstruction</li> <li>• Vigorous foreign investment in the tertiary sector for reconstruction</li> <li>• Gradual expansion of market</li> <li>• Vocational training by JICA</li> <li>• Abundant natural resources (ex. oil)</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of economic infrastructure (power supply, transport, telecommunication, and industrial estate) to foster and facilitate the labour intensive industries and those with relative advantages by utilizing local resources</li> <li>• Improvement of facilities and development of programs for capacity building and qualification of workers to meet the demand in the market</li> <li>• Intensification of distribution function as a regional transport hub by utilizing river, international road and airport</li> </ul>
<b>3. Urban function and living environment</b>		
<ul style="list-style-type: none"> <li>• Insufficient basic infrastructure including, power supply, water supply, sewerage system and roads</li> <li>• Insufficient social infrastructure and low level of public services</li> <li>• Expanding gap in terms of accessibility to urban functions between Juba Town area and rural areas</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation of rehabilitation program</li> <li>• Improvement of financial condition of the Governments by the revenue from oil</li> <li>• Existence of excellent green area along the Nile</li> <li>• Large amount of open spaces and lands for public purpose</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation and improvement of social infrastructure</li> <li>• Rehabilitation and Improvement of infrastructure corresponding to the housing development</li> <li>• Public facilities rehabilitation and improvement</li> <li>• Strategic use of communities</li> <li>• Rehabilitation and improvement of urban environment as a capital city</li> <li>• Rehabilitation and implementation of Environmental Impact Assessment of projects</li> </ul>
<b>4. Transport network and urban structure</b>		
<ul style="list-style-type: none"> <li>• Concentric expansion of urban area</li> <li>• Topographical constraints of urbanization (river, swamp, and mountain)</li> <li>• Disordered land use conversion in areas along the River Nile and trunk roads</li> <li>• Mixed existence of traditional tukul houses in land readjusted areas</li> <li>• Inconvenient accessibility in circular direction</li> <li>• Vulnerable condition to climate (rain)</li> <li>• Insufficient access roads to opposite river bank and transport nodes</li> <li>• Insufficient functioning of regional transport network</li> <li>• Underdeveloped hierarchical road network in Juba Town area</li> </ul>	<ul style="list-style-type: none"> <li>• Accumulation of shops at the transport node</li> <li>• Repair of regional road network</li> <li>• River port rehabilitation</li> <li>• Implementation of rehabilitation program</li> </ul>	<ul style="list-style-type: none"> <li>• Realization of planned land use to eliminate the problems caused by the concentration of urban functions</li> <li>• Realization of well arranged housing areas and working places through adequate network formation</li> <li>• Materialization of inducement and restriction of land use (implementing measures, funding, and land market improvement)</li> <li>• Realization of dense habitation in view of economic efficiency in infrastructure investment</li> <li>• Rehabilitation and improvement of road network for better traffic movement</li> <li>• Inducement of commercial and business functions at transport node</li> <li>• Improvement of public transport system</li> <li>• Solution of discontinued urban area due to topographic constraint (river) and formation of new housing areas</li> <li>• Formation of reliable transport network against climate condition (rain)</li> </ul>



#### 4.1.4 Stage Development Plan

An immediate target year of the plan in this Study is set in year 2015. However, the infrastructure development plan should be formulated from long horizontal viewpoint based on the socio-economic development scenario of the region since infrastructure will be the base for daily activities and economic activities of people in the long span. In this Study, the planning period was divided into following three terms.

Short Term:	2006-2011
Medium Term:	2012-2015
Long Term:	2016-2025

Short Term is up to year 2011, where the referendum is scheduled to be held, as a Reconstruction/ Consolidation stage. Medium Term is from 2012 to 2015, the target year of the Study, as a Growth Stage. Long Term is beyond 2015 up to 2025 as an Expansion Stage.

The Socio-economic scenario as a planning base is stated below.

##### (1) Development potential and impediment in and around Juba

- Current economic situation of Juba

Regional economy is still in the self-supportive stage in spite of the potential to develop agricultural and mining production in and around the region. However, tourism-related business such as hotel, air, river and road transport, telecommunication mainly operated by foreign investors are located and operated in Juba Town area after CPA (Comprehensive Peace Agreement).

- Economic development potential of Juba

- Although not developed as yet, the region is endowed with high potential for hydraulic power generation.
- Gold, uranium, precious stones and other mining veins are abundant in the region.
- The region is also endowed with high potential for agriculture and cattle breeding because of the large tract of lands and available supply of water coming from Nile River.
- A lot of labor force located in Juba Town and the surrounding area.

- Impediment to economic development of Juba

- Insufficient infrastructure raise the production costs and lower the profitability of the industrial activities in the region. Especially the delay caused by poor road and river transport condition has lead to the transport cost increase and reflected in the production

costs and prices of commodities, resulting in the weak international competitiveness of the industries.

- Lack of the skilled labor force in the area is the fetter for all activities of the economic entities.
- The scarcity of accumulated domestic capitals and entrepreneurs prevents the local economy, especially in industrial sector from development.

## **(2) Economic Development Scenario up to 2015**

The economic development scenario up to 2015 for Juba Town and the surrounding areas to eliminate impediments and to utilize potentials is stated below.

### **1) Short Term (-2011)**

The first half of this stage is considered as a reconstruction stage:

Industries and supportive industries to fulfill the needs for reconstruction of infrastructure and community, recommended in JAM report, will be the protagonists of the economic activities funded by the governments and international donor agencies.

Second half of this period is considered as a consolidation stage:

Needs for reconstruction will be settled. Supportive service industry (ex. printing, computer service, and judicial services) for the business activities entailed by capital functions on the relatively small scale will be activated. In the production sector, labor intensive industries to absorb labor surplus and domestic contractors to fulfill the continuous construction needs will evolve.

Handicraft (ex. leather article), construction materials (ex. bricks and foundry), and some agro-industry (ex. fruit-processing) are considered as a presumable labor intensive industry.

