

Transport Infrastructure and Services

7 Transport Infrastructure and Services

7.1 Current Status of Transport Services and Infrastructure

7.1.1 Overview of the Transport Sector

The transport system in South Sudan consists of four modes – road, rail, river and air transport – the largest being road transport. South Sudan’s main access to the sea is through Mombasa in Kenya, which accounts for most of the traffic, Port Sudan and Djibouti ports (see Map 7.1). The Juba-Mombasa link is mainly accessed by road through Uganda or directly to Kenya. The distance from Juba to Mombasa by road is around 1,900 km via Nimule and Gulu in Uganda and 1,800 km through Torit, Nadapal and Lokichogio in Kenya.

Multimodal transport is also possible, and it involves combining road transport from Juba to Kampala or Eldoret and rail transport to Mombasa. South Sudan is connected to Port Sudan by road, rail and multimodal link. Port Sudan connects by road to Malakal (Upper Nile State), Bentiu (Unity State), Aweil (Northern Bahr El Ghazal State) and Wau (Western Bahr El Ghazal State). A railway line links Wau and Aweil to Port Sudan. Between Juba and Port Sudan, the existing infrastructure allows bi-modal transport by river from Juba to Kosti and then by rail or by road from Kosti to Port Sudan. However, multimodal transport is hampered by the poor condition of the existing infrastructure and inadequate connectivity between modes. Malakal is linked to Djibouti by road through Jikou and Addis Ababa. The other possible link is from Juba to Kapoeta - Boma in the South East and then to Djibouti via Ethiopia.

Table 7.1: Paved Road and Railway Indicators in Sub-Sharan Africa

Country category	Urban population (%)	Paved road density		Rail density	
		By area (km/1 000 km ³)	By population (km/million)	By area (km/1 000 km ³)	By population (km/million)
Sub-Saharan Africa	34.9	16.8	533.0	2.8	83.1
Low income fragile states	34.5	9.9	275.0	1.6	45.9
South Sudan	19.7	0.2	15.0	0.4	25.0

Source: Carruther et. al. (2009), Annex Table 1.4, and estimates by authors.

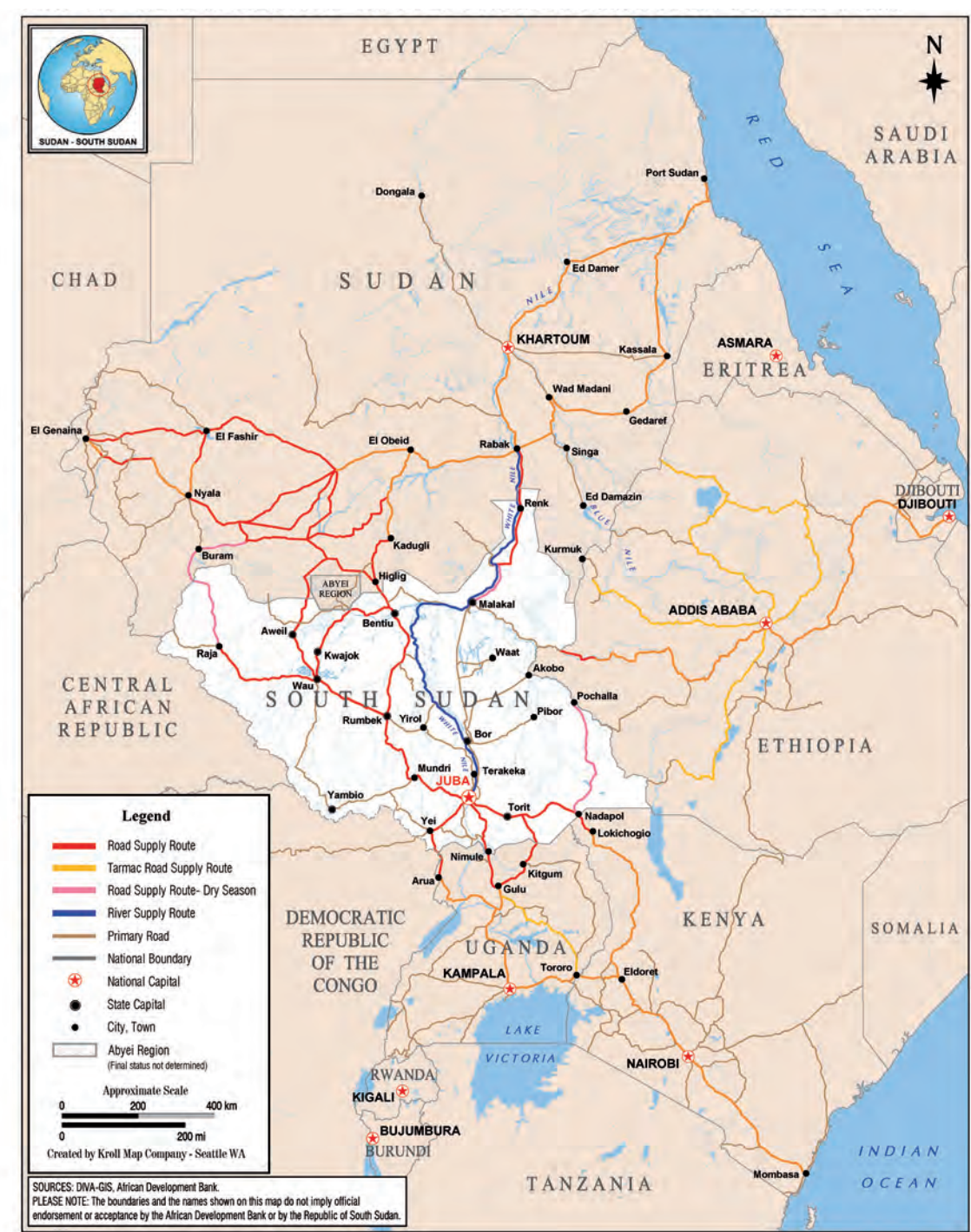
Access to transport infrastructure in the country is poor. Table 7.1 shows that the road density in terms of land area or population in the country is extremely low with 19 km per 1,000 km² or 1.3 km/1,000 persons. The density for paved roads is 0.2 km per 1,000 km², which is much lower than the averages of 16.8 and 9.9 km per 1,000 km² for Sub-Saharan Africa and Low income fragile states respectively.

Institutional arrangements. Prior to independence, the Ministry of Transport and Roads (MTR) was responsible for transport services and infrastructure in the country. At the time, the MTR was divided into the following directorates:

Directorate of Roads and Bridges (DRB); Directorate of Road Transport and Safety; Directorate of Railway Transport; Directorate of River Transport; Directorate of Air Transport; and Directorate of Administration and Finance.

Post independence, the MTR was split into two ministries to form the Ministry of Transport (MoT) and the Ministry of Roads and Bridges (MoRB). Additionally, the Ministry of Physical Infrastructure (MoPI) was created and it is in charge of the intrastate transport infrastructure in each of the ten states of South Sudan.

MAP 7.1: Regional Routes from South Sudan to Seaports



These ministries face considerable difficulties recruiting well qualified technical staff. To address this challenge, training programs have been undertaken, but starting from a low base a large skills gap still persists.

Transport policy. A Transport Sector Policy was developed and passed by South Sudan Legislative Assembly on 3rd October, 2007. The policy framework covers a five year period with a two phase implementation strategy, which

included the recovery and development phases between 2007-2008 and 2009-2011 respectively.

The policy paper has twelve objectives, namely to: (i) strengthen the MTR to play an effective coordination and regulation role; (ii) create capacity to meet the transport requirements of the economy; (iii) optimize the allocation of available resources among the various transport modes; (iv) improve mobility in rural areas through the promotion

of the use of appropriate means and modes of transport; (v) facilitate the return and settlement of the Internally Displaced People (IDP) and refugees; (vi) encourage and promote increased private sector participation in the provision, management and maintenance of transport infrastructure and services; (vii) contribute to job creation and income generation, and provide equal opportunities for men and women in transport sector; (viii) ensure safety standards in all modes of transport; (ix) ensure coordinated disaster management in all modes of transport by enforcing appropriate protective and control measures; (x) introduce sound management through appropriate policies and institutions in the transport sector that will lead to rapid sustainable development and poverty eradication; (xi) provide links with the states and neighbouring countries; and (xii) recognize and account for environmental concerns in line with the national environmental plan.

Recognizing the negative impact of a poor transport system on the performance of the economy, the new Government of the Republic of South Sudan has reaffirmed its commitment to reform the sector to catalyze the social and economic development process of the country.

The establishment and operation of a new institutional framework is a priority for each transport sub-sector. This framework will guide the functions of a regulator and service providers. Additionally, the country needs to urgently develop a regulatory framework to promote

Public Private Partnership (PPP) opportunities. It will therefore be necessary to have a timely decision on whether a single authority will regulate the entire transport sector or various regulatory authorities' will be accorded different regulatory responsibilities for each sub-sector. In the latter case for example, the Civil Aviation Authority (CAA) will regulate the air transport sub-sector as well as own and operate the country's major airports.

7.2 Road Transport Infrastructure and Services

There is very limited data on the transport sector. Despite its importance for proper development and maintenance planning, the inventory and classification of the road network is incomplete.

7.2.1 Road Network and Condition

According to the Transport Policy document, the country has an estimated road network of 12,642 km; consisting of 7,369 km of Interstate roads, 1,451 km of State primary roads and 3,822 km of State secondary roads (see Map 7.2). The recent World Bank report estimates tertiary road network to be 2,301 km.⁷³ The Road Authority Provisional Order states that all public roads shall be categorized into classes as shown in Table 7.2.

