

**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  
EXECUTIVE SUMMARY**

**MARCH 2007**

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

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*(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.

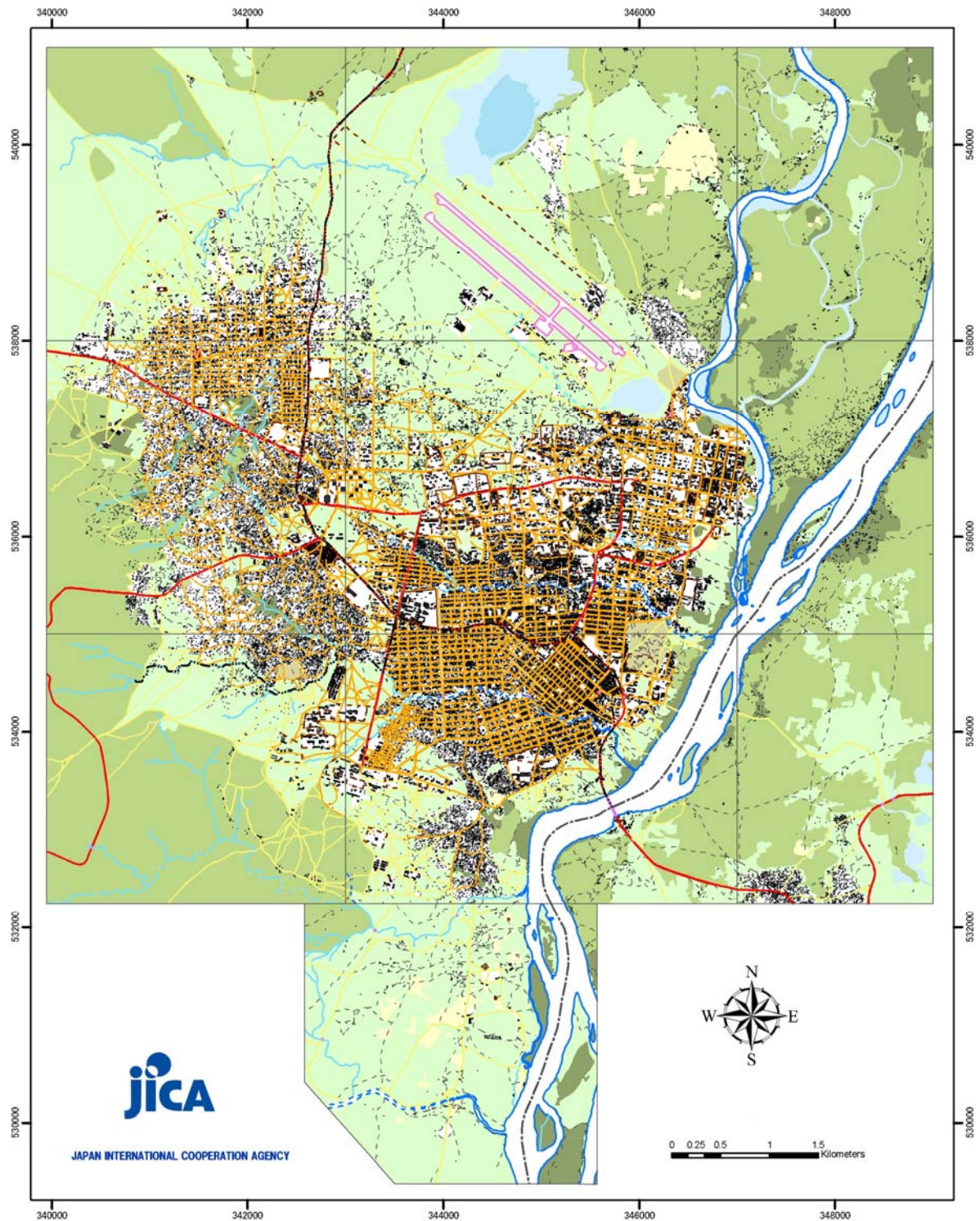
The report analyses the present and future conditions and demand in physical and social infrastructure in Juba Town and the surrounding areas. It presents the master plan from reconstruction/rehabilitation to development of Juba Town and the surrounding areas. In the course of the Study, implementation 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

# **INTRODUCTION**

## **BACKGROUND OF THE STUDY**

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 IDP 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 for more than 20 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 supply, sanitation, education and health care is required to enhance the settlement of the IDP returnees.

Under such situation, GOS requested the Government of Japan (GOJ) 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" (the Study). In response to the request, 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.

## **OBJECTIVES OF THE STUDY**

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

Accordingly, the Study consists of the following two components:

- 1) Formulation of Juba Town Development plan, and
- 2) Implementation of pilot projects in transport, water supply and community-based development sectors.

## **STUDY AREA**

The Study shall cover Juba Town and surrounding areas.