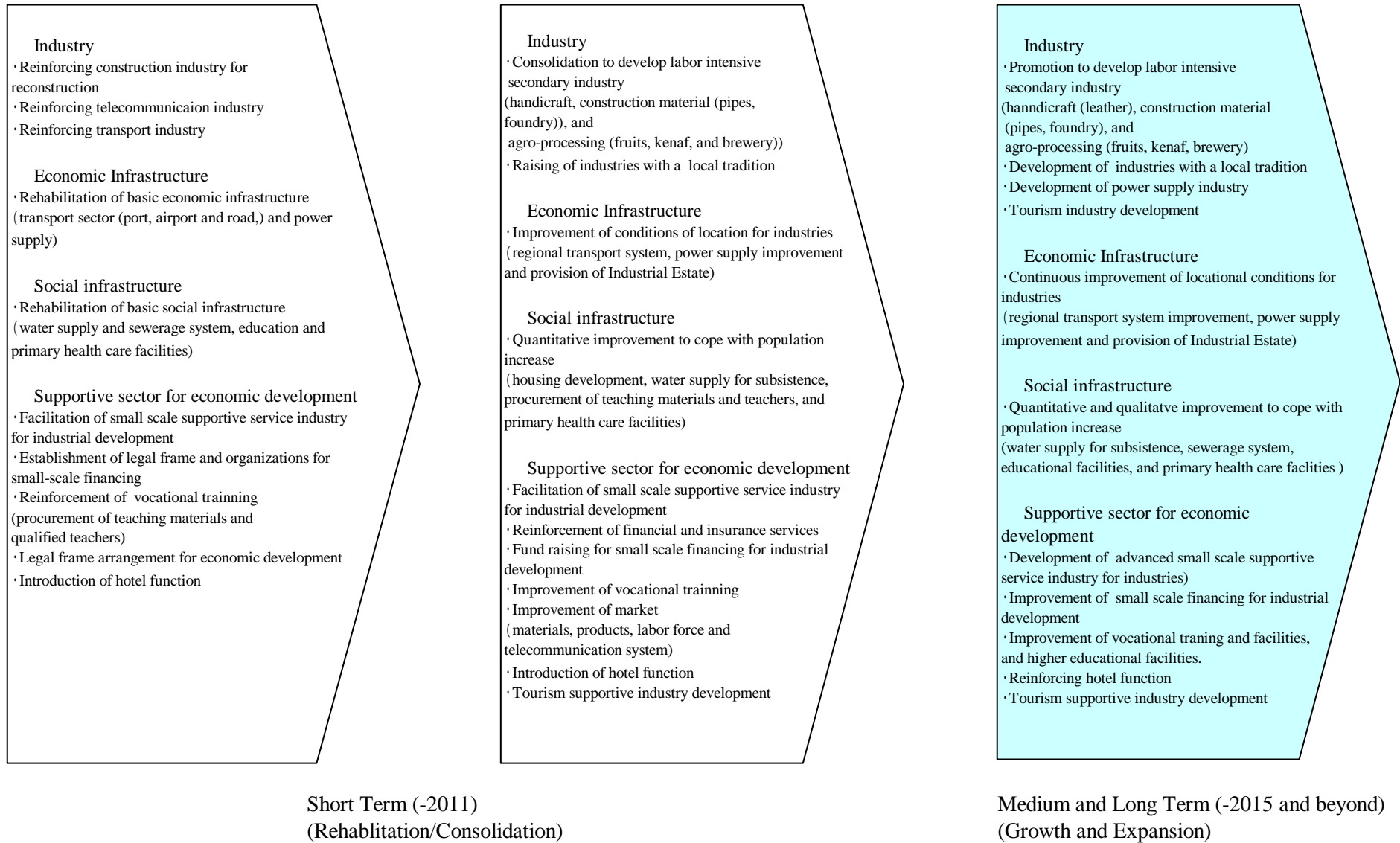
### **2) Medium Term (2012-2015)**

Supportive industry for business activities, labor intensive industries and domestic construction industry to cater for the continuous construction needs will further evolve. In addition, tourism industry and also supportive industry for tourism (ex. vocational training service for tourist guides) will be introduced and encouraged.

Environment for production activities will be continuously improved. Regional transport network improvement, industrial estate development and expansion of power supply will be realized.

### **3) Long Term (2016-)**

This period is considered as an expansion stage of socio-economy:



**Figure 4.1-1 Development Scenario for Juba**

## 4.2 SOCIO-ECONOMIC FRAMEWORK IN YEAR 2015

### 4.2.1 Population Framework in 2015

#### (1) Future Population in Sudan and Southern States

Future population is estimated by the Central Bureau of Statistics (CBS) of Sudan up to the year 2018. In this study, therefore, future population in 2015 is based on the CBS's estimation using interpolation method between 2013 and 2018. According to this projection, the followings are noted:

Population in Sudan is expected to increase from 35.1 million in 2006 to 45.4 million in 2015 with an average annual growth rate of 2.62 %. This rate is comparatively higher than that of the neighbouring countries.

While population in the Southern States is expected to increase from 5.4 million in 2006 to 6.3 million in 2015 with an average annual growth rate of 1.51 %, this rate is comparatively lower than that of the neighboring countries.

**Table 4.2-1 Future Population Framework in Sudan, and Southern States** (1,000 Persons)

	2003	2006 (Base Year)	2008	2013	2015	AAGR (%) 2006/2018
Sudan	33,334	35,101	38,193	43,130	45,416	2.62
Southern States	5,242	5,402	5,700	6,128	6,315	1.51
Bahr El Ghazal	2,491	2,491	2,491	2,491	2,491	2.21
Upper Nile	1,494	1,517	1,554	1,614	1,639	0.76
Equatoria	1,300	1,317	1,350	1,392	1,410	0.65

Source: CBS: Statistical Year Book for the Year 2004

Note: Population in the year 2006 and 2015 is estimated using interpolation method

**Table 4.2-2 Population Growth Rate in the Neighboring Countries**

Countries	Population Growth	
	1990-2004	2004-2020
Sudan	2.9	2.6
Southern Sates	1.5	1.5
Kenya	2.5	2.5
Ghana	2.4	1.8
Uganda	3.2	2.7
Tanzania	2.6	1.7
Ethiopia	2.2	2.7
Average of 5 Neighboring Countries	2.6	2.3

Source: World Bank :World Development Indicators 2006

## (2) Future Population Projection in Juba

As mentioned in Section 2.2 of Chapter 2, the existing population is unclear. Since 1983, population census has not been conducted and other population surveys have not been carried out. However, based on the parameters presented in the preceding Subsection 2.2.2, the population in Juba and the surrounding area in 2005 is estimated at around 250,000 persons.