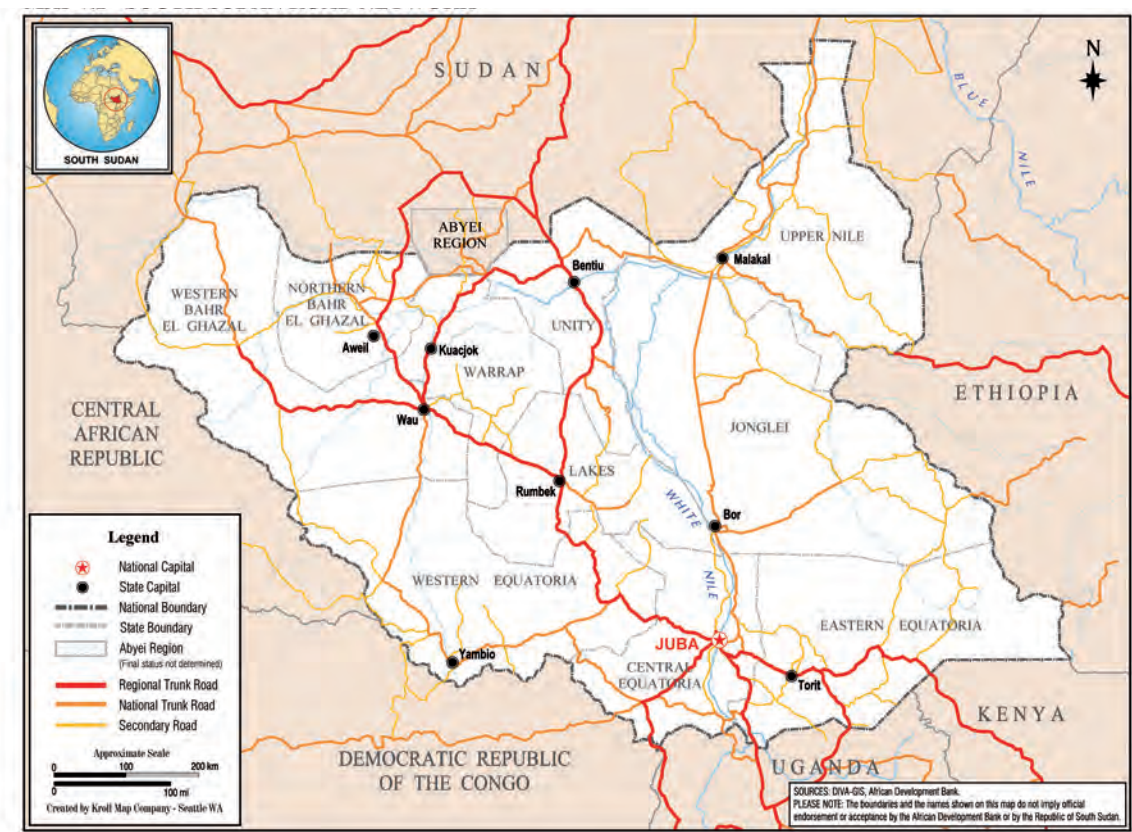
Table 7.2: Road Classes

Class		Description
Part A - Trunk Roads		
	International Roads	International trunk Roads linking centres of international importance and crossing international boundaries or terminating at international ports
	Interstate Roads	National trunk Roads linking nationally important centres
Part B - State Roads		
	Primary Roads	Primary Roads linking State important centres to each other
	Secondary Roads	Secondary Roads linking County important centre to each other, to more important centres or to higher class Roads
	Feeder Roads	Tertiary Roads linking minor centres (Roads other than Inter-State and International Roads other than those inside cities and municipalities)
Part C - Urban Roads		
	UA	Urban Arterials
	UC	Urban Collectors
	UL	Urban local roads

Source: The Southern Sudan Roads Authority Provisional Order, 2011

73 A recent report by the World Bank provides somewhat different estimates for the road network: 2,696 km of interstate primary roads which are those connecting all state capitals and major cross-border corridors; 4,475 km of "other primary roads"; 6,292 km of secondary roads; and 2,301 km of tertiary roads. Excluding the estimate for tertiary roads in the World Bank total, the adjusted length of the national network is 13,463 km compared with the 2006 official estimate of 12,642 km. (See World Bank (2011a).

MAP 7.2: South Sudan Road Network



South Sudan’s road infrastructure was largely destroyed or left in disrepair during the protracted civil wars. After the signing of the Comprehensive Peace Agreement (CPA) in 2005, significant construction and rehabilitation projects were initiated and implemented including the Emergency Road Repair Program (ERRP) and Sudan Emergency Transport Infrastructure Development Project (SETIDP). The main objective of these projects was to restore and maintain basic links between major towns and regions in the country. As a result, around 5,000 km of trunk roads were constructed/rehabilitated to all-weather gravel roads standard.

However, heavy rains increased levels of traffic; overloaded trucks and inadequate maintenance have often led to the deterioration of the rehabilitated roads in the country. As a result, only 40% of these improved trunk roads are in a good condition, the remaining 60% are deemed to be in a fair condition. The only paved roads are the Juba-Nimule link to Uganda (193 km), which is under construction to a DBST ⁷⁴ standard, the 65 km of urban roads that were recently rehabilitated or upgraded in Juba and a few sections of urban roads in Wau and Malakal. The remaining gravel roads, earth roads and tracks are in a state of disrepair with the majority impassable during the rainy season.

Majority (80%) of the population lives in rural areas and most of these have no access to all-weather roads; the Rural Accessibility Index (RAI), which expresses the percentage of the rural population living within two kilometres of an all-season road, is estimated at 5% for the whole Sudan.⁷⁵ This clearly indicates a substantial road infrastructure deficit in the country, both in terms of quantity and quality.

7.2.2 Institutional Arrangements

The Southern Sudan Roads Authority Provisional Order, 2011, which came into force on 7th January, 2011, established the Southern Sudan Roads Authority (SSRA), an autonomous corporate body responsible for the management, development, rehabilitation and maintenance of all interstate and international roads, and the development of roads in war-affected areas in South Sudan. The functions and duties of the SSRA include development planning, construction, maintenance and preparation of annual road work programs. In addition, the Authority shall ensure adherence by motorists to the rules and guidelines on axle load control, and the quality of works in accordance with the standards in force. It will also monitor and evaluate the use of roads under its control

and collect all related data as may be necessary for efficient planning.

The Governing Structures of the SSRA are the Board and the Executive Management. Upon recommendation, the Board members are appointed by a resolution of the Council of Ministers. The Board comprises:

- The Undersecretaries, or their representatives of the Ministries for (a) Transport and Roads, (b) Environment, (c) Finance and Economic Planning, (d) Commerce and Industry, and (e) Regional Cooperation
- The Executive Director of the SSRA
- Six other persons from civil society associations. One of the members of the Board is appointed by the Minister of Transport and Roads as a Chairperson.

The mandate of the Board is to oversee the general direction and supervision of the Authority. The Board also establishes rules and procedures for appointment, promotion, termination, discipline and terms and conditions of service of staff and approves projects and programs proposed by committees and/or directorates. And finally it proposes and manages budget allocations, monitors and evaluates, through technical and financial audits, the delivery of goods, works and services, and monitors road transport, traffic and safety management.

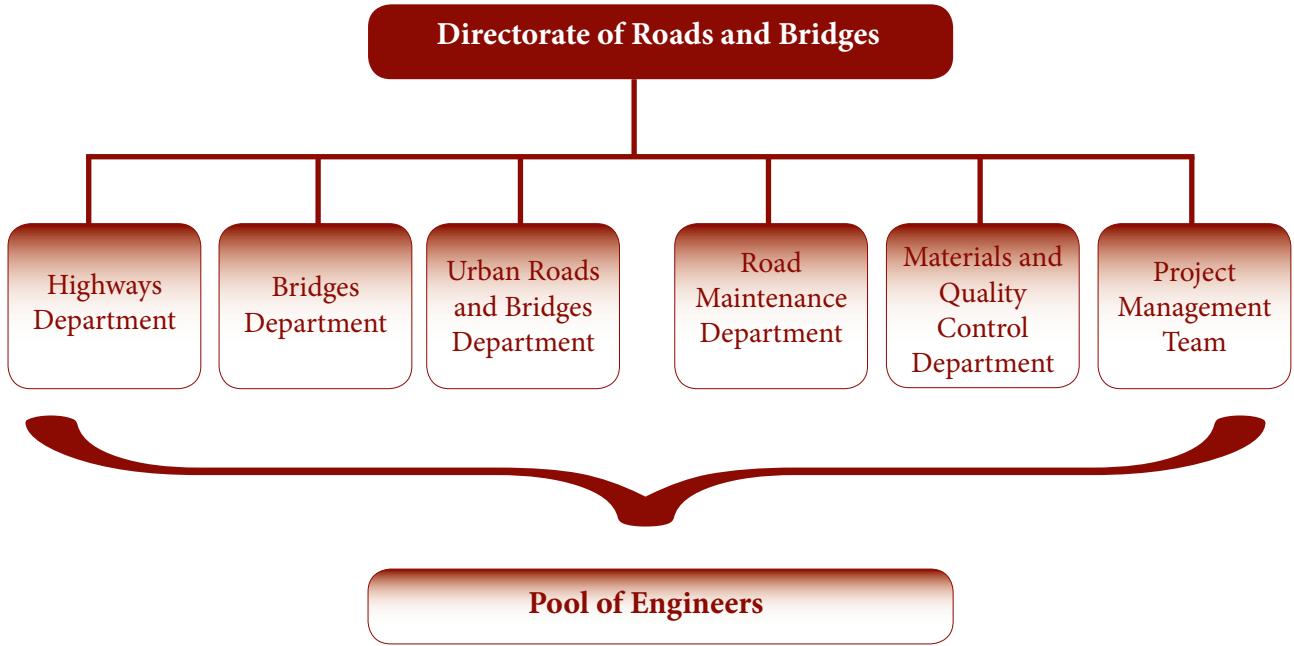
The Executive Management is the primary implementing authority in charge of the daily transactions and operations of the SSRA. It is headed by the Executive Director (ED) who reports to the Board. The ED has administrative, financial and technical powers to manage the Authority,

including but not limited to:

- Developing the operating plan to achieve its objectives;
- Developing an economic, efficient and cost effective internal management structure;
- Designing the organizational chart and internal policies and procedures;
- Appointing staff;
- Drafting policies and framework documents of the Authority;
- Overseeing the use of the funds; and
- Proposing and implementing SSRA’s strategic, business and annual plans.

The SSRA will develop a Road Investment Program (RIP), containing both development and maintenance priorities and submit it to the Minister who shall present it for approval to the Council of Ministers. Notably, annual budgets and work programs shall be based on the RIP. Activities outside these approved work programs will only be undertaken with the concurrence of the Board and approval of the Minister.

The establishment of the SSRA is an important milestone in the implementation of the Transport Sector Policy. Pending the start-up of operations by the SSRA, its functions and responsibilities are handled by the Directorate of Roads and Bridges. The organizational structure of the Directorate is shown below:



⁷⁴ Double Bituminous Surface Treatment
⁷⁵ Robin Carruthers, Ranga Rajan Krishnamani and Siobhan Murray (update August 2010), “Improving Connectivity: Investing in Transport Infrastructure in Sub-Saharan Africa.” AICD Background Paper 7 (phase II), World Bank, Washington DC,

The Directorate has limited capacity both in terms of numbers and skills. Seven Managers, including the Director General, a Director, three Deputy Directors, and two Chief Engineers, are heading the Directorate and its units. Around five engineers are attached to the departments/units and over 20 Engineers or holders of certificates/diplomas from tertiary education programs are regrouped in a pool and solicited by the units according to their workload. Having said that, over half of these engineers and technicians need to be closely supervised in the course of their duties.

7.2.3 Road Transport Services

Buses and taxis provide urban transport services. Usually, urban transport services are provided by privately owned minivans and motorbikes taxis called boda-boda. There are also sedan car taxis, but they are not commonly used. Interstate and international transport is provided by coaches operated by about a dozen bus companies.