## **PERIOD OF THE STUDY**

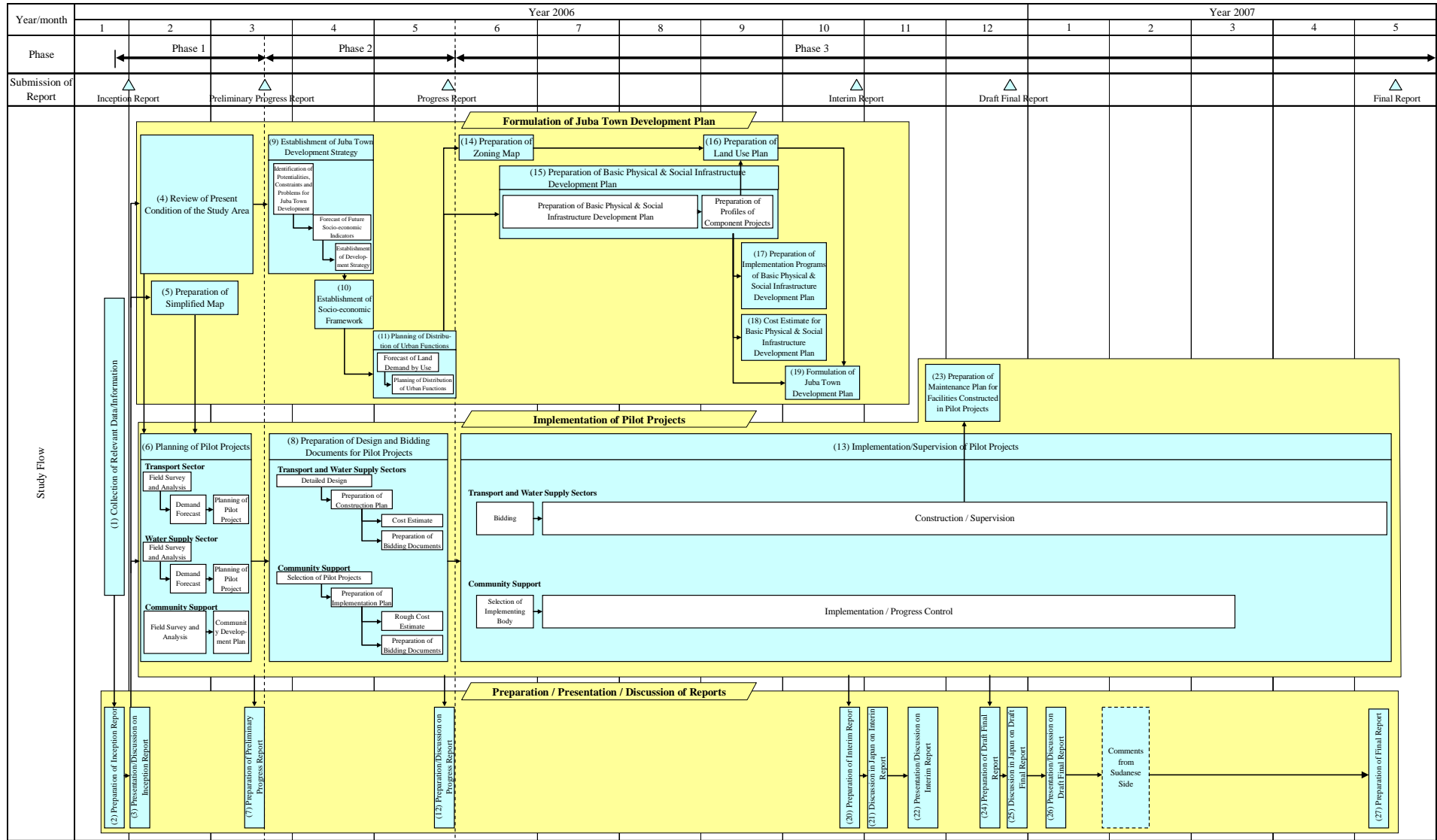
The Study is carried out in the following three phases :

- 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

## **REPORTS**

The Final Report consists of the following:

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



Study Flow Diagram

# PART I PRESENT AND FUTURE ISSUES

## 1. Present Condition of the Study Area

### (1) Natural Condition

Location	4°52' north of the equator and 31°36' east of eastern longitude, 460m above MSL
Climate	Ave. Min. Temp.: 19.4 ~ 23.7 [ Dec. ] Ave. Max. Temp.: 31.5 ~ 37.9 [ Jan.-Feb. ] Annual precipitation: 1,000mm, Rainy Season (May~Oct. ) /Dry season [ Nov.~Apr. ] The prevailing winds: from the south, from the north-north-west (Jan. & Feb).
Topography	Bahr al Jebel alluvial plain inclining in a south-southwest - north-northeast direction

### (2) Administrative System

( See Figures in this Chapter. )

### (3) Population

	2006
Juba Town	103,000
Kator	69,000
Muniki	78,000
Juba Municipality	250,000

### (4) Economy

Some 45% of the working population are engaged in public sector, whereas the primary industry accounts for 15%, industry 6%, and transport and warehousing activities for 8% respectively (1973 Census). Constitution of the working population is distinctively characterized by the high dependency on the public sector and low dependency on industrial and commercial activities.