Future population projection is principally made up of two (2) alternatives:

Approach 1: Future population is projected taking into consideration the natural and social increases.

Approach 2: Future population is projected based on the share of the capital city in South Sudan

### Approach 1:

Future population is projected considering two (2) components; a) natural increase and b) social increase. The social increase in case of Juba consists of three (3) types; 1) conventional migrants (the balance between in-migration and out-migration), 2) refugees from other countries and 3) internally displaced persons (IDPs). The following assumptions are made to estimate future population projection in Juba:

- The natural increase of population was assumed in consideration of present population composition in Juba.

Conventional migration involving Refugees and IDPs from Khartoum, North Sudan and South Sudan was calculated on the basis of the Migration Model prepared by GIBB Africa. In this study, population increase by migration has totally employed the principles and concepts of this model.

Table 4.2-3 shows the future Juba population. Accordingly, the future population in Juba is expected to increase from 250,000 in 2006 to 459,100 (low estimate) and 585,200 (high estimate) in 2015.

**Table 4.2-3 Future Juba Population in 2015** (Persons)

	Low Estimate	Medium Estimate	High Estimate
Population in 2006	250,000		
Natural Increase between 2006-2015	48,800	57,500	71,900
Conventional Migration *	6,800	12,700	19,900
Refugees from Neighboring Countries	89,000	94,700	109,000
IDP's from Khatoum and North Sudan	47,300	76,300	112,200
IDP's from South Sudan	17,200	18,800	22,200
Total Population in 2015	459,000	510,000	585,200

\* Projected using the Migration Model prepared by GIBB Africa

### Approach 2:

The population concentration rate is assumed to become about 11 % of the population of the entire Southern Sudan based on the data of population concentration to the capital cities in the African Countries shown in Table 4.2-4. Based on the assumptions, the population in Juba in 2015 is estimated at about 510,000.

**Table 4.2-4 Future Juba Population in 2015 (Approach 2)** (1,000 persons)

	2006 (Base Year)	2010	2015	2020	2025	AAGR (%)	
						2006-2015	2015-2025
Southern States	5,498	5,851	6,315	6,863	7,185	1.6	1.3
Concentration Rate (%)	4.5	6.3	8.1	9.1	11.0	-	-
Juba	250	368	510	625	790	7.0	5.6

Without suitable economic growth, rapid population increase will result in emergence of large number of unemployment, large tract of informal or slum areas, and requirement of large public investment and social welfare.

In this Study, the population of Juba in the year 2015 is projected at around 510,000 persons.

## **4.2.2 Labor Force and Working Population by Sector**

### **(1) Labor Force**

Based on the labor force estimated in Subsection 2.2.3, the future labor force is forecasted in this section. In order to estimate the labour force, the following assumptions are made;

The age structure of the future population is assumed to be same as the existing one. This assumption is adopted because of the difficulty in estimating the age structure of Refugees and IDPs.

The economically active rate is assumed and set up in reference to the economically active rate of the neighboring countries as shown in Table 4.2-5.

The economic activity rates of male and female in Sudan are lower than those of the neighboring countries. Especially that of female in Sudan is almost one-half of those of the neighboring countries. In this study therefore, it is assumed that the economically active rate of the South Sudan in 2025 is expected to reach the average in the neighboring countries within this region.

**Table 4.2-5 Economically Active Rate in 2004 by Neighboring Countries of Sudan (%)**

Countries	Economically Active Rate		Female % in Labor Force
	Male	Female	
Sudan	72.6	24.2	24.8
Kenya	89.6	71.4	44.0
Ghana	93.0	23.0	48.1
Uganda	87.8	81.2	48.2
Tanzania	90.8	88.4	49.5
Ethiopia	90.9	73.5	44.9
Average	90.4	67.5	46.9

Source: World Bank :World Development Indicators 2006

Table 4.2-6 shows the economic activity rate in Juba in 2005 and 2015.

**Table 4.2-6 Economically Active Rate in 2006 and 2015 in Juba (%)**

Age Group	2006		2015	
	Male	Female	Male	Female
15-24	23	18	27	22
25-54	94	34	94	48
55-64	93	23	93	33
65+	73	12	73	17

Based on the population by age group and the economically active rate by age group, the labor force is estimated and shown in Table 4.2-7. The labor force in Juba is expected to increase from 67,700 persons in 2006 to 163,300 persons in 2015.

**Table 4.2-7 Estimation of Economically Active Population in Juba in 2006 and 2015**

	2006	2015
Population	250,000	510,000
Population (15 and Over)	152,400	310,700
Economically Active Population	67,700	163,300
Participation Rate (%)	44.4	52.6
Not Economically Active Population	84,700	147,400

## (2) Working Population by Sector

Using the estimated economically active population and unemployment rate, the assumed number of working population in 2006 is estimated at around 46,700 workers. In future, it is assumed that unemployment in 2015 will be about 15%. As the results of the projection, the number of working population is estimated at 138,800 workers.

**Table 4.2-8 Estimation of Working Population in Juba in 2006 and 2015**

	2006	2015
Economically Active Population	67,700	163,300
Unemployment Rate (%)	31.0	15.0
Working Population	46,700	138,800

Sector distribution of the working population is largely dependent upon the government trade and industrial policy. Presently, there exists no government policy in this regard. However, taking into account the industrial composition in the neighboring countries, the sector distribution of the industry likely to be set up is tentatively proposed in the Study as tabulated in Table 4.2-9.