Transport costs in the country are high (Table 7.3). Freight tariffs on trunk roads reach \$0.20 per ton km, roughly three and four times the average tariff of Eastern Africa and Southern Africa countries respectively. The poor infrastructure in the country also increases travel times, this coupled with a significant reduction of loads on several trucks for safety reasons substantially raises the transport costs per ton in South Sudan. As articulated in the South

Sudan Development Plan (SSDP) 2011-2013, “widespread official and unofficial road checkpoints collecting taxes, fees and charges are also a big disincentive to deliver the products to the markets. This increase in costs inhibits investment and renewed growth.”

Additionally, uncertain security situations and the asymmetrical trading patterns between South Sudan and its neighbours’ means that trucks usually return empty from South Sudan and this significantly increases the freight cost per ton. Again at a national level, the poor and inadequate intra-state road network in South Sudan makes domestic transport costs much higher than those in the neighbouring countries. For example the freight rate from Yei to Juba can reach 65 US cents per ton km and as much as 85 US cents per ton km from Malakal to Juba. Compared to the domestic freight rates of about 15-20 US cents per ton km on primary roads in Uganda and Kenya, South Sudan rates are too high.

The recent improvements of roads linking South Sudan to Uganda and Kenya have led to an upsurge in commercial freight traffic using heavily loaded trailers. The lack of effective weighbridge operations on roads to monitor the weights of the trucks is causing rapid deterioration of the upgraded infrastructure in Southern Sudan. To address this, the Government is constructing two weighbridges along Juba-Nimule road and it is also in the process of drafting the traffic act which will guide the traffic control and management in the country.

Table 7.3: Comparison of Freight Rates and Road Condition for South Sudan with Other African Countries

Indicator	South Sudan	Sudan	West African Corridor	Central African Corridor	East African Corridor	Southern African Corridor
Freight tariff (US cents per ton km)	20.0	8.0-10.0	8.0	13.0	7.0	5.0
Roads in good condition (%)	5	26	72	49	82	100

Source: World Bank (2011a).

7.2.4 Vehicle Fleets and Road Safety

The Directorate of Road Transport and Safety is responsible for the implementation of the road transport, traffic management and road safety policy. Its functions and powers include: (i) registration of vehicles and issuance of licenses and permits pursuant to the laws of South Sudan; (ii) establishment of the standards for vehicles so as to comply with road safety standards; (iii) conducting road safety education and sensitization; and (iv) coordination of road safety programs. Presently, this Directorate lacks

the human capacity and financial resources to fulfil its mandate.

The Ministry of Transport registers and issues licences for the Central Government, Non-governmental Organization (NGOs), Aid Agencies and diplomatic missions’ vehicles. While the State Traffic Police register vehicles and issue licenses for the State Government, Private and Commercial vehicles.

According to a feasibility study carried out, the Average Daily Traffic (ADT) was below 20 for most rural roads

surveyed in 2009.⁷⁶ However, the Juba-Yei-Kaya road connecting to Uganda, the ADT was approximately 800 vehicles in 2008 and projected to reach 1,600 in 2016 and 4,000 in 2026. The Juba–Gumbo-Torit-Nadapal linking to

Kenya, the average figure was slightly lower, 700 in 2008, but with much higher growth projections i.e. 2,300 in 2016 and 5,100 in 2026.

Table 7.4: Road Accidents and Fatalities in Juba

Indicator	2005	2006	2007	2008	2009	2010
Number of accidents	960	1 073	1 100	1 200	1 304	1 404
Number of deaths	35	40	65	76	86	92
Accidents per 100 000 people	587	429	406	421	414	407
Deaths per 100 000 people	21	16	24	27	27	27
Memo item:						
Juba population (mid-year ‘000)	163.4	250.0	270.8	285.0	315.0	345.0

Source: Annex Table 1.3; safety statistics, Directorate of Road Transport and Safety

Available information indicates a significant increase in accidents and casualties on some upgraded roads such as the Juba-Nimule route. This worrying trend is confirmed by the available statistics for Juba, as reported in Table 7.4. Fatalities are running at about 27 per 100,000 people. From 2007 to 2010, crashes and fatalities increased by an average of respectively 9% and 12% per year. Besides, 47% of the drivers who caused an accident in March 2010 had no driving licenses; this issue is linked to the high illiteracy levels and the weak enforcement of the traffic regulations in the country. These alarming figures call for urgent action to enhance road safety by: (i) building safety concerns into road design; (ii) enforcing periodic vehicle inspections; and (iii) launching specific initiatives targeting drivers aimed at improving their training programs.

In the meantime, an interim Road Safety Management Committee (RSMC) was set up in 2011 to: (i) establish road safety standards and a data bank for road traffic accidents in South Sudan; (ii) prepare necessary legislation for the establishment of Road Safety Council, consisting of stakeholders; (iii) formulate a comprehensive Road Safety Program (RSP) in close coordination with stakeholders;

and (iv) establish an effective monitoring and evaluation mechanism.

7.2.5 Road Construction Costs

Road construction costs in South Sudan are among the highest on the continent (see Table 7.5). While the average unit cost for a paved standard two lane road is less than US\$ 0.5 million per km in most African countries, it exceeds US\$ 0.9 million per km as reflected in recent road works in South Sudan. Indeed, the engineer’s cost estimate for an AC standard was at \$1.6 million per km for the planned Juba-Yei-Kaya, connecting to Uganda and \$1.2 million for Juba-Torit-Nadapal linking to Kenya. The main factors driving up the costs are: (i) inelastic supply in a post-conflict economy due to a limited supply base for construction work; (ii) large costs associated with import of construction materials; (iii) overhaul costs due to lack of or limited local borrow materials; (iv) limited availability and cost of skilled and unskilled labour; (v) very poor condition of existing roads; (vi) a long rainy season with heavy rainfall; and (vii) insecurity and cost of mine-clearing operations in some areas.⁷⁷

76 Africon and BKS (September 2010). “Feasibility Studies for the Phased Rehabilitation of about 7,000 km of Rural Roads in Southern Sudan – Final Development Plan”
77 On this last point, up to April 2010, 30.8 sq. km were cleared of mines and around 3,240 km of roads were verified. But a report of the United Nations Mine Action Office (UNMAO) dated June 2, 2011 deplores re-mining operations in Unity State that would be associated with militia rebels actions in conflict areas. It also reports several injuries and deaths due to explosion of landmines on roads from March to June 2011.

Item No	Road Type	Cost (\$/km)	Remarks
1	Paved/asphalt road (two lane)	1 100 000 to 1 300 000	Lower margin for DBST
2	Gravel road (two lane) – gravel road with seal or stabilized	350 000 to 400 000	For staged upgrading of roads to paved road
3	Gravel road (two lane)	170 000 to 250 000	Lower margin applies to tertiary/feeder roads – Class A feeder roads designed for 50 vehicles per day, with adequate drainage structures and pavement
4	Class B feeder roads	100 000	Class B for 30 vehicles per day or less, with critical drainage structures, basic surfacing and variable road width. Cost may vary depending on terrain and natural soil type
5	Class C feeder roads	50 000	Class C for 10 vehicles per day or less, with minor provision of drainage, mainly drifts, and spot improvement along an engineered road alignment. Cost may vary depending on terrain and natural soil type
6	Road maintenance	30 000	Including spot improvement and repair works. In the case of routine maintenance, cost may go down to \$10 000 – 15 000

Source: World Bank Staff

Recent studies indicate that the average unit costs for the upgrading to paved standard of the two international roads are US\$1.2 million per km for Juba-Torit-Nadapal and \$1.6 million per km for Juba-Yei-Kaya. To construct or upgrade urban roads to paved standard will cost on the average US\$2.6 million per km for Juba and US\$1.2

million per km for the other towns.⁷⁹ To upgrade interstate and urban roads to all-weather condition costs on average of US\$ 0.2 million per km and US\$0.16 million per km for the rural roads. For comparison, outcomes of a recent African Development Bank (ADB) study are given in Table 7.6.⁸⁰

Table 7.6: Summary of Unit Rate Statistics for Different Types of Road Investment (\$/lane km at 2006 constant prices)

Types of Road Infrastructure Investment	Periodic Maintenance of Unpaved Roads	Periodic Maintenance of Paved Roads	Rehabitation of Paved Roads	Construction and Upgrading of Paved Roads
<100 lane km				
Quartile 3	10 500	N/A	290 000	425 400
Median	9 600	N/A	180 300	227 800
Quartile 1	8 100	N/A	109 800	166 300

79 Juba Urban Transport Infrastructure and Capacity Development Study in the Southern Sudan

80 Study on Infrastructure Costs: Analysis of Unit Cost and Cost Over-runs in Road Infrastructure Projects in Africa

Types of Road Infrastructure Investment	Periodic Maintenance of Unpaved Roads	Periodic Maintenance of Paved Roads	Rehabitation of Paved Roads	Construction and Upgrading of Paved Roads
>100 lane km				
Quartile 3	12 800	72 200	130 500	162 000
Median	11 300	64 600	84 400	147 100
Quartile 1	9 600	56 900	47 400	115 900

Note: All values are given in 2006 USD

The high construction costs are a great concern to the Government and donor community. Therefore the Government has undertaken a number of initiatives to address it and these measures include the adoption of road standards and specifications, and the design manuals of Ethiopia and awarding public contracts in accordance with the Interim Public Procurement and Disposal Regulations published in 2006--despite the weak enforcement.

The country has limited local capacity to provide consulting services, and as a consequence most of the road works contracts are awarded to international firms. To promote the involvement of local contractors, the Government in collaboration with development partners has initiated pilot labour-based maintenance projects. Through these projects, potential small entrepreneurs from each state were selected and trained in labour-based works. After the training, around 30 entrepreneurs under the supervision of qualified technicians were awarded contracts to maintain or open up more than 800km of roads. The results were quite mixed, but the overall performance was satisfactory.

Moving forward, with deeper regional integration it is anticipated that the high construction costs in South Sudan will reduce in the medium-term. The removal of the customs barriers and free movement of people and goods will also foster the country’s access to more dynamic and competitive markets and in so doing enable South Sudan to access lower commodity prices.

The implementation of the Short Term Program (STP) should also yield some outcomes. Particularly, regional and national connectivity improvement should drastically reduce Vehicle Operating Costs (VOC) and travel time, facilitate transit transportation and remove significant non tariff barriers along the roads. This would significantly reduce the transportation costs. This coupled with improved security and a competitive environment should lead to a significant reduction in construction costs.

In this context, with the exception of Juba, the average unit costs are estimated at US\$1 million, US\$0.8 million and

US\$0.6 million per km for the construction/upgrading to paved standard of urban, international and interstate roads respectively. In Juba, urban road development follows the recommendations of the Master Plan study which proposes an average unit cost of US\$4 million per km for arterials and collectors. Again, in Juba the proposed costs for the construction or upgrading roads to all-weather conditions are US\$0.2 million per km for interstate roads, 0.18 million per km for primary roads and US\$0.15 million per km for rural roads.