### (5) Land Use

Due to the lack of a proper land use zoning system, Juba town area is characterized as a low density urban area where houses, shops and small business intermingle (ref. Figure).

( ha )

Housing	Business	Industry	Public	Others	Total
1,671	54	4	814	1,484	4,027

### (6) Urban Infrastructure

#### 1) Road

##### Urban Roads

Arteries and bridges including secondary roads servicing the commercial areas are generally in poor condition due to the lack of proper construction and/or maintenance. Almost all sections of the roads once asphalted have also deteriorated.

Paved: some 10km

Unpaved: some 50km

##### Regional Roads

Five regional arterial roads in formed direction-wise in a radial pattern, connect Juba town with neighboring regions and countries.

WFP has been implementing Emergency Road Repair Programmes.

#### 2) Electricity

Juba power generation plant was constructed in the 1980s and two power generators out of five are in operation. The total power production is estimated to be 1.6MW covering 75% of Juba Town area. Lack of electricity supply is serious.

#### 3) Public Buildings

Public buildings built in 1940s, 1950s and 1970s were severely damaged. 650 public buildings are located with a total area of approximately 172,632 sq.m.

#### 4) Water Supply

Central area: Water intake from the River Nile / distribution by Urban Water Corporation [ 51km piping, 2,045 water tapping flat fare by class ]

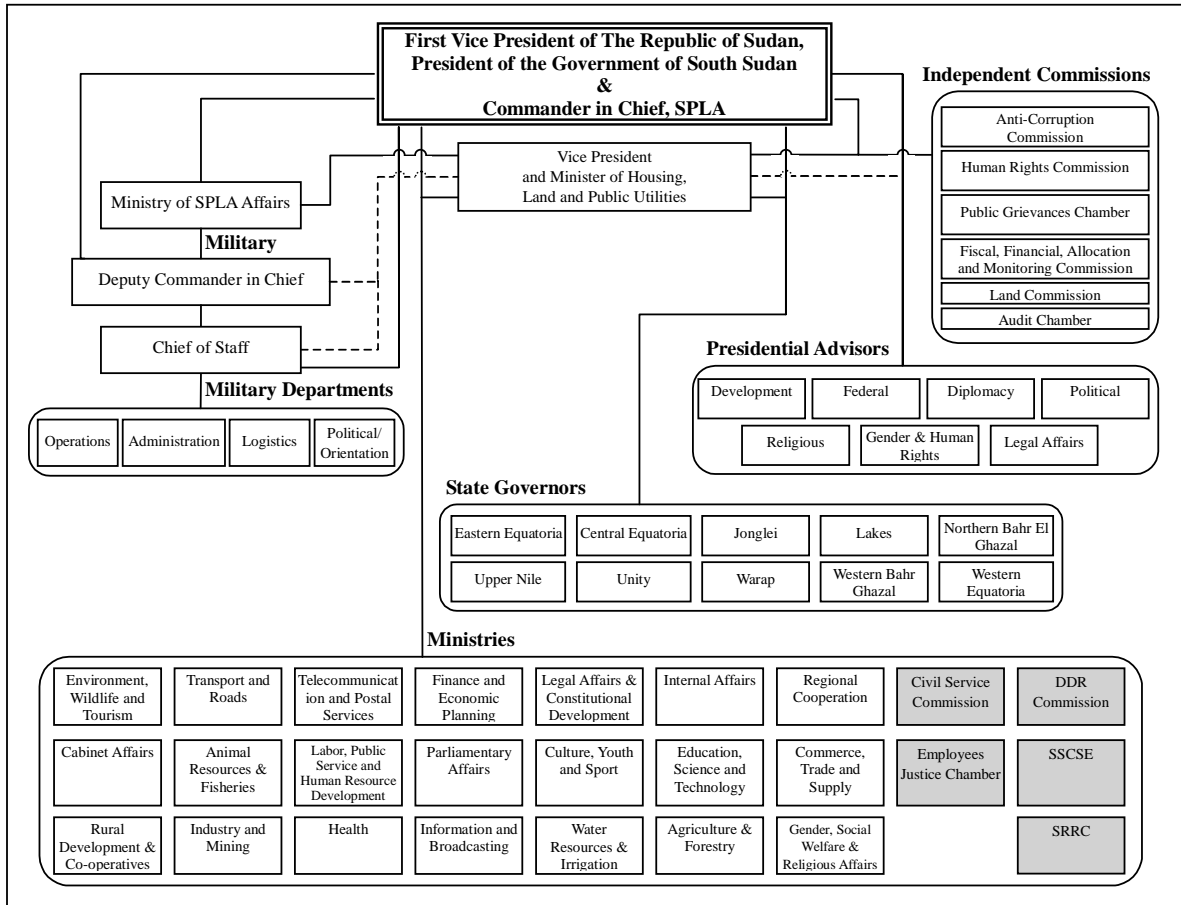
Peripheral area: Borehole water by Rural Water Corporation