**Table 4.2-9 Sector Distribution of Working Population in the Neighboring Countries (2004)**

	(%)			
	Agriculture	Industry	Manufacturing	Service
Sudan	39	25	6	36
Kenya	27	17	11	56
Nairobi (2004)	2	27	-	71
Ghana	38	25	9	37
Uganda	32	21	9	47
Tanzania	44	17	7	39
Ethiopia	46	10	-	44
Average	37	18	9	45
Average (when agriculture is assumed to be 10%)	10	26	13	64

Source: All data except Nairobi (2004) are World Bank :World Development Indicators 2006  
Urban Transport Study in Nairobi Metropolitan Area by JICA, 2006

Taking into account the sector composition, the follows are assumed:

- The share of primary industry comprising of agriculture, farming, etc. is set at 10 %. This is because agriculture is the basic industry notwithstanding the propulsion of an advanced industrial composition as expected in future.
- The share of secondary industry is set at 10 % of the total. This is because the manufacturing industry in Juba was almost destroyed during the conflict period. It is therefore difficult for it to recover abruptly.
- Tertiary industry is a very essential industry in Juba. The share of tertiary industry is expected to reach almost 80 % of the total.



- Presently, the government workers are estimated to occupy a share of about 40 % of the total. In future, this share is expected to decrease due to private participation. Retail and trading and service industries will become important sectors among others.

In view of the above results, the sector composition can be set up as depicted in Table 4.2-10.

**Table 4.2-10 Estimation of Working Population by Sectors in Juba in 2006 and 2015**

	2006		2015	
	Employment	%	Employment	%
Primary Industry	7,600	20.3	13,900	10
Farming and other	7,600	20.3	13,900	10
Secondary Industry	400	1.1	13,900	10
Manufacturing	100	0.3	12,500	9
Construction	300	0.8	1,400	1
Tertiary Industry	29,350	78.6	111,000	80
Government	15,000	40.2	16,700	12
Transport & Communication	760	2.0	2,800	2
Retail and Trading	9,910	26.5	55,500	40
Services	1,260	1.3	27,800	20
School & Clinics	2,420	6.5	8,300	6
Total	46,700	100.0	138,800	100.0

### 4.2.3 Economic Indicators

As for the economic activities in Juba and the surrounding areas, subsistence agriculture is the dominant economic activity, whereby durra, maize, groundnuts, sesame, cassava, millet, beans, sweet potatoes, fruits and vegetables are some of the common crops. As far as animal husbandry is concerned, goats are common and cattle are rare. There are some natural resources, but those are all distant from Juba.

According to the statistical data, the GDP growth rate of Sudan was more than 6% in recent years. (The World Bank estimated the GDP growth rates of Sudan for 2003 and 2004 at 6%.) The estimated GDP per capita of Sudan was USD 590 (at current prices) in 2004.

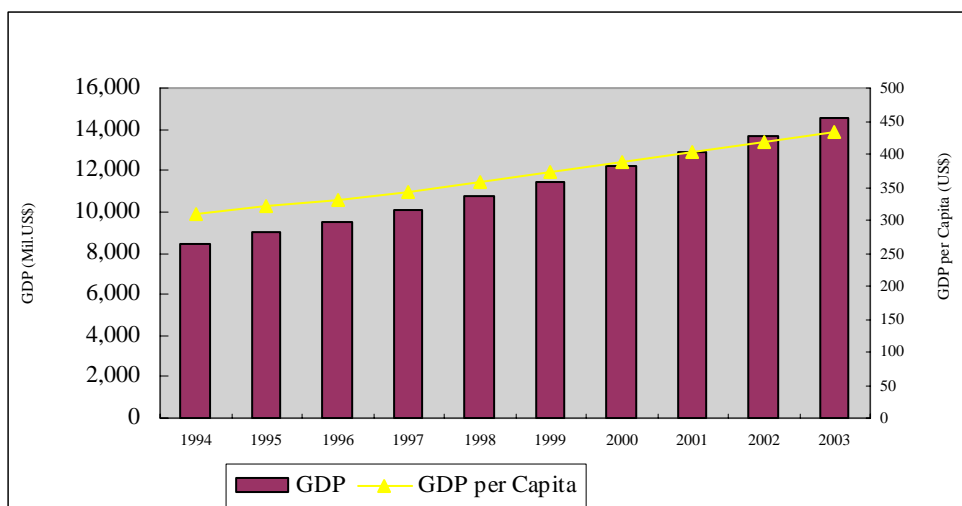
IMF forecasts that economic growth rate of Sudan in 2005 would mark 8.3% and more than this in 2006.

As Sudan has the largest country territory in Africa and is endowed with oil, minerals including iron, copper, gold, water resources, and fertile agricultural land, the latent economic growth potential is large. After CPA, Sudan is expected to get out of fetters of debt owing to the Heavily Indebted Poor Countries (HIPC) initiative debt relief, and create favorable environment for economic activities by remittance from overseas Sudanese, educated and skilled Sudanese returnees and influx of oil money. Some petroleum exporting countries in Africa (ex. Angola) showed high GDP growth rates over 10% p.a.

No official information and/or data on the Gross Domestic Product (GDP) of the Southern States or Gross Regional Domestic Product (GRDP) of Central Equatoria State or Juba are existent. Instead, GNI per capita of Sudan in 2002 is estimated at USD 350, and that of SOSUS (Southern Sudan SPLM areas) at USD 90 in the UNICEF report, "TOWARDS A BASELINE: BEST ESTIMATES OF SOCIAL INDICATORS FOR SOUTHERN SUDAN", May 2004, NEW SUDAN CENTER FOR STATISTICS AND EVALUATION in association with UNICEF. In the same report, population of Southern Sudan (SOSUS) is estimated at 7,514,000 in 2003, accounting for 22.3% of total county population living in SOSUS.