7.2.6 Overview of Proposed Program for Road Transport

The proposed Action Plan for the road transport sector includes a Short Term Program (STP) for 2011-2015, with specific details and a longer-term program for 2016-2020 that is more general. During the STP, a master plan for the roads sub-sector will be drafted and feasibility studies undertaken to provide information for the design and implementation of the proposed program for the longer-term.

This report has also attempted to provide an evaluation of the medium to long term investment needs in the sub-sector. At this stage, the usual transport demand models, which are very data-intensive, are not suitable. A connectivity approach has been adopted in seeking to identify key geographic and demographic features of the country and determine the transport infrastructure needed to connect these features which are of international interest, like capital cities, deep-water ports, and international borders that provide connectivity across the entire region, and others of national interest such as state capitals and large towns. This approach also considers the population distribution and the productive agricultural land which will be affected by this national road network that will link regions and cities in South Sudan. Because of information gaps, proposals for longer-term are based primarily on rough estimates by the authors using a mix of connectivity and benchmarking approaches.

Table 7.7: Summary of Proposed Road Improvement Program

Road category	Total network			Proposed upgrades		
	2011	2015	2020	2012-2015	2016-2020	Beyond 2020
National trunk roads						
Interstate trunk roads						
Paved	193	783	4 158	590	3 375	365
All-weather standard	4 091	4 946	3 211	855	1 640	
Seasonal road	3 085	1 640	-			
Total	7 369	7 369	7 369	1 445	5 015	365
State primary roads						
Paved	-	-	-	-	-	
All-weather standard	-	-	1 451		1 451	
Seasonal	1 451	1 451	-			
Total	1 451	1 451	1 451	-	1 451	-
Secondary roads						
All -weather standard	-	1 000	3 822	1 000	2 822	
Seasonal road	3 822	2 822	-			
Total	3 822	3 822	3 822	1 000	2 822	-
Tertiary roads						
All -weather standard	-	1 000	2 178	1 000	1 178	123
Seasonal road						
Total				1 000	1 178	123
Urban road network						
Paved	70	270	510	200	240	
All-weather standard				100	200	
Seasonal road						
Total				300	440	-
Total program						
Paved	263	1 053	4 668	790	3 615	365
All-weather standard				2 955	7 291	123
Seasonal				-	-	-
Total				3 745	10 906	488
Memo items:						
Primary network paved (%)	2.2	8.9	47.1			
Primary network AWS (%)	46.4	56.1	52.9			
Urban network paved (%)						
Rural network AWS (%)						

Source: Directorate of Roads and Bridges and estimates by authors.

Of course, proposals, such as Juba Urban Transport Development and Airport Development master plans, were given due consideration during the preparation of these long term programs. The proposals in the South Sudan Development Plan (SSDP) were also reviewed carefully.

“Expanded and improved road transport infrastructure” is one of the top five priority program areas for the Economic Development pillar of the SSDP. The activities listed in the pillar matrices under this program area are included in the proposed STP. Drawing lessons from the performance

of the on-going Juba-Nimule project which is currently facing major cost overrun and a considerable delay. This report has significant differences in the cost estimates used as compared to those in the SSDP.⁸¹ For example, for the construction to paved standard of two interstate roads, Juba-Kaya and Juba-Nadapal, the STP estimates derived from the related design studies are 65% higher than those of SSDP. The related implementation period spans around four years, including lead time for procurement, instead of two in the SSDP. In this regard, Table 7.7 provides a summary of the proposed improvement programs for the roads sub-sector during 2011-2020. The STP proposes to upgrade a total of 3,745 km of roads during 2012-2015. These will include 590 km and 855 km of trunk roads to paved and all-weather standards respectively. It will also upgrade 1,000 km of secondary and 1,000 km of tertiary roads to all-weather standards, thus improving the quality of 2,000 km of rural roads by 2015. And finally, it will also upgrade 300 km of urban roads.

The program for the medium-term (2016-2020) will upgrade a total of 10,906 km of roads, including paving 3,615 km of trunk and urban roads, and converting 7,291 km of road to all-weather standard. Implementation of this program will bring the entire national trunk road network to paved and or all-weather standard by 2020. It will also improve to all-weather standard a total of 4,000 km of rural roads, thereby bringing the total improved rural road network to 6,000 km by 2020. A further 440 km of urban roads will also be improved.

7.2.7 Improving Regional Connectivity

The proposed strategy in this report aims at improving regional connectivity by establishing a road network that links cities, national capitals, international land borders and deep water sea ports. Given that South Sudan is

landlocked, this connectivity will be of strategic importance and will improve access to local, regional and international markets and boost regional trade. Additionally, improved level of service on the existing regional infrastructure will translate into significant declines in the very high transport costs and in turn will reduce the high construction costs, high food prices and high living costs. The proposed links will improve access to Mombasa, Djibouti and Port Sudan and in the long-term facilitate the access to the Atlantic Ocean.

This report also proposes that the improvements in the primary road network are phased to eventually bring them to paved standard. The phases will depend on the standard and condition of existing road, volume of traffic and trade with neighbouring countries, and the potential agricultural production in a given area, as identified in Chapter 6.

Improving regional connectivity in the short-term. Firstly, two all-weather gravel roads in the Central Equatoria State (CES) and Eastern Equatoria State (EES) measuring a 590 km will be upgraded to paved standard (see Table 7.8). So far, feasibility and design studies for both roads have been completed and confirm the high economic interest of the related projects with an Economic Internal Rate of Return of 20% and 22% respectively. The project will include the installation of weighbridges and improvement of transport facilitation measures through promotion of one-stop border posts and removal of multiple checkpoints along the roads. As well as the construction of 9 km of urban roads in Torit and Kapoeta and 23 km of ring road in Yei.

During this phase, it will be strategically important to improve the connectivity to Ethiopia and Djibouti port. To do so, it will be a priority for South Sudan to upgrade to paved standard the Juba-Torit-Kapoeta-Nadapal route which will open up the country in both directions to Kenya to access Mombasa and Port Lamu; and through Kapoeta-Boma to Ethiopia/Djibouti. The estimated cost of this project is \$815 million at 2010 constant prices.

Table 7.8: Regional Connectivity - Upgrading to Paved Standard

Road Details	Length (km)	Location	Cost (\$ million)	Completion date	Remarks
Juba-Torit-					
Kapoeta-Nadapal	345	CES-EES	420	2015	Link to Kenya and Ethiopia/Djibouti
Juba-Yei-Kaya	245	CES-EES	395	2016	Link to Uganda and Mombasa
Total	590		815		

Note: All values are given in 2006 USD

81 The SSDP anticipated these type of issues as it noted that “many of the costing requires refining.”

Secondly, feasibility and design studies will be undertaken in preparation for the subsequent upgrade of a total of 965 km of all-weather gravel roads in Upper Nile State (UNS), Jonglei State (JS), Central Equatoria State, Warrap State

(WS) and Western Bahr el Ghazal (WBGs) to bitumen standards (Table 7.9). The cost of this project is estimated at \$7.7 million.

Table 7.9: Regional Connectivity - Feasibility Study and Design to Paved Standard

Roads Details	Length (km)	Location	Current Road Condition	Cost (\$ million)	Completion date	Remarks
Malakal-Jikou	270	UNS	All Weather Gravel Road	2.2	2014	Link to Ethiopia and Djibouti
Malakal-El Renk	300	UNS	All Weather Gravel Road	2.4	2014	Link to Sudan
Wau-Gogrial-Abyei	225	WBGs-WS	All Weather Gravel Road	1.8	2015	Link to Sudan
Kapoeta-Borma	170	EES-JS	Seasonal Road	1.4	2016	Link to Ethiopia and Djibouti
Total	965			7.7		

Source: Directorate of Roads and Bridges and Consultant's Estimates

Table 7.10: Regional Connectivity - Upgrading to All-Weather Condition

Roads Details	Length (km)	Location	Current Road Condition	Cost (\$ million)	Completion date	Remarks
Kapoeta-Borma	170	EES-JS	Seasonal Road	34	2014	Link to Ethiopia and Djibouti
Yei-New Lasu	45	CES	Seasonal Road	9	2014	Link to Democratic Republic of Congo
Juba-Kajo Keji	120	CES	Seasonal Road	24	2014	Link to Uganda
Raja-Boro-Madina	200	WBGs	Seasonal Road	40	2015	Link to Chad and Sudan
Total	535			107		

Source: Directorate of Roads and Bridges and Consultant's Estimates

Thirdly, the regional network which comprises some 535 km of roads in Eastern Equatoria State, Jonglei State,⁸² Central Equatoria State and Western Bahr el Ghazal State will be upgraded to all-weather gravel standard in the short-term (see Table 7.10). The cost of this project is estimated at \$107 million.

The total cost of the proposed project to upgrade the regional network to paved standard or all-weather standard is estimated at \$929.7 million. The total length of roads in the regional network improved will be 1,125 km. Also at this stage, detailed feasibility studies to upgrade an additional 965 km to paved standard in the medium-term will be finalized.

Improving regional connectivity in the medium-term. The proposed program for the medium-term (2016-2020) will comprise road works which will be based on the feasibility and design studies carried out under the STP and subsequent studies during the medium term to bring regional links to paved standard after 2020 and these will include:

- Upgrading to paved standard of 965 km of roads at a cost of \$772 million; and
- Completion of feasibility studies and design of 365 km regional road network to paved standard including: (i) Yei-New Lasu (45 km) linking to DR Congo; (ii) Juba-

Kajo Keji (120 km) linking to Uganda; and (iii) Raja-Boro Madina (200 km) linking to Chad. The estimated total cost of the studies is \$ 2.2 million.

7.2.8 Improving National Connectivity

Majority of the interstate or primary roads in South Sudan connect to densely populated areas and provide access to

health and education services as well as facilitate economic activities. These roads are experiencing a rapid increase in traffic volumes. This component of the proposed program targets such road infrastructure and it intends to upgrade paved roads to bitumen standard.

Improving national connectivity in the short-term. In the short-term program, 320 km of seasonal gravel or earth roads will be upgraded to all-weather gravel condition (Table 7.11).

Table 7.11: National Connectivity - Upgrading to All-Weather Condition

Roads Details	Length (km)	Location	Current Road Condition	Cost (\$ million)	Completion date	Remarks
Yei-Farak Sika Mambe	160	CES-WES	Seasonal Road	32	2015	Connect WES and CES
Mogiri-Lafon-Chalamni	160	CES-EES	Seasonal Road	32	2015	Minerals and Agricultural Potential
Total	320			64		

Source: Directorate of Roads and Bridges and Consultant's Estimates

Feasibility and design studies will be undertaken to assess the viability of upgrading the remaining 2,410 km of roads linking state capitals from all-weather gravel roads to bitumen. The Bor-Malakal link is a major concern, because this section of the northern corridor linking Juba to Malakal is located in the Sudd with black cotton soils unsuitable for road construction. It will therefore

be imperative to conduct a pre-feasibility study that will determine the characteristics of the transport demands on this route and propose optimal solutions to meet these demands, considering all transport modes. The cost of this study is estimated at \$0.5 million and the entire cost of all the studies to upgrade the national connectivity is estimated at \$19.3 million.