In addition, borehole development by NGOs and water trading by private sector water trucks

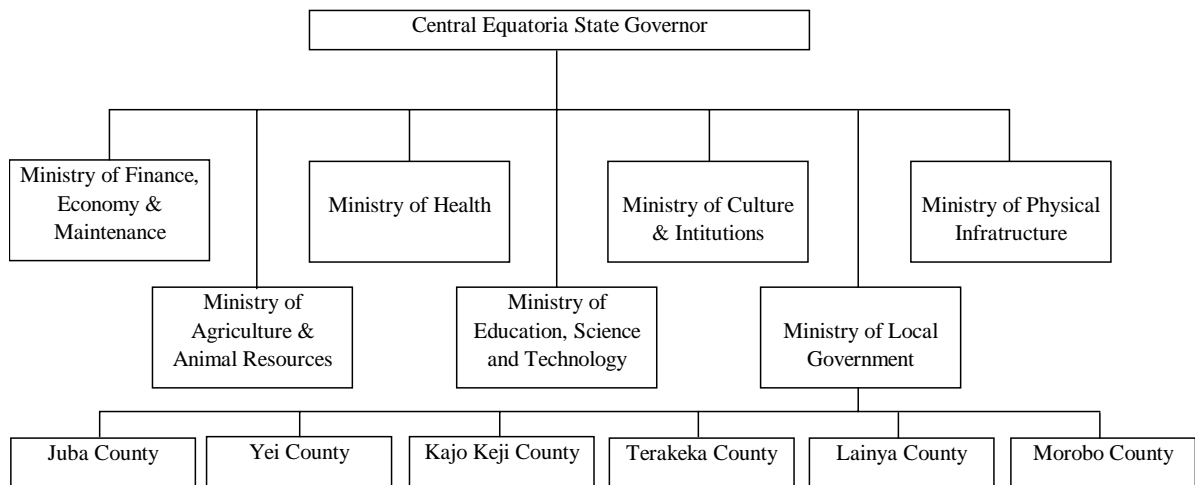
#### 5) Public Health Facilities

Collection and disposal of solid waste, and sewerage disposal, once in practice, are now a thing of the past. Environmental influence is hardly considered.

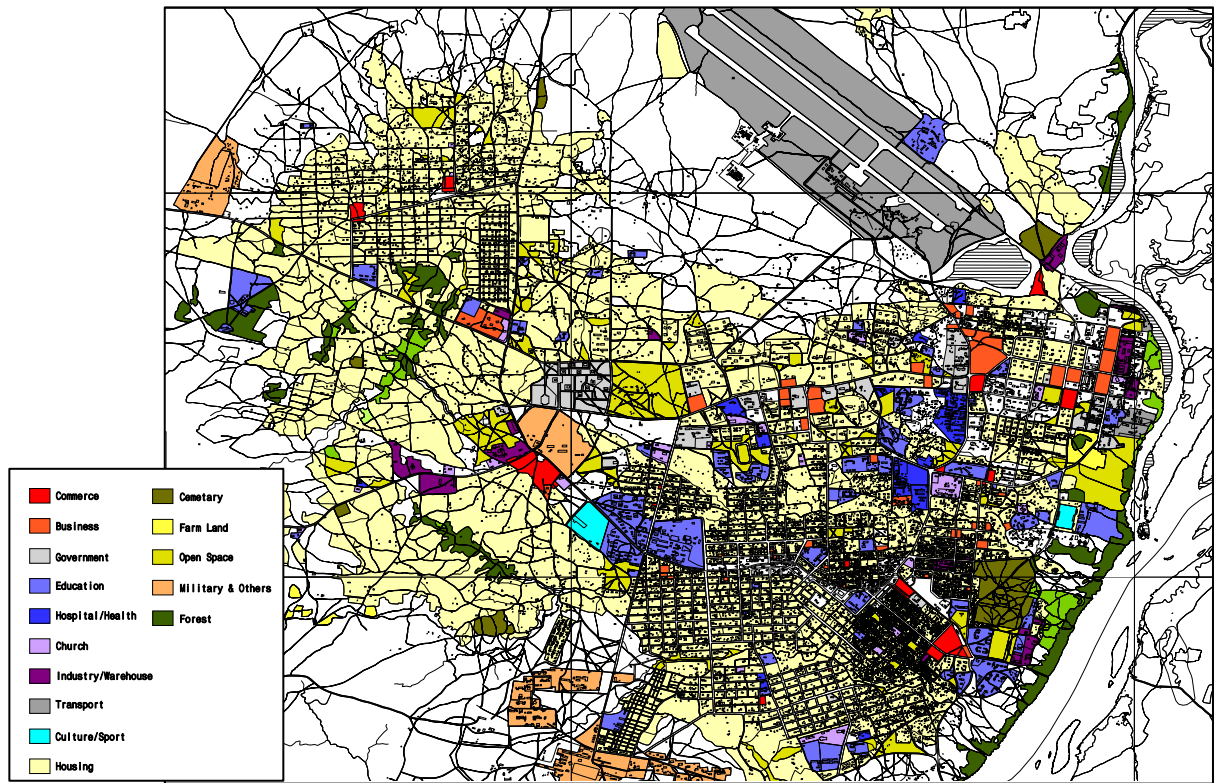
The current administrative and management policy of Juba Town is to handover the management of sewerage disposal to the Urban Water Corporation.