**Table 4.2-11 GDP and GDP per Capita in Sudan, 1994-2003**

	GDP		Population		GDP per Capita	
	Million US\$	Growth Rate(%)	Million of Peoples	Growth Rate (%)	US \$	Growth Rate (%)
1994	8,471		27.32		310	
1995	8,979	6.0	28.08	2.8	320	3.1
1996	9,511	5.9	28.81	2.6	330	3.2
1997	10,113	6.3	29.52	2.5	343	3.8
1998	10,765	6.4	30.19	2.3	357	4.1
1999	11,447	6.3	30.83	2.1	371	4.1
2000	12,192	6.5	31.44	2.0	388	4.4
2001	12,935	6.1	32.09	2.1	403	3.9
2002	13,711	6.0	32.79	2.2	418	3.7
2003	14,534	6.0	33.55	2.3	433	3.6

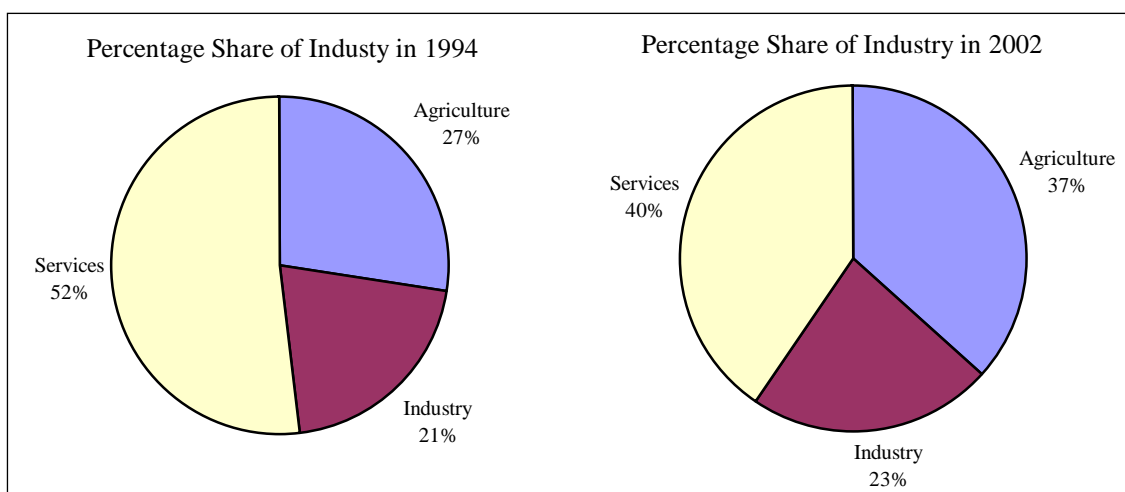


**Figure 4.2-1 GDP and GDP per Capita in Sudan, 1994-2003**

**Table 4.2-12 Value Added by Industry in Sudan, 1994-2002**

	mil.USD			
	Agriculture	Industry	Services	All Sector
1994	2,235	1,681	4,225	8,141
1995	2,369	1,781	4,478	8,628
1996	2,818	2,121	3,896	8,835
1997	3,292	2,170	4,079	9,541
1998	3,678	2,308	4,188	10,174
1999	4,033	2,503	4,610	11,146
2000	4,301	2,470	5,015	11,786
2001	4,541	2,843	5,190	12,574
2002	4,882	3,056	5,399	13,337

Source: World Bank African Development Indicators, 2005



**Figure 4.2-2 Value Added by Industry in Sudan, 1994-2002**

As for the GRDP of Juba, high performance is expected through the reconstruction/rehabilitation works for the moment. Rapid compilation of business functions and service industry is also expected as the capital. However, self-helped economic development in the region may not be easy when the current “boom” of the reconstruction/rehabilitation will be over.

In this Study following GDP growth rates of Southern Sudan were set as a planning base.

2006-2011: 10-12%

2011-2015: 8-10%

Taking above ratios into consideration and based on the World Bank statistical data, GDP and GDP per capita in Southern Sudan in 2006 were estimated out. As a result, the GDP and GDP per capita of Southern Sudan in 2006 were estimated at USD 1,506 mil. and USD 184, respectively. GRDP of Juba Metropolitan area was also estimated at USD 46.1 mil. in 2006.

**Table 4.2-13 GDP per Capita in Southern Sudan**

	2006 (USD at current prices)	2011	2015	2025
Sudan	715	-	-	-
Southern Sudan	184	289	384	-

#### 4.2.4 School Enrolment

##### (1) School Enrolment in Juba

Since there is no information of the cohort structure of the population, it is difficult to estimate the school enrolment in Juba. However, the following assumptions are made in order to estimate future school enrolment status.

- Since the forecasted future population consists of the existing population with the natural growth, refugees and IDPs, it is very difficult to estimate the cohort structure of the future population. Therefore, the age structure of the future population is assumed to be the same as the existing one.

Table 4.2-14 shows the school enrolment rate of the neighboring countries. According to this table, the rates of both male and female of Sudan are lower than those of the neighboring countries. The female enrolment rates in Sudan are particularly low at almost one-half of the rates in the neighboring countries. Consequently, in this Study, it is assumed that the gross school enrolment rate of the South Sudan in 2025 is expected to reach the average in the neighboring countries in the region.

**Table 4.2-14 Gross and Net School Enrolment Ratio by Neighboring Countries of Sudan**

	Gross Enrolment Ratio				Net Enrolment Ratio	
	Preparatory	Primary	Secondary	Tertiary	Primary	Secondary
Sudan	23	60	33	-	58	36
Kenya	53	111	48	-	76	-
Ghana	46	81	42	3	58	-
Uganda	3	125	19	3	98	15
Tanzania	25	101	-	1	86	-
Ethiopia	2	77	28	2	46	25
Average	26	99	34	2	73	-

Source: World Bank : World Development Indicators 2006

Table 4.2-15 compares the school enrolment rate in Juba in 2006 and 2015.

**Table 4.2-15 Gross School Enrolment Ratio in 2006 and 2015 in Juba (%)**

	2006	2015	2025
Primary	46	100	100
Secondary	23	28	34
Tertiary	1	2	3

Based on the population by age group and the school enrolment rate by age group, the school enrolment is estimated as shown in Table 4.2-16. The school enrolment is expected to increase from 27,500 persons in 2006 to 121,400 persons in 2015.