Table 7.12: National Connectivity - Feasibility Study and Design to Paved Standard

Roads Details	Length (km)	Location	Cost (\$ million)	Completion date	Remarks
Juba-Mundri-Rumbek-Tonj-Wau	650	CES-WES-LS-WS-WBGs	5.2	2014	Link state capitals with Juba
Mundri-Yambio-Tambura-Wau	710	WES-WBGs	5.7	2015	Link state capitals with Juba
Juba-Bor	180	CES-JS	1.4	2014	Link state capitals with Juba
Juba-Terekeka-Rumbek	450	CES-LS	3.6	2015	Link state capitals with Juba
Rumbek-Maper-Bentui	270	LS-US	2.2	2014	Link state capitals
Wau-Aweil	150	NBGs-WBGs	1.2	2014	Link state capitals
Total	2 410		19.3		

Source: Directorate of Roads and Bridges and Consultant's Estimates

82 Kapoeta-Boma, which is currently a seasonal road, would first be upgraded to all weather standard and then the subject of studies to paved standard

The STP proposes an upgrade of a total of 2,730 km of national road network with an estimated total cost of US\$83.3 million, excluding maintenance costs. Periodic maintenance will also be undertaken on roads rehabilitated or upgraded to all-weather condition.

Improving national connectivity in the medium-term. Basing on the studies carried out during the STP period, an estimated 2,410 km of interstate roads linking state capitals will be upgraded to paved standard over this period (2016-2020). Together with the proposed regional connectivity program this will mean that with the exception of urban areas, the country would have upgraded a total of 4,158 km to primary paved road network by 2020. The remaining 3,091 km of interstate and primary roads will also be brought to at least all-weather gravel road condition during 2016-2020 period.

This will essentially result into a road density by population of around 290 km/million which is still well below the prevailing Sub-Saharan African average of 533 km/million people (See Table 7.1). Cumulatively, the total cost for this national connectivity program is estimated at \$2.046 billion, with \$1.446 billion and \$600 million allocated to the construct roads to paved standard and to all-season gravel conditions respectively.

7.2.9 A Program to Strengthen Rural Connectivity

For the purposes of this Report, rural roads refer to the existing secondary and tertiary roads of South Sudan. Currently, the rural road network is roughly 6,123 km and these connect rural communities to the network of trunk roads. These rural roads are meant to open up rural areas and connect farmers and rural communities to markets to facilitate the flow of agricultural inputs/outputs and provide access to basic services. However, in the recent past, minor improvements have been undertaken through labour-based contract works and the vast majority of traceable rural roads are in very poor condition.

Improving rural connectivity in the short-term. The country needs to develop a rural road network. Between 2009 and 2010, feasibility studies and design of about 7,000 km of rural roads were carried out culminating in the submission of a related Final Development Plan Report (FDPR) in September 2010. Furthermore, the five-year prioritized program to improve rural connectivity also includes some trunk roads which are already part of the STP. The FDPR selection and prioritization is based on a

combined economic evaluation (EIRR and NPV) and a multi-criteria assessment (MCA) that was based on the following scale: (i) level of agricultural production; (ii) degree of regional integration; (iii) average daily traffic (iv) number of non-motorized traffic; and (v) level of cost effectiveness.⁸³

Subsequently, a Feeder Road Technical Committee (FRTC) chaired by the Under Secretary of the Ministry of Roads and Bridges (MoRB) and comprising representatives of development partners and relevant ministries was set up to develop the rural road network. The specific task of the committee is to: (i) liaise with stakeholders to obtain a list of proposed priority roads to develop at National and State level; (ii) design a criteria for selection and prioritization of roads to develop; (iii) produce a list of priority roads to develop; and (iv) develop technical standards and specifications, and implementation plans for the roads. A Feeder Road Steering Committee (FRSC), co-chaired by the Ministry of Agriculture and the MoRB approves the prioritization criteria and a list of priority roads. The outputs from the FRTC/FRSC work will serve as reference in aligning government and development partner interventions in the rural road network.

So far, priority lists submitted by states had a total length of 17,000 km of feeder roads. These lists are being reviewed and screened by the FRTC and below are the characteristics of priority areas: (i) high agricultural productivity, including livestock rearing and fisheries; (ii) ability to develop local capacity as well as have county/state agencies that will be trained in maintenance; (iii) less than 100 km from main truck; (iv) access to appropriate materials for construction such as water and gravel sources; (v) consistent and participatory support from local authorities and communities; and (vi) availability of dependable manual labour.

Clearly, a rural road recommended under the FDPR and validated through the FRTC/FRSC process will most likely qualify for the rural connectivity short-term program. Given the magnitude of the needs, development partners are likely to target roads or areas that have close linkages with their complementary initiatives to deepen synergies in the implementation of the program.

Considering implementation capacity limitations, this Report proposes an ambitious plan to upgrade 2,000 km of rural roads to all-weather status during 2011-2015. The related cost is estimated at US\$330 million. The assumption is that the experience gained from the short-term program will underpin the design and implementation of a much larger program to upgrade 4,000 km of rural roads to

all weather status during 2016-2020. The cost of this is estimated to be \$600 million (at 2010 constant prices and exchange rate). Once, the rural road improvement program of 6,000 km is implemented in the decade ahead it will essentially mean that entire rural road network of the country has been upgraded.

In the short-term, the livestock sub-sector is expected to significantly contribute towards the growth and prosperity of South Sudan.⁸⁴ Therefore priority livestock markets have been proposed as the major focus of the road sector strategy to allow the farmers' access the backbone infrastructure. These markets are located in ten areas, i.e. Greater Kapoeta region in EES; Nyirol and Pibor counties in JS; Nasir, Baliet and Renk in UNS; Panyinjar, Mayom and Leer in US; and Terekeka in CES.

7.2.10 Proposed Urban Road Program

The urban population in South Sudan was estimated at 16% in 2008 and is expected to increase steadily to 23% in 2015 and 26% in 2020. At the same time, urban transport infrastructure, including roads, is severely underdeveloped. With less than 70 km of paved urban roads, there are only about 35 meters of paved road per thousand residents in 2011, compared to an average of 128 metres in Sub-Saharan Africa's cities and 700 metres in the low-income countries of the developing world.⁸⁵

Upgrading program for the short-term. In collaboration with Japan, a Master Plan for Urban Transport Infrastructure was developed for Juba-- the business hub of South Sudan. This plan recognized Juba's rapid expansion and its critical contribution to the development of the country. The study identified the investment requirements to meet the present and future transport demands in Juba and South Sudan. The requirements amount to \$510 million for the first period of seven years (2009-2015). The related physical investment will comprise new construction and upgrading to AC standard of about 190 km of streets and a bridge of 560 metres over the Nile. The proposed investment for the 2012-2015 period will include new construction and upgrading to AC standard of about 100 km of urban roads including 20 km of arterial streets and 80 km of collector and local streets.

Going forward, urban transport infrastructure master plans will be developed for major towns, particularly those with a population close to or exceeding one hundred

thousand and these include Malakal, Wau, Aweil, Bor, and Yei (See Annex Table 3.1). Furthermore, 100 km of urban roads will be upgraded to all-weather condition and another 100 km will also be upgraded to paved standard in these major towns and the remaining state capitals. Roads that access river ports and airports will be among those upgraded.

The total cost of the urban connectivity during the STP is estimated at \$415 million, of this amount \$260 million will be used to extend and upgrade 100 km of urban roads in Juba to AC standard, \$140 million will finance the upgrade of 200 km of urban roads in state capitals and major centres, and \$15 million will support the development of urban transport infrastructure master plans for four major towns and two others state capitals.

Improving urban connectivity in the medium-term. The medium-term program will provide a continuation of the Juba urban road development program and will also support the implementation of the urban transport master plans. In the medium-term, an additional 140 km of paved roads and two bridges will be built in Juba to bring the total length of paved roads in Juba to about 300 km by 2020. The program proposes the construction of a total of 100 km of urban paved roads in the other main cities of the country and another 200 km of urban roads built to all-weather standard. The total cost of this program is estimated at \$1,250 million. Given that the total urban population projections of South Sudan are estimated to be 3.7 million in 2020, representing 26% of the total population, the implementation of this urban road program will translate into 135 metres of paved road per thousand residents, which is almost the same as the current level for Sub-Saharan African cities.

The total cost of the proposed urban connectivity medium-term program amounts to \$700 million, of this amount \$660 million will be used to construct urban roads to paved standard for and \$40 million to upgrade roads to all-weather road condition.

7.2.11 Institutional Development, Capacity Building and Technical Studies

Road safety enhancement. Technical support is required to assist the RSMC and the Directorate of Road Transport and Safety in the formulation and implementation of a

83 Cost effectiveness analysis (CEA) indicator is defined as the cost of upgrading a particular route divided by the number of people served by the route

84 OTF Group (March 2011), "Fostering Innovation and Competitiveness in Southern Sudan (FICSS) – Sector Growth Strategies". Prepared for Ministry of Commerce and Industry - GOSS
85 Robin Carruthers , Ranga Rajan Krishnamani and Siobhan Murray (2009), "Improving Connectivity: Investing in Transport Infrastructure in Sub-Saharan Africa." AICD Background Paper 7, World Bank, Washington DC, 2009.

comprehensive RSP. The RSP will include: (i) review and improvement of RTA management system; (ii) support to emergency services; (iii) support to law enforcement; (iv) support to vehicle inspection activities; (v) promotion of public awareness campaigns; (vi) support to specific programs targeting commercial vehicle drivers; and introduction of road safety education in schools. The plan estimates that it will cost \$6 million to develop and implement road safety programs. This will cover the cost of equipment, workshops, campaigns, surveys, trainings and technical assistance.

Capacity building and institutional support. The proposed program of capacity building and institutional support will support the following:

- *Technical assistance (TA).* This assistance will complement SSRA capacity to implement the STP as well as support the development of a road maintenance strategy. Essentially technical support will target government agencies to support the handling of the large volume of procurement and financial management. The TA will include procurement experts, financial analysts and civil engineers. Basing on the existing capacity in the Ministry of Roads and Bridges a total of 170 man-months of technical assistance will be required to implement the STP and it is estimated to cost \$4.3 million.
- *Training for ministry technical staff.* The current training of engineers and technicians from MoRB, MoPI and SSRA will continue and going forward, training in planning, contract administration, procurement management, geotechnical, structural and transportation engineering are being planned. This training component is estimated at \$3.5 million.
- *Support to create a road maintenance fund.* A study will be undertaken to prepare for the establishment and initial operation of a Road Maintenance Fund (RMF) and this is estimated to cost \$1 million.

These capacity building programs and technical support will continue in the medium-term, including road safety enhancement (\$5 million), technical assistance (\$5 million), and training (\$ 2.8 million).