**Organization of Central Government of Southern Sudan**



**Organization of Central Equatoria State Government**



**Present Land Use in Juba**



**The River Nile**



**Suburb of Juba**



## 2. Development Plans and Programs

### (1) Development Plan of the Government of Southern Sudan

The Government of Southern Sudan has not yet formulated a National Development Plan following the realization of the CPA.

#### 1) “The Six Year Plan of Economic and Social Development 1977/78-1982/83”, Regional Ministry of Finance and Economic Planning, Democratic Republic of the Sudan, 1977”

The strategy for 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 for the development. A growth rate of 4.5% to 7% per annum, in the regional economy was pursued.

#### 2) Development Plan of Central Equatoria

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 in the precondition of the plans. As a consequence, the circumstances of planning pre-conditions were far from the prevailing one at present. Enhancement of industrial development was stressed in the “Regional Development Plan Vol. 1 General Report, Democratic Republic of the Sudan Southern Region, 1978”

#### 3) Development Plan of Juba Town

The long term structure plan showed the following

- The development of the city is mainly to the south according to a linear type of urbanizing scheme.
- Formation of north-south transport axis 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

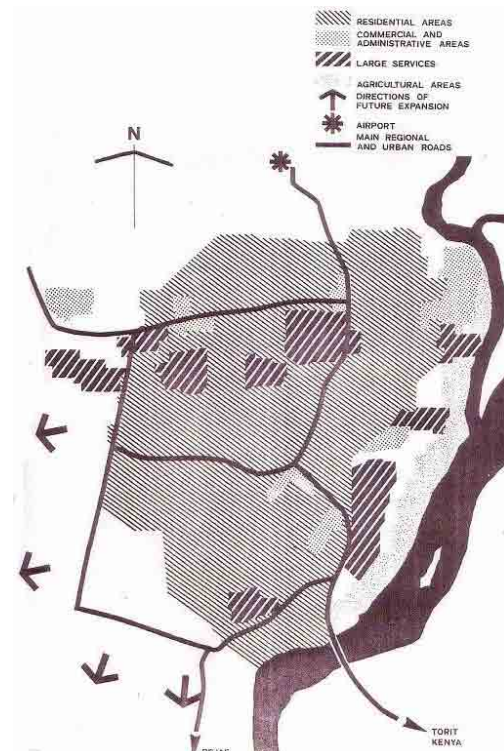
“Urban Plans of Juba, Wau, Malakal, Bor, Rumbek, Yambio (Vol. 1: Objectives and Criteria of Urban Planning, Vol. 2: Urban Plans)”, 1978

### (2) Existing 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. Already, the following projects are underway

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

Implementing body is GOSS, implementation period is from 2006 to 2007, and total project costs is USD 103mil.



Source: Urban Plans of Juba, Wau, Malakal, Bor, Rumbek, Yambio (1978)

#### Development Direction

### (3) Development Assurances by Donors

#### 1) JAM Report (2005)

- 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.

USD 4.5 bil. was pledged in April 2005, in Oslo.

## 2) UN

### United Nations Work Plan

- 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
- The passage of UN Security Council Resolution Number 1590, provided the mandate for the UN Mission in Sudan (UNMIS)

(Total recorded funding towards international assistance to Sudan in 2005 by international organizations including United Nations, bi-lateral donors and other agencies amounted to more than USD 1.3 bil.)

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 economic opportunities, the disarmament and reintegration of ex-combatants, the destruction of landmines and Unexploded Ordnance (UXO), and peace reconciliation and trust-building initiatives.

### UNDP

- a) Programmes by Trust Fund Management Unit
- b) Post-Conflict Community Based Recovery and Rehabilitation Programme

UNDP manages the fund sourcing mainly from EU. Considerable number of boreholes are to be developed.

### WFP

“Improving Food Security in Sudan (Country Programme 10105.0)”

Other than food assistance, Special Operations such as securing transport routes are carried out. (ex. “Emergency Road Repair and Mine Clearance of Key Transport Routes in Sudan in Support of the Emergency Operation (SO 10368.0)”)

### 3) The World Bank

The World Bank is in charge of MDTF-Southern Sudan operation.