**Table 4.2-16 Estimation of School Enrolment in Juba in 2006 and 2015**

	2006	2015
Population in Juba	250,000	510,000
School Enrollment Ratio (%)	46	100
Number of Pupils in Primary School	27,450	121,400
Secondary School Enrollment Ratio (%)	23	28
Number of Students in Secondary School	4,800	9,300

**(2) Higher Education in Juba**

In South Sudan, there are three (3) universities, i.e. University of Juba, University of Upper Nile and University of Bahr El Ghazal.

In Juba, there exists the University of Juba, but only Arts and Music faculty. The other faculties of the University, which are still located at Khartoum, will be transferred to Juba by the year 2015. Table 4.2-17 shows estimation of the higher school enrolment in Juba. The students of the higher education are expected to increase from 300 in 2006 to 14,400 in 2015.

**Table 4.2-17 Estimation of Higher School Enrolment in Juba in 2006 and 2015**

	2006	2015
Population in Southern States (1,000 persons)	5,402	6,315
17 -21 Age Population (1,000 persons)	480	720
Higher School Enrollment Ratio (%)	1	2
Number of Students in Higher School	4,800	14,400

## 4.3 ESTIMATION OF LAND DEMANDS

### 4.3.1 Existing Land Use Situation

Based on the land use survey in the Study Area which was conducted in the field where the simplified map prepared in the course of the Study covered. The existing land use by category, that was measured, is shown in Table 4.3-1. According to this table, the followings are noted:

Urbanized area in the Juba is about 40km<sup>2</sup>. Among the area, the urban area in Juba Town is about 1,751 ha, while that in Kator is about 1,239 ha and that in Munuki is about 1,036 ha.

Among the land use category, residential area occupied 1,600 ha or 40 % while open space, agriculture, grassland has 1,080 ha share or 27 % of the total.

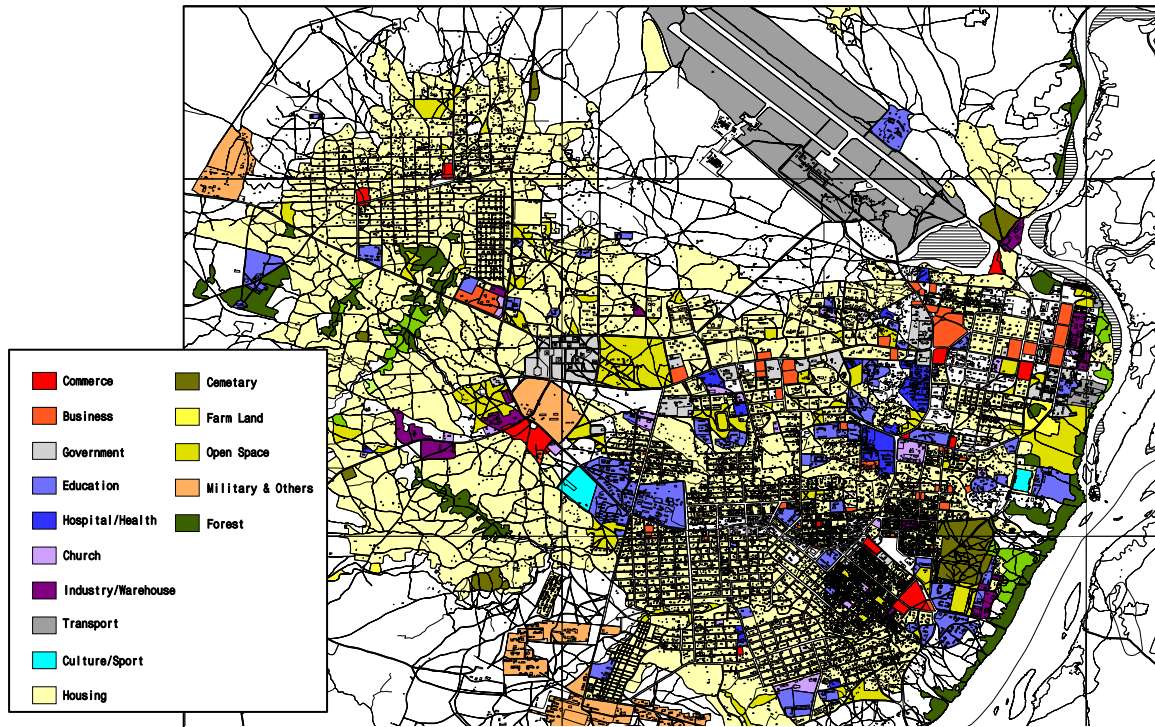
Due to the long conflict period, other land uses such as commercial area, business area, industrial area are not developed at all.

The land use in Kator and Muniki is simple. They are mostly residential area except for few shares of commercials and some governmental uses.

**Table 4.3-1 Existing Land Use by Category** (ha)

	Land use	Juba	Kator	Munuki	Study	%
1	Residential Area	586.56	414.85	669.54	1,670.95	41.5
2	Commercial Area	16.53	6.66	5.73	28.92	0.7
3	Business	25.42	0.00	0.00	25.42	0.6
4	Government	39.60	10.07	10.97	60.64	1.5
5	Military Area	0.00	280.00	0.00	280.00	7.0
6	Industrial Area	4.00	0.00	0.00	4.00	0.1
7	Institutional	37.59	0.42	7.80	45.81	1.1
8	School / Educational Facilities/ Hospital	71.51	7.67	0.40	79.58	2.0
9	Religious	17.88	3.36	0.80	22.04	0.5
10	Public Facilities	21.70	0.00	0.00	21.70	0.5
11	Roads	101.58	61.20	45.24	208.02	5.2
12	Airport	175.00	0.00	0.00	175.00	4.3
13	Agriculture / Grassland	654.11	454.96	296.15	1,405.22	34.9
	Total	1,751.48	1,239.19	1,036.63	4,027.30	100.

The existing land use is illustrated in Figure 4.3-1.



**Figure 4.3-1 Existing Land Use Pattern**

### 4.3.2 Future Urbanized Areas

#### (1) Future Urbanized Areas Required

Based on the population, working population by sector and school enrolment projections described in the previous section and the existing land use survey conducted, the future urbanized areas required are estimated in this section. The urbanized areas required in 2015 are estimated at about 55km<sup>2</sup>, of which existing urbanized areas are 30km<sup>2</sup> and additional new urban areas required are about 15km<sup>2</sup> as shown in Table 4.3-2.