Technical studies. A series of studies will be undertaken in the short-term to lay the foundations for expanded levels of support for development of road sector infrastructure and services in the medium- and longer-term. These will include the following:

- *National transport master plan.* The national master plan will provide input for the development of medium-to long-term strategy (MLTS) of the transport sector. A draft national transport master plan was completed in

January 2010; however, there was limited coverage of the requirements for the decade ahead. The new master plan for South Sudan will highlight the characteristics of transport demand; develop projections related to the most likely scenarios; and come up with efficient programs to meet the demand as well as propose a pragmatic and effective institutional framework for the sector.

- *Bor-Malakal link.* A pre-feasibility study will be undertaken to determine the characteristics of the transport requirements and recommend ways to meet the projected future demand along the Bor-Malakal corridor. This activity is estimated to cost \$ 0.5 million.
- *Urban transport master plan.* Urban transport infrastructure master plans will be developed for major towns and these plans are estimated cost to \$15 million.
- *Feasibility and design studies for road upgrades.* The plan proposes studies that will lay a foundation to upgrade 965 km of regional network to a pave standard and 2,410 km of national truck road network. The feasibility studies for regional network and national truck road network will cost \$ 7.7 million and 19.3 million respectively and are expected to be completed during 2012-2015 period.

Over the medium and longer term, the estimated costs of the feasibility and design studies to upgrade of 365 km of the regional trunk road network will be \$2.2 million and the other road related studies will roughly cost \$6.8 million.

7.2.12 Proposed Development Expenditures for Road Transport

Proposed expenditures. The proposed program for road infrastructure development in the decade ahead amounts to about \$6.2 billion. Capacity building and technical services account for about \$92 million, with capital outlays of road infrastructure accounting for the remaining \$6.1 billion. Of this amount ongoing government and donor programs account for about \$250 million, and it is proposed that the balance \$5.9 billion will be mobilized primarily from government and donor sources.

Sources of funding for the program. During 2009-2011, the average annual donor disbursements for roads programs were \$85 million, while Government annual capital outlays for road works amounted to about \$165 million. Therefore the average annual level of spending on roads infrastructure and related capacity building and technical

studies was \$250 million, meaning that the Government’s funding accounted for two-thirds of the cost. As Table 7.13 indicates that in 2012 annual disbursements will remain close to the average of the past three years, and thereafter will continue rise annually to reach a little over US\$500 million by 2015 and close to \$1, 030 million a year by 2020. Clearly, mobilizing the resources of such magnitude to finance the road sector is a massive challenge to the Government.

As discussions in Chapters 2 and 3 indicate, the working assumption used in this Report is that the donor community will allocate 25% of total ODA (excluding humanitarian

assistance) to the infrastructure program for the decade ahead. In recent years donors have been allocating 7% of their total ODA allocations for road sector infrastructure in South Sudan. The funding arrangement included in Table 7.13 calls for donors to increase their allocation to road infrastructure from 7% to 15% of total ODA by 2013. In this scenario, donors’ allocations for roads infrastructure will increase annually by \$20 million. However, the Government allocation for the roads program has to increase from the recent annual average of \$165 million to \$280 million by 2013 and roughly \$780 million by 2020. Meaning the Government will fund 68% of the proposed program which was close to its share in 2009-2011.

Table 7.13: Development Expenditure Program for the Roads Sector

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capacity building & technical services								
Road safety enhancement	-	-	2 000	2 000	1 000	1 000	1 000	11 000
Capacity building for Roads Authority	5 306	4 720	1 574	-	-	-	-	6 294
Capacity building for road maintenance	-	565	1 125	1 125	935	-	-	3 750
Support for road maintenance Fund	-	-	600	400	-	-	-	1 000
Training	-	-	700	1 000	1 000	800	500	6 300
Technical support	-	-	1 000	1 200	1 100	1 000	1 000	9 300
Nile bridge studies	340	650	329	-	-	-	-	979
Road studies & detailed design	-	-	4 000	10 000	7 000	6 000	-	29 200
Transport master plan	-	-	5 000	9 000	1 000	-	-	15 000
Total	5 646	5 935	16 328	24 725	12 035	8 800	2 500	82 823
Capital expenditures								
Ongoing government road programs	194 640	135 280	-	-	-	-	-	135 280
Ongoing donor road programs	62 080	52 615	50 598	5 000	3 255	-	-	111 468
Proposed new road programs								
Trunk roads	-	-	63 400	200 500	277 900	385 600	704 600	3 804 600
Rural roads	-	-	40 000	80 000	82 500	93 500	150 000	930 000
Urban roads	-	-	88 000	176 000	112 000	24 000	200 000	1 200 000
Sub-total	-	-	191 400	456 500	472 400	503 100	1 054 600	5 934 600
Total	256 720	187 895	241 998	461 500	475 655	503 100	1 054 600	6 181 348
Grand total	262 366	193 830	258 326	486 225	487 690	511 900	1 057 100	6 264 171
Financing arrangements								
Government	194 240	135 280	179 910	345 100	318 500	311 900	747 100	4 286 890
Donor community	68 126	58 550	78 416	141 125	169 190	200 000	310 000	1 977 281
Total	262 366	193 830	258 326	486 225	487 690	511 900	1 057 100	6 264 171
Government share of funding (%)	74.0	69.8	69.6	71.0	65.3	60.9	70.7	68.4

Source: Annex Tables 8.3 and 8.4.

7.2.13 Road Maintenance

Current status of road maintenance. Maintenance activities are currently financed through national budget and donor support. Most of these are handled sporadically without proper planning and coordination. There have been massive demands on the budget which in turn has kept the allocations at the minimum. The 2011 National Budget reported an outlay of about \$28 million and \$16 million for road maintenance in 2010 and 2011 respectively.

Proposed institutional arrangements for maintenance. South Sudan transport policy recognizes the critical importance of road maintenance and is aware of the need to establish a system that will ensure adequate and consistent funding for this activity. The policy also provides for the creation of a Road Maintenance Fund (RMF) which will raise revenues through user charges, primarily in the form of a fuel levy. RMF resources will finance road agencies’ activities, and these funds will be kept in separate and discrete accounts, and will be used exclusively for road maintenance activities. The study earlier mentioned of the RMF for the proposed program will address the following issues:

- Propose the fees of user charges and find other innovative ways of raising revenues for the fund;
- Design an appropriate system for charging and collecting the revenue;
- Formulate laws to guide the collection of the road user charges; and
- Investigate existing agreements and applicable rates within COMESA regional arrangements and the effects of applying specific rates for South Sudan.

Currently, the road network classification and inventory which is a prerequisite for an effective road maintenance strategy is incomplete and the implementation of the transport policy has also encountered some delays. The Ministry of Roads and Bridges, through the DRB and soon SSRA, is responsible for the planning and execution of maintenance of trunk and state roads and on the other hand MoPI is in charge of other roads.

The next steps. The expectation is that once the newly established SSRA is operational, the management of maintenance requirements will improve substantially. As articulated in its Provisional Order, the SSRA will first finalize the classification of public roads and draw up and budget for its annual and five-year maintenance plans. SSRA will also carry out a study on road user charges as well as champion the establishment of the RMF and prepare a road maintenance strategy. Over time, a Road Asset Management System (RAMS) will be put in place.

The DRB has prepared a document providing recommendations on the consistent and pragmatic road maintenance strategy. The paper proposes that the strategies deployed should be tailored to resources available, this has compelled the Ministry to undertake an in-depth evaluation of the practicalities of adopting the Output and Performance-based Roads Contracts (OPRC) model as the basis for the maintenance strategy for bitumen surfaced roads.

In this model, “the Contractor is not paid directly for inputs or physical works but for achieving specified outputs or service levels, i.e. the construction or rehabilitation of the road to pre-defined standards, followed by the maintenance of certain minimum service levels on the road throughout the period of the contract, all defined by outcomes expressed in the service level criteria.

Going forward, basing on the same model, the contracting of the design, construction and maintenance of new roads will be done at the same time. This will ensure that these roads are well looked after beyond the construction phase and largely guarantee a certain level of service. The paper further states that “community-based and labour-based methods for the maintenance of gravel roads will provide opportunities to local enterprises and in so doing lead to growth of the firms involved as well reduce the poverty in the country. Whilst this might not be applicable to all of South Sudan’s gravel roads it is suggested that the feasibility of implementing a system in which local residents actively participate on a regular basis in the maintenance of the roads in their communities will be worth investigating. Subject to further investigation, it is anticipated that regional depots with limited technical capabilities but strong labour-based capabilities will provide an optimum solution to the maintenance of gravel roads.

Proposed levels of spending on maintenance. The report proposes routine maintenance for roads in relatively good condition. Total maintenance expenditures are projected to be about \$960 million for the next decade. The total periodic road maintenance costs are estimated at \$500 million with annual outlays increasing steadily from \$20 million in 2012 to about \$110 million in 2020 as indicated in Table 7.14. Periodic maintenance is projected to be about \$460 million for 2012-2020, equivalent to an annual average of about \$50 million.

This report proposes that the maintenance expenditures will entirely be financed by the national budget and the RMF. Today’s budget allocation for road maintenance in 2011 is \$16 million, the Government will need to quadruple this amount in 2012 so that the roads are kept in good repair. To be able to carry out the same level road maintenance activities, the authorities will need to ensure the increases in the allocations are maintained at the same rate for the successive annual budgets until the RMF is

established and is operational. Having said that, potential RMF revenues are closely correlated with the vehicle fleet, including motor cycles, and road traffic densities, however the current projections indicate these resources are

unlikely to cover the full cost of maintenance in the short-term. Therefore, road maintenance will also be supported by a significant budgetary allocation during most of the IAP period.