- Sudan Emergency Transport and Infrastructure Development Project

(This project is basically to be undertaken by GOSS and MDTF is only mobilized to supplement its implementation.)

- Multi Donor Education Rehabilitation Project - Phase I
- Rapid Impact Emergency Project  
(The project addresses emergency needs of the Government of Southern Sudan in the health, education, and public service sectors.)
- South Sudan Umbrella Program for Health System Development  
(Development of core capacities and components of the health system, and support of rapid expansion of service delivery and selected high-impact preventive health interventions )

### **WFP Planned Operations**

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)
Provision of Humanitarian Air Service (SO 10181.3) (Jul. 2004-Dec. 2006)
Emergency Infrastructure Improvement of Sub Offices and Airstrips in South Sudan, in Support of EMOP 10503.0 (SO 10428.0) (Jan. 2006-Dec. 2006)
Expansion of VAM Capacity in Support of WFP Food Aid Operation in Sudan (Mar. 2005-Mar. 2007)
Logistics Augmentation in Support of EMOP in Darfur

### 4) USAID

- Preparation of maps for 10 state capitals based on the Quickbird satellite imagery
- Water supply project in Juba
- Juba Town assessment

“Juba Town Assessment Town Planning and Administration”, Nov. 2005

(Preliminary images worthwhile to consider in the Master Plan are depicted.)

### 5) NGO

NGO activities are prevalent all over the Southern Sudan more than they are in Juba town. Practical measures of improving the means for livelihood are training to instil skills and knowledge concerning agriculture, husbandry, and apiculture

Organizations: ACF-USA, ADRA, CRS, SFM, etc.

### 3. Juba Town Development Strategy

#### (1) Position and Role of Juba Town

##### 1) Roles as a Capital

- To reinforce and support central political functions and realize political and public services relations
- To disseminate the latest international and domestic information, culture, and education
- To realize a preferable urban environment

##### 2) Roles as an Economic Development Centre

- To develop factories and business entities

- To promote a soft-type assistance for industries utilizing local resources, whilst for the sustenance of labour intensive industries.
- To encourage and reinforce the function as a regional logistic center
- To improve telecommunication and information exchange systems to strengthen the business and commercial functions
- To reinforce work force to meet the requirements in the labor market

#### (2) Development Issues and Directions

Present Condition and Problems	Keys to Solution	Issues to be Considered in Infrastructure M/P
<p>1. Population &amp; movement</p> <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</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of supplying good housing area for IDPs in the periphery</li> <li>• Promotion of dense habitation</li> <li>• Study on the eastern bank of the River Nile for development</li> </ul>
<p>2. Industry and employment</p> <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</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</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</li> <li>• Intensification of distribution function as a regional transport hub by utilizing river, international road and airport</li> </ul>
<p>3. Urban function and living environment</p> <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 in 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 Government by the revenue from oil</li> <li>• Endowment of excellent green areas along the River Nile</li> <li>• Large 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 facility 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 EIA for projects</li> </ul>
<p>4. Transport network and urban structure</p> <ul style="list-style-type: none"> <li>• Concentric expansion of urban area</li> <li>• Topographical constraints of urbanization</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>• 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>• 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 the 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 by topographic constraint (river) and formation of new housing areas</li> <li>• Formation of reliable transport network against climate condition (rain)</li> </ul>

## 4. Future Socio-economic Framework

### (1) Population

#### Future Juba Population in 2015

	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	459,100	510,000	585,200

Source: 1) Projected by JICA Study Team  
2) Projected by GIBB Africa

Future population of Juba was estimated to reach 510,000 in 2015.

### (2) Industrial Structure

Future economically active working population of Juba in 2015 was estimated at 138,800.

### (3) Economic Indicators

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

#### Economically Active 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

#### Working Population by Sector in Juba in 2006 and 2015

	2006		2015	
	Employment	%	Employment	%
Primary Industry	7,600	20.3	13,900	10
Farming /other	7,600	20.3	13,900	10
Secondary industry	400	1.1	13,900	10
Manufacturing	100	0.3	9,700	7
Construction	300	0.8	4,200	3
Tertiary Industry	29,350	78.6	111,000	80
Government	15,000	40.2	16,700	12
Trans. / Comm.	760	2.0	2,800	2
Retail /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

2006-2011 10-12%

2012-2015 8-10%

Based on the World Bank statistical data, the GRDP per Capita of Southern Sudan in 2015 were estimated at USD 384. GRDPs of Juba Metropolitan area were also estimated at USD 46.1mil. in 2006 and USD 196.1mil. in 2015.