**Table 4.3-2 Urbanized Area Required**

Description	Number
Population in 2006 (persons)	250,000
Population in 2015 (persons)	510,000
Population Increase between 2006 and 2015 (persons)	260,000
Existing Urbanized Area (excl. farmland, glass land)	3,000
Gross Population Density in Existing Urbanized Area (persons/ha)	85
Existing Habitable Area (ha)	2,000
Net Population Density in Existing Habitable Area (persons/ha)	125
Population Required in the New Development Area (persons)	260,000
Gross Population Density in New Development Area (persons/ha)	80
Additional New Urban Development Required (ha)	3,250
Total Urbanized Area (excl. farmland & glass land) (ha)	6,250



## (2) New Development Areas

The new development areas consist of the following two (2) areas;

- Approved / planned development area
- New settlement area

Each of them will be discussed below:

### 1) Approved / Planned Development Area

After hearing from various agencies of GOSS and provincial governmental agencies, the possible approved development areas in future are assumed to be as listed below:

- Gudele Area
- Lologo Area
- Nyokuron Area
- Gumba Area
- 3-K South Residential Development
- Hai-Mara Residential Development
- Industrial Area

These new development areas are expected to be constructed by the year 2015 as shown in Table 4.3-3 and Figure 4.3-2.

**Table 4.3-3 Approved Sites of New Urban Development by 2015**

	Area to be Developed	Number of Plots	Remark
1 Gudele Area	800	13,520	3 <sup>rd</sup> Class residential Area
2 Lologo Area	122	1,231	4 <sup>th</sup> Class residential Area
3 Nyokuron Area-1 <sup>st</sup> Class Residential Area	100	930	1 <sup>st</sup> Class Residential Area
4 Nyakuron Area-Commercial & Residential Area	426	1,068	Commercial & Residential Area
5 3-K south Residential Area	130	600	1 <sup>st</sup> Class Residential Area
6 Hai Marar Residential Area	30	240	1 <sup>st</sup> Class Residential Area
5. Gumba Block 1	164	1,114	1 <sup>st</sup> Class Residential Area
6 Gumba Block 2 and Block 3	164	2,185	1 <sup>st</sup> Class and 2 <sup>nd</sup> Class Residential Area
7 Heavy Industrial Area, Juba North	24	64	Industrial Area
Residential & Commercial- Total	1,936	20,800	
Industrial Area	24	64	

Source: All areas are based on the development plan

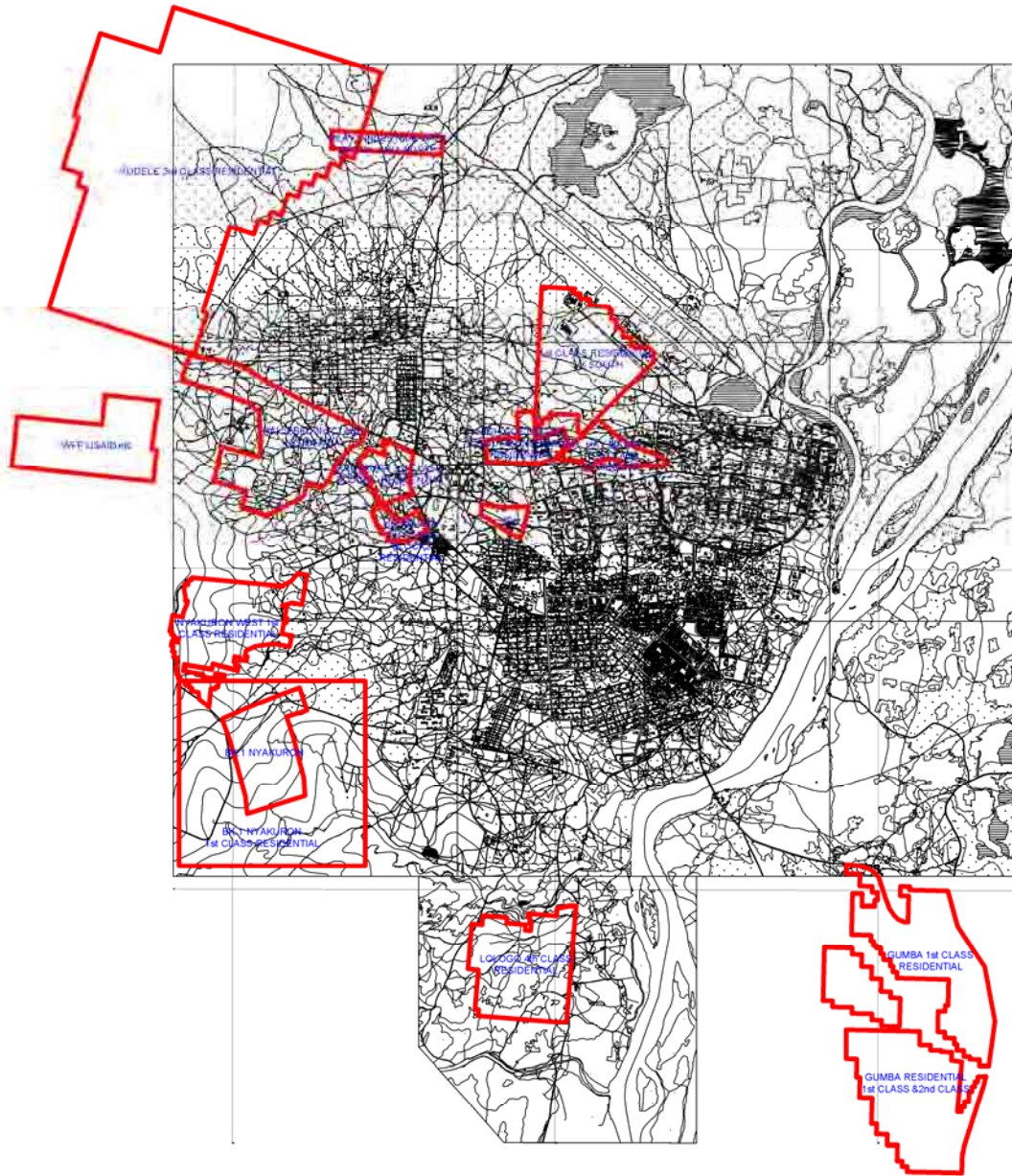


Figure 4.3-2 Approved & Planned Sites of New Urban Development by 2015

2) New Settlement Areas Required

The new development areas are required as follows:

Table 4.3-4 New Settlement Areas Required in 2015

	Area to be Developed (ha)	Number of Population	Number of Family
1 Additional New Urban Development Required	3,250	260,000	43,300
2 Approved and Planned New Urban Development	1,940	124,800	20,800
3 New Settlement Area Required	1,310	135,200	22,500

The candidates of new settlement areas to be developed are as follows:

**Table 4.3-5 Candidate New Settlement Areas Required**

	Name	Location	Area
1	North Bari New Settlement Area	North of Juba Town	250 ha
2	Munuki West New Settlement Area	West of Munuki	250 ha
3	Nyakoron South New Settlement Area	South of Nyakuron	250 ha
4	Lologo South New Settlement Area	South of Lologo Residential Development Area	450 ha
5	East Bank of the River Nile Settlement Area	East Bank of Nile River	110 ha
	Total		1,310 ha

### 4.3.3 Future Land Use Demand Projection

#### (1) Residential Area

It is estimated that number of housing plots in 2006 is about 41,700 plots and total residential area is about 1,670 ha. An average plot size in 2006 is calculated on the basis of residential area and population. As the results, the unit plot size calculated is about 400 m<sup>2</sup>. This means that an average plot size is almost equal to the second class residential area. Taking into account the Government Policy of housing, the average plot size of 2006 shall be maintained in 2015. It is therefore estimated that future residential area in Juba is about 3,400 ha. as shown in Table 4.3-6.

**Table 4.3-6 Future Residential Area Requirement**

Item	2006	2015	2015/2006
Population	250,000	510,000	2.04
Number of Family	41,700	85,000	2.04
Number of Housing Plots	41,700	85,000	2.04
Residential Area Required (ha)	1,670	3,400	2.04
Average Plot Size (m <sup>2</sup> /plot)	400	400	1.00

#### (2) Commercial and Business Area

##### 1) Business Area

Presently the most powerful activities of the business sector in Juba is the government-related business. However, private business activities will be gradually increasing by the year 2015.

Presently, number of employment in tertiary sector is estimated at about 29,350 persons, of

which that in business sector is about 18,680 persons or 63 % of the tertiary sector employment. It is estimated that average land area requirement per employment is about 46 m<sup>2</sup> /person.

The future business area is estimated on the basis of number of employment in business sector and the unit land area per employment. The future business area is expected to increase from 86 ha in 2006 to 241 ha. in 2015 as shown in Table 4.3-7.

**Table 4.3-7 Future Business Area Requirement**

Item	2006	2015	2015/2006
Employment of Service Sector	29,350	111,000	3.78
Employment of Business Sector	18,680 (15,000)	52,530 (15,000)	2.81
Percent Share to Service Sector	63.4 %	47.3 %	-
Business Area Required (ha)	86.06	241.00	2.80
Average Business Area per Employment	46.1	46.00	1.00

Note: Figure in ( ) means the government employment.

## 2) Commercial Area

The commercial activities in Juba has been tremendously increasing in the post-conflict period. This trend will be continued upto the year 2015.

At present, the number of employment in the tertiary sector is estimated at about 29,350 persons, of which that in the commercial sector is about 9,910 persons or 34 % of the tertiary sector employment. It is estimated that the average land area requirement per employment is about 29.2 m<sup>2</sup> /person.

The future commercial area is estimated on the basis of number of employment in the commercial sector and the unit land area per employment. The future commercial area is expected to increase from 28.9 ha in 2006 to 167 ha. in 2015 as shown in Table 4.3-8.

**Table 4.3-8 Future Commercial Area Requirement**

Item	2006	2015	2015/2006
Employment of Service Sector	29,350	111,000	3.78
Employment of Commercial Sector	9,910	55,600	5.61
Percent Share to Service Sector	33.7 %	50.0 %	-
Business Area Required (ha)	28.92	167.00	5.27
Average Business Area per Employment	29.18	30.00	1.03

**(3) Industrial Area**

Currently, the industrial sector's activities in Juba is very small. Number of employment in the industrial sector is estimated only at about 500 persons. It is estimated that the average land area per employment is about 80.0 m<sup>2</sup> /person.

The future industrial area is estimated on the basis of the number of employment in the industrial sector and the unit land area per employment. The future industrial area is expected to increase from 4.0 ha in 2006 to 125.0 ha. in 2015 as shown in Table 4.3-9.

**Table 4.3-9 Future Industrial Area Requirement**

Item	2006	2015	2015/2006
Employment of Industrial Sector	500	13,900	27.8
Industrial Area Required (ha)	4.00	125.00	31.25
Average Industrial Area per Employment	80.0	90.00	1.125

**(4) Other Land Use Areas**

Other land uses such as institutional, educational, religious and public facilities areas are expected to increase principally in proportion to population increase. Therefore, these land uses are estimated on the basis of the existing land use areas multiplied by the increase rate of the population as shown in Table 4.3-10.

**Table 4.3-10 Future Institutional Area Requirement**

Item	2006	2015	2015/2006
Population	250,000	510,000	2.04
Institutional Area (ha)	45.81	91.80	2.04
Institutional Area/Population (ha/person)	1.80	1.80	-
School/Educational Facilities (ha)	79.58	163.20	2.04
Educational Area/Population (ha/person)	3.20	3.20	-
Religious Area (ha)	22.04	45.00	2.04
Religious Area/Population (ha/person)	0.88	0.88	-
Public Facilities (ha)	21.70	44.30	2.04
Public Facilities /Population (ha/person)	0.86	0.86	

**(5) Future Land Use Demand in 2015**

Table 4.3-11 shows the future land use demand obtained from the results of the future land use demand projection, after minor modification.