Table 7.14: Road Maintenance Expenditures (In \$ at 2010 constant prices and exchange rate)

Category	Unit Cost (\$ '000)	2012		2015		2018		2020		2012-2020
		Length (km)	Cost (\$ million)	Length (km)	Cost (\$ million)	Length (km)	Cost (\$ million)	Length (km)	Cost (\$ million)	Cost (\$ million)
Routine Maintenance										
Interstate and primary roads										
Paved	12			193	23	590	7.1	1897	22.8	61
Gravel	10	1 591	15.9	3 001	30	3652	36.5	5839	58.4	322.4
Rural Roads										
Gravel	5			750	3.8	2100	10.5	3570	17.9	61.5
Urban Roads										
Paved	15	70	11	180	2.7	306	4.6	367	5.5	28.4
Gravel	10	133	1.3	233	2.3	299	3	353	3.5	21.7
Total Routine Maintenance			18.3		41.1		61.7		108	495
Periodic Maintenance										
Interstate and primary roads										
Paved	150					193	29			
Gravel	25	1831	45.8	1831	45.8	2099	52.5	1020	22.5	353.3
Rural Roads										
Gravel	20					500	10	550	11	36
Urban Roads										
Paved	200							30	6	20
Gravel	30	67	2	67	2	67	2	97	2.9	21.9
Total Periodic Maintenance			47.8		47.8		93.4		45.4	460.2
Total Maintenance Expenditures			66.1		88.9		155.1		153.4	955.2

Source: Directorate of Road and Bridges; Consultant estimates

7.3 River Transport and Infrastructure

7.3.1 The Current Situation

River corridors. As noted in Chapter 5, the White Nile extends from Lake Victoria to Khartoum for nearly 3,700 km. It enters South Sudan at Nimule, flows to Juba and Bor and through the vast swamps of the Sudd, and passes major towns such as Malakal, El Renk and Kosti. The section of the White Nile between Juba, El Renk and border with Sudan is navigable and it is about 1,300 km long. The Bahr el Ghazal River is a tributary of the White Nile. It is navigable all year round from the main route where it joins the White Nile to Meshra Achol and for more than half of the year to Wau. The Sobat River, another tributary, is navigable between Malakal and Abwong all year round. Its stretch from Abwong to Nasir, Akobo and Pibor is navigable for more than six months of the year. The Sobat area and indeed most of the flood-prone areas of Upper Nile Region depend on river transport from June to October during the year

The navigable part of White Nile and its tributaries crosses six of the ten states of South Sudan. Given the poor road infrastructure, presence of land mines in some areas and huge swampy areas makes river transport a practical and cost effective option to reach communities along the White Nile and its tributaries. It specifically links Malakal the capital of the Upper Nile State to Juba.

Commercial river transport services are fairly regular on the route known as the “Southern reach” of the White Nile, which stretches from Kosti to Juba (1,436 km), through El Renk, Malakal, Shambe, Diam Diam, Bor and Mongala. The water level slope between Juba and Bor is relatively steep and here the river flow velocities range between 2 to 3 metres per second. Between Malakal and Kosti, water level slopes are very mild and the flow velocity of the river is very low, ranging between 0.5 to 0.7 metres per second.

Inadequate navigations aids and poor river conditions are significant impediments to effective development of river transport. The number of buoys and navigation sign boards installed along the river is insignificant. During navigation, the operators rely on their knowledge of the river physical features to avoid accidents.

On a positive note, companies are increasingly using new technologies, such as Global Positioning System (GPS), satellite phones and high frequency radios to track barge movements. However, there are still major difficulties to pass through areas with rocks, sharp bends and flood plains. The main obstacle is the narrow section with sharp bends between Mongala and Juba. Other major obstacles

along the river include unmarked rocks, wrecks, silt build-ups, shoals, water hyacinth growth, and siltation especially near ports. Risks are higher when the water level is low.

River ports. There are seven main river ports in South Sudan located in El Renk, Malakal, Shambe, Diam Diam, Bor, Mongala and Juba (see Map 7.3). With the support from Japan, South Sudan has constructed a jetty, offices for port officials and open air storage facilities in Juba Embankment Port. The jetty has a gantry crane arm with a 2.5 tonne metric capacity. A shipyard has been built at the Old Juba Port location which was formerly abandoned because of siltation problems. Dredging works will be undertaken to facilitate access of the shipyard. Finally, in collaboration with the Japanese a Juba River Port Expansion Project has been launched and it will transform the Port into a modern well equipped facility with an extended jetty, warehouses and administrative buildings. Currently, Stevedores’ Union has the monopoly to load and offload cargo. Since it is the sole provider it charges high rates and it usually undertakes the activities manually and on average manages to only loading/off loading four barges per day. Occasionally, mobile mechanical lifting equipment is availed on demand. The lack of storage facilities means that fuel is pumped directly from the barges to the waiting tankers. The Port area is also used as a staging point for IDPs returning to the South, en route to their final destination.

New river ports have recently been built in Mongala, Diam Diam and Shambe. The facilities constructed include a jetty, a gantry crane arm and offices. Shambe port is particularly important as it enables access to the Lakes, Warrap and Unity States. Because of the narrow and winding section between Mongala and Juba, pusher convoys are usually dismantled in Mongala. The river port in Bor consists of a natural embankment for offloading fuel and general cargoes. Bor has also privately owned storage facilities. Independent vendors offering mechanized lifting equipment are occasionally available.

Malakal is a primary transit point between Kosti and Juba. It is served by smaller boats that can access the White Nile tributaries. All major private operators call at Malakal to offload fuel, building materials and general cargoes. The port has silt free a pier of about 300 metres. Cargo handling is mostly done manually by private porters. Mobile mechanized lifting equipment can be acquired on demand. Loading/offloading capacity is around 3 barges per day. Fuel is discharged at a privately-owned depot with a storage capacity of 60,000 litres of diesel and 60,000 litres of petrol.

El Renk was known as a loading facility for Dura. Currently majority of private operators also call at El Renk to offload fuel and general cargoes. The port has a functional jetty which is in poor condition. At times, porters do the manual handling at rates cheaper than those charged in Juba. Mobile mechanized lifting equipment is available

on demand from private vendors. Privately owned storage facilities are available a few kilometres away from the port.

MAP 7.3: White Nile River – Main Ports on Kosti-Juba Corridor



River operators and traffic. The New River Transport Company (NRTC) and Sudan River Transport Company (SRTC) were created by privatizing Government-owned River Transport Corporation (RTC). The majority shareholder in the new venture is Kuwait Gulf Link (KGL) Group with 70% while GoNU and GoSS hold respectively 20% and 10%. Although they operate with different names, both companies have the same top management and headquarters in Khartoum. They have also created

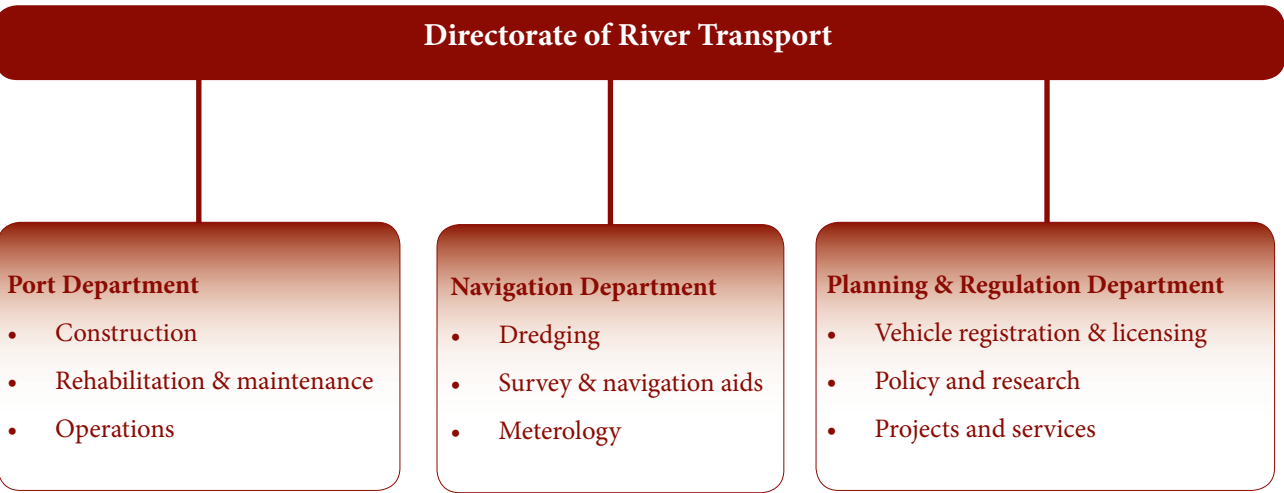
an entity in South Sudan, the Southern Sudan Trans-Nile Company (SSTC) located in Juba. NRTC/SRTC is the largest operator on the White Nile with a large fleet composed of pushers, passenger barges and a mixture of flap top, general cargo and fuel barges. The other major barge operator is the KEER Group which has the same fleet mix except passenger barges. Both operators can transport all types of cargos including containers, fuel, vehicles, construction materials, machinery and food items. Alongside these,

there are a number of smaller private active operators that do not call regularly into the ports. There are also some companies or independent operators with boats of various sizes that operate primarily in the South between Malakal, Bor and Juba and the tributaries in between.

Historically, the traffic volumes reached 300,000 tons per year in the mid-1970s, but by 2008 traffic had fallen way short of 100,000 tons. Despite the lack of compiled data in recent years, it seems unlikely that it will reach the 100,000 ton mark in the near future.

During the first quarter 2011, around 20 NRTC/SRTC trips to and from Juba were registered against an average one per month for KEER. Rates range from US\$250 to \$300 per metric ton or cubic foot- depending on which is larger, from Kosti to Juba. The travel time for cargo barges along this route is around 3-5 weeks excluding loading and off-loading times. The carrying capacity per sail is between 1,200 and 2,000 metric tons. For a return journey from Juba to Kosti, rates are 50% of that for upstream travel and sailing time can drop to one week. For passenger barges, it takes about 10 days.

Figure 7.1: Structure of River Transport



Source: Ministry of Transportation

River transport administration. Until the independence of South Sudan, the Inland River Navigation Department (IRND), based in Khartoum was the Federal Unit which had the overall responsibility on river transport. The main objectives assigned to IRND were to:

- Promote river transport
- Assume an overall control of river transport
- Encourage the private sector to invest in river transport
- Ensure safety of navigation on all the river routes in Sudan

Its functions include registration of crafts, vessel inspection, vessel licenses and crews’ licenses. GoSS, through MTR, has claimed progressive delegation of the development, management and operation of river transport system in Southern Sudan. The Directorate of River Transport has the organizational structure set out in Figure 7.1.

Port Managers report to the Port Department Director. In the case of Juba Port, the Port Manager is presently supported by a team of eight technicians; three (3) in charge of maintenance of equipment, three (3) maintaining

infrastructure and cargo handling and two (2) handling security matters. The security function is reinforced by the River Transport Police and other security organs. The directorate staffing is poor, both in terms of quantity and quality.

7.3.2 Proposed Program for River Transport

GoSS signed an agreement with an international company to dredge the river in selected locations including near the jetty in Juba. Bathymetric surveys will be required to update the details of the river sections (depths, widths, bend radii), explore and map the navigable route and precisely identify navigation constraints.

Alignment with SSDP. With the support of Japan, the Juba Port Expansion project will soon be implemented. Furthermore, GoSS has signed an agreement with an international company to dredge the access of Juba shipyard as well as some of selected sections.

Short-term. In the short term, the construction of cargo handling facilities will increase the efficiency of some major ports, such as Malakal and Bor. It is also critical to survey and map White Nile River with a special focus on the 45 km section between Mongala and Juba. It is envisaged that these hydrographic surveys will be the basis for all river engineering studies and subsequent works including dredging and installation of navigation aids. Firstly, a bathymetric survey beginning with Mongala-Juba section will provide inputs to determine the requirements for possible dredging operations and appropriate positioning of navigation aids. Further still, given the high cost implications and far reaching consequences on the hydraulic and morphologic behaviour of the river, in depth reviews will be undertaken prior to the implementation of large-scale dredging operations.

Following the independence, South Sudan has taken full responsibility for river transport on the Southern reach of the White Nile, at least from El Renk to Juba. There is a need to establish and implement a new institutional framework, including a River Transport Authority, which will take over from the Khartoum-based IRND. Legislation and regulation for river transport will be consistent with the regional and international regulations on inland water transport. A training program for staff of the river transport institutions will be developed and implemented. Technical assistance will be needed for these assignments.

The cost of short-term river transport program is estimated at \$36.8 million (2011-2015), including \$7.5 million of budget supported by the Government, \$4 million will finance the handling facilities to major ports, \$9.7 million will support dredging works, \$2.7 million for installation of navigation aids, \$10.8 million for hydro graphic surveys and \$2.1 million for training and technical assistance.

Medium- to long-term. The medium to long-term program will mainly ensure the continuation of support to dredging works, installation of navigation aids, and provision of technical assistance and training. Total expenditures estimated at \$30.1 million, including capital expenditures of \$29 million and capacity building of \$1.1 million.

7.3.3 Expenditure Program and Funding for Water Transport

Total cost of the proposed river transport program is estimated at \$67 million for 2011-2020. This estimate includes on-going projects such as Juba River Port development and specific dredging on selected areas. As reflected in Table 7.15, the first four years include significant outlays on capacity building and technical studies, including the establishment and implementation of a new institutional framework, staff training, and hydro graphic/bathymetric surveys which will give a solid base of primary data on the physical characteristics of the White Nile River and its tributaries.

Table 7.15: Development Expenditures for the River Services and Ports Program (In \$ millions at 2010 constant prices and exchange rate)

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capacity building and technical services								
Technical assistance	-	-	0.3	0.3	0.3	0.3	-	1.6
Training	-	-	0.3	0.2	0.2	0.2	0.1	1.6
Hydrographic survey & studies	1.1	0.8	4.0	1.0	2.0	3.0	-	10.8
Sub-total	1.1	0.8	4.6	1.5	2.5	3.5	0.1	14.0
Capital expenditures								
Ongoing government programs	13.1	7.5	-	-	-	-	-	7.5
Port handling facilities	-	-	2.8	1.2	-	-	-	4.0
Dredging	-	1.6	2.1	2.0	-	4.0	5.4	36.6
Navigational aids	-	-	-	-	1.0	1.7	-	4.7
Sub-total	13.1	9.1	4.9	3.2	1.0	5.7	5.4	52.8
Total	14.2	9.9	9.5	4.7	3.5	9.2	5.5	66.9

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Financing arrangements								
Government	13.1	7.5	2.8	1.2	1.0	5.7	2.7	31.7
Donors	1.1	2.4	6.7	3.5	2.5	3.5	0.1	19.6
Private sector	-	-	-	-	-	-	2.7	15.5
Total	14.2	9.9	9.5	4.7	3.5	9.2	5.5	66.9

Source: Annex Tables 8.5 and 8.6.

The proposed sources of funding for the river transport program are: (i) national budget for a total amount of \$31.7 million, representing 47% of the total cost, (ii) private sector for \$15.5 million (23%) and (iii) donors for 19.7 million (30%). For the purposes of this Report, it is assumed that by 2014 the required institutions and entities will be fully operational and traffic levels will have increased significantly. A PPP-type arrangement, either as a concessionaire or a lessee of facilities will then be agreed which will allow significant private sector involvement in the financing of capital expenditures. Afterwards, the private sector will finance installation of navigation aids and contribute to half of dredging costs and donors will mainly be involved in capacity building activities.

7.4 Railways Infrastructure and Services

7.4.1 Current Status of the Railways Network

The only railway line in the country is the southern section of the 446 km Babanusa-Aweil-Wau line, which has been part of the 4,578 km Sudan rail network operated by the Sudan Railway Corporation (SRC). This line connects Wau in South Sudan to Babanusa, Khartoum and Port Sudan in Sudan (see Map 7.4). The total length of the railway line in the country is 248 km, from Wau to the border with Sudan. The single track is narrow gauge (1,067 mm) and is based on steel sleepers. The track condition is considered to be poor. Although the initial design speed was 50 km/h, the current speed is very low.

The country’s portion of the network was not operational for almost two decades. Following some rehabilitation works supported by funding from the United Nations, the line was reopened in March 2010. However, the service

is irregular and limited; on average it is operational once a month mainly transporting consumer goods from Khartoum.

The Directorate of Railways of the MoT is responsible for promoting railways in South Sudan. It is headed by a Director General who is currently the only senior staff of the directorate. The functions of the directorate include the development of policy and regulations for railway operations in South Sudan.

7.4.2 Proposed Program for Rail Transport

Ongoing programs and the Southern Sudan Development Plan: According to the Southern Sudan Development Plan (SSDP), on-going efforts in the railway transport sub-sector include: (i) rehabilitation of housing along the Wau-Aweil-Babanusa line; carrying out feasibility study of a proposed extension from Wau to Juba and Nimule; and undertaking a modest program of capacity building for the Directorate of Railways. The 2011 National Budget allocated a total of \$1.26 million equivalent of capital outlays for railways. This allocation included \$0.630 million for a feasibility study of an extension of the rail line from Wau to Juba and Uganda, and \$0. 630 million for rehabilitation and maintenance of railway facilities.

The SSDP includes a proposed expenditure of \$241 million on the railways sector during 2011-2013. This is will support the creation of a railways regulatory body, purchase equipment for the railways network, and construct the 150 km of new lines in 2013.⁸⁶ However, discussions with Directorate of Railway Transport confirmed that there is no on-going project in the sub-sector, contrary to what is indicated in SSDP. Such a huge investment has to be justified by specific pre-investment studies as proposed below.

MAP 7.4: Railways Network in South Sudan and Sudan



Proposed strategy for the railways sub-sector. After Independence, a number of issues will need to be addressed. Of particular importance at this stage will be the following:

- Clarification of the ownership arrangements for the section of the rail line in South Sudan.
- Selection of an entity that will operate the railway service. Several PPP options should be investigated taking into consideration political situation between Sudan and South Sudan and the very low level of traffic.

The working assumption that underpins the proposed Action Plan for the railways is that in the Government, represented by the South Sudan Railway Corporation or some such state owned corporation, will own the national rail infrastructure (track and communications network) and will be responsible for rehabilitation and upgrade of the existing network and any possible future expansion of the network. Subject to further detailed study and dialogue with potential investors, the expectation is that the South Sudan Railway Corporation will enter into a PPP-type partnership with a private concessionaire who will own and operate locomotives and rolling stock. The

⁸⁶ There have been a number of media reports about a proposed rail line extension from Wau to Nimule. See, for example, Odhiambo, Allen (2011), “RVR targets planned Uganda-Sudan railway line” (<http://www.businessdailyafrica.com/Corporate+News/RVR+targets+planned+Uganda+Sudan+railway+line/-/539550/1213656/-n6o0bz/-/>). Business Daily August 5, 2011.

key objective for the short-term is to develop a realistic program improving the railway service in the country.

The short-term work plan is therefore dominated by capacity building and technical services. It is proposed to carry out a study that will investigate the foregoing issues and review the existing situation of the railway infrastructure in the country. The study will explore and make recommendations on the following issues: (i) legal, institutional and regulatory framework including issues related to infrastructure asset ownership and management; (ii) management of railway operations; (iii) detailed inventory of the track and signalling system; (iv) traffic demand analysis and prospects; and (v) an appropriate development program, including support for the establishment and operation of the new institutional framework.

Expansion of the network in the country has to be underpinned by regional integration benefits and a strategic diversification of access to the sea. In that regard, the proposed Action Plan for railways includes a prefeasibility study of a rail link to one or more seaports. The cost of the proposed short-term program (STP) for railways is estimated at \$5 million, including \$1 million for rehabilitation of houses, \$3 million for studies and a notional amount of \$1 million for the establishment and operation of the new institutional framework.

The program for the longer-term will be built around two initiatives:

- The rehabilitation and improvement of the 248 km of existing line from Wau to Aweil and the Border. The cost of this program is estimated at about \$75 million.
- Basing on prefeasibility study initiated under the STP, undertake a feasibility study of a rail link that connects the country to a deep-water port; for instance, a railway line linking Kampala or Eldoret to Juba and Wau. Such an extension will have the added advantage of connecting the existing Sudan rail network to that of the East African Community.

Table 7.16: Development Expenditure Program for the Railways Sector
(In \$ '000 at 2010 constant prices and exchange rate)

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capacity building and technical services								
Study of the railways sub-sector	-	-	0.3	0.7	-	-	-	1.0
Support for new institutional arrangements	-	-	-	0.5	0.5	-	-	1.0
Prefeasibility study of rail link to a seaport	-	0.6	1.0	1.0	-	-	-	2.6
Feasibility study for a rail link to a seaport	-	-	-	-	3.0	3.0	-	6.0
Sub-total	-	0.6	1.3	2.2	3.5	3.0	-	10.6

7.4.3 Development Expenditures
Required for the Program

The total estimate of the rail transport program amounts to \$87 million. The cost of new rolling stock and locomotives for the provision of services are not included at this stage, pending further analysis of traffic demand for the medium- and longer-term and creation of an appropriate operating environment for the award of contracts to one or more concessionaires who will be responsible for service provision.

The proposed Action Plan for the decade ahead does not include any provision for construction of a line from Wau to Juba neither to the border with Kenya nor Uganda. According to the World Bank (2010), the cost of constructing a single track, non-electrified railway line on relatively flat terrain is at least \$1.5 million per km, increasing to \$5 million a km in more rugged terrain.

Assuming an extension from Wau to the border with Kenya or Uganda involved about 750 km of a new single track line, the capital cost of the extension will be in the range of \$2-4 billion (at 2010 constant prices). A substantial number of passengers and a significant amount of freight traffic will be required for the economic and financial justification of a capital outlay of this magnitude. The proposed feasibility studies will address these types of concerns prior to serious negotiations with potential concessionaires that will operate on the track once built.

As Table 7.16 indicates, the Government will most likely fund at least 90% of the proposed expenditures for the railways program. The working assumption in this Report is that the Government will cover most of the capital outlay expenditures and largely collaborate with donor community to provide modest support to capacity building activities for the infrastructure sector.

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capital expenditures								
Rehabilitation of administrative houses	-	0.6	0.5	0.5	-	-	-	1.6
Improvement of existing rail line	-	-	-	-	-	-	-	75.0
Sub-total	-	0.6	0.5	0.5	-	-	-	76.6
Total	-	1.2	1.8	2.7	3.5	3.0	-	87.2
Financing arrangements								
Government	-	1.2	1.5	1.5	0.5	-	-	79.7
Donors	-	-	0.3	1.2	3.0	3.0	-	7.5
Total	-	1.2	1.8	2.7	3.5	3.0	-	87.2

Source: Ministry of Transportation