#### GRDP per Capita Estimate

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



Town Centre

## 5. Planned Distribution of Urban Functions

### (1) Strategy for Spatial Structure Planning

#### 1) Urban Structure

##### Spatial Development Pattern

- Belt-type development along transport corridors

##### Town Area

- Existing planned areas of development and east bank of the River Nile by 2015

##### Transport Corridors and Transport Nodes

- Transport corridors to facilitate belt type development, circumferential road network, bridges across the River Nile, and regional transport hubs (river port and airport)

##### Development Direction

- To northwest, southwest, and south along transport corridors.

#### 2) Distribution of Urban Functions

##### Commercial Area

Commerce and business: Central area, and supplementary areas in dispersed pattern

Wholesale and distribution: Near industrial area/regional transport network

##### Industrial Area

Strategic key industry: Near regional transport network

Modern light industry: Near trunk road and in the urban periphery

##### Public Service Area

Government: Central area

Public service for residents: Dispersed pattern

##### Housing Area

Formal settlement: Densification

Traditional settlement in the formal area: Housing modernization

Informal peripheral settlement: Land readjustment

New settlement: Belt type pattern along corridors

##### Green Area and Farm Land

Green area: Reservation of open space in town, and co-existence of green areas and urban functions along the River Nile

Farm land: Conversion to housing area along trunk roads

### (2) Land Use Plan

#### Typical Housing Standards

Class	Size
House size	10m X 10m
Parcel Size	
Class 1	25m x 25m: Upper Class
Class 2	20m x 20m: Middle Class
Class 3 & 4	20m x 15m: Lower Class

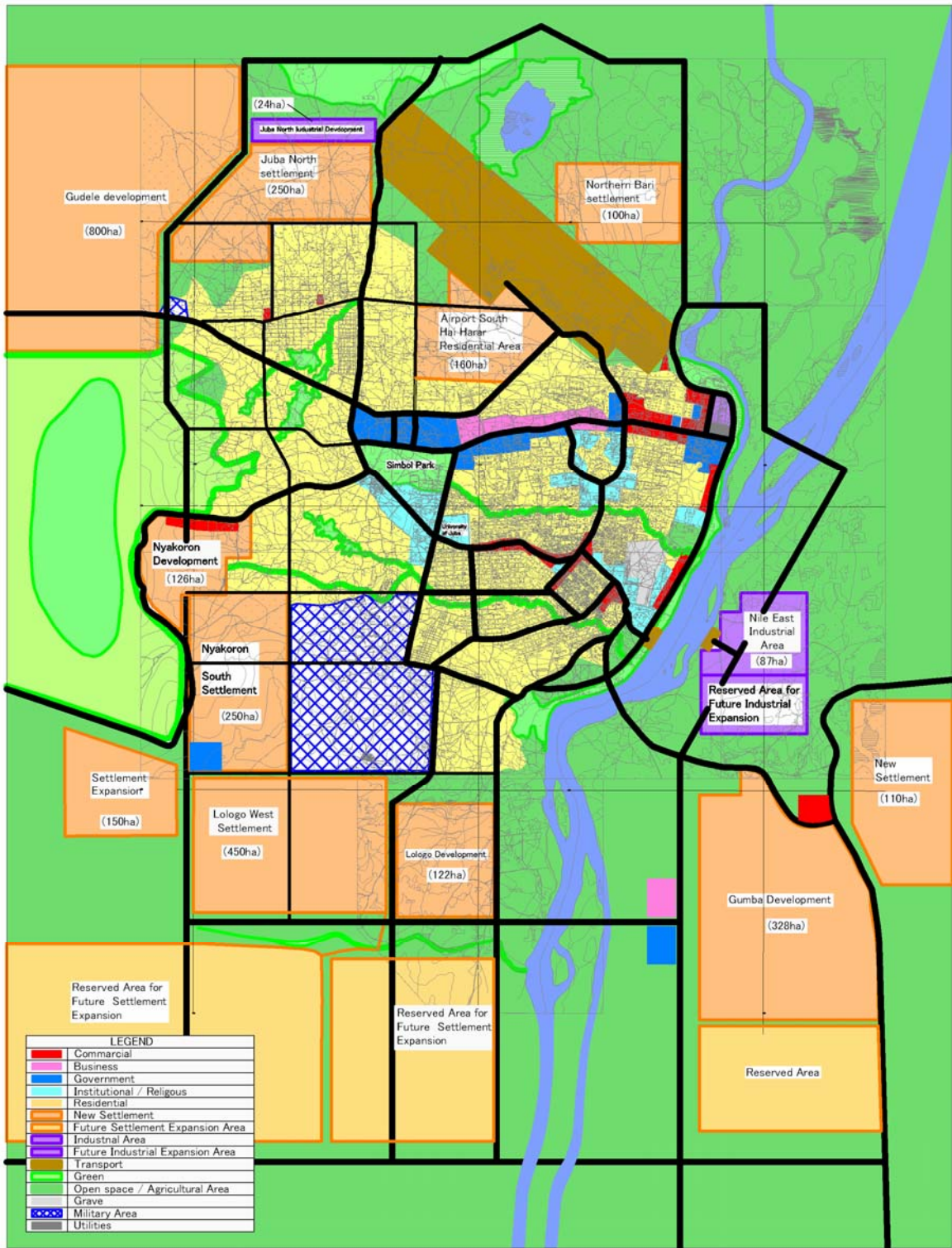
#### Future Land Use Demand

		2006		2015	
		ha	%	ha	%
1	Residential	1,787	37.0	3,290	42.4
2	Commercial	29	0.6	207	2.7
3	Business	24	0.5	152	2.0
4	Government	52	1.1	82	1.1
5	Military	280	5.8	280	3.6
6	Industry	4	0.1	129	1.7
7	Institutional	46	0.9	182	2.3
8	School / Clinics	78	1.6	204	2.6
9	Religious	20	0.4	29	0.4
10	Sport Field / Public Facility	22	0.4	54	0.7
11	Road / Transport	426	8.8	1,488	19.2
12	Grassland/ Agricultural	2,060	42.7	1,662	21.4
	Total	4,827	100.0	7,759	100.0

Source: JICA Study Team

#### Main Future Land Use by Payam

Payam	Main Future Land Use
Juba Town	<ul style="list-style-type: none"> <li>• Central Business District</li> <li>• Central governmental function</li> <li>• Dense housing (medium to long term)</li> </ul>
Munuki	<ul style="list-style-type: none"> <li>• Housing</li> <li>• Industrial function</li> <li>• Commercial function along Yei Rd.</li> </ul>
Kator	<ul style="list-style-type: none"> <li>• Green area and commercial and business function along the River Nile</li> <li>• Housing and bus terminal</li> <li>• Governmental function along Yei Rd.</li> </ul>
Rajaf (East bank of the River Nile)	<ul style="list-style-type: none"> <li>• Housing and bus terminal</li> <li>• Juba University, governmental function, cultural function</li> <li>• River port (long term) and industrial function, wholesale and distribution function</li> </ul>



Future Land Use (Draft)

## 6. Social and Environmental Considerations

### (1) Environmental Management System

Central Equatoria State Government: Comprehensive environmental management law has not been established yet. The EIA Legislation in the Central Equatoria State is essentially of a sector-based character such as agriculture, forestry, fisheries, public health and animal resources.

Government of Southern Sudan: A law with the title of "Environmental Law" has not been drafted or a specific policy in the field has not been elaborated at the moment. However, Environmental policy will be prepared by USAID by the end of 2006.

The Ministry of Environment is to develop better processes for environmental monitoring and implementation of "environmental impact assessments" on the occasion of any governmental, non-governmental or private sector projects.

JICA's environmental and social consideration guidelines are adopted for this Study.

### (2) Social and Environmental Issues

#### 1) Predicted Major Impacts

##### Social Environment

Relocation of residents: Expected. Enough explanation, public consultations are required for them including IDPs.

Cultural heritage: Not identified

Gender issues, minority groups, children's rights or indigenous persons issues: Not expected

##### Natural Environment

Native vegetation: No major protected forest cover in the project area, and no exotic species or medicinal plants were found.

Although some endangered species such as Nile crocodile may make their habitat in the river, such habitat is not special one.

##### Pollution

Effluents from a landfill site will result in water pollution in rivers and underground waters and likely provoke waterborne diseases such as cholera and amebic dysentery.

A thermal power station plant will emit a certain a volume of exhaust emissions, which will provoke significant impacts in terms of

greenhouse gases and ambient air quality.

Construction activities and operation of construction vehicles may give some temporary pollution and it does not give significant impact.

### Proposed Mitigation Measures by Sector

Sector	Mitigation measures
Transport	<ul style="list-style-type: none"> <li>Generally some mitigation measures are required for pollution control, traffic safety and greening &amp; conservation of bio-diversity.</li> </ul>
Water supply/ Sanitation	<ul style="list-style-type: none"> <li>Discharged water after treatment from the sewage plant should not exceed BOD 120mg/l (day average according to Japanese standards for effluent waters).</li> <li>Sewage plant location should avoid residential areas and ecotone.</li> </ul>
Power supply	<ul style="list-style-type: none"> <li>The most frequent wind direction, as well as the density of affected air pollution from plants should be taken account of in the selection of site to minimize adverse impacts.</li> </ul>
Public facilities	<ul style="list-style-type: none"> <li>Installation of incinerators and independent disposal system of medial waste from general waste should be promoted at medical facilities.</li> <li>Installation of barrier-free infrastructures are required for the elderly, IDP and returned soldiers injured during the war.</li> </ul>

### 2) Recommendation

Main issue is IDPs resettlement for all sectors' projects, and inappropriate measures against it should create slums. These slum areas may be nest of crimes and represent an obstacle to development. The supply of low-cost housing and the creation of jobs are the major solution to prevent citizens from gathering in such slums. Therefore, a systematic resettlement plan for IDP and an effective utilization of unused land should be required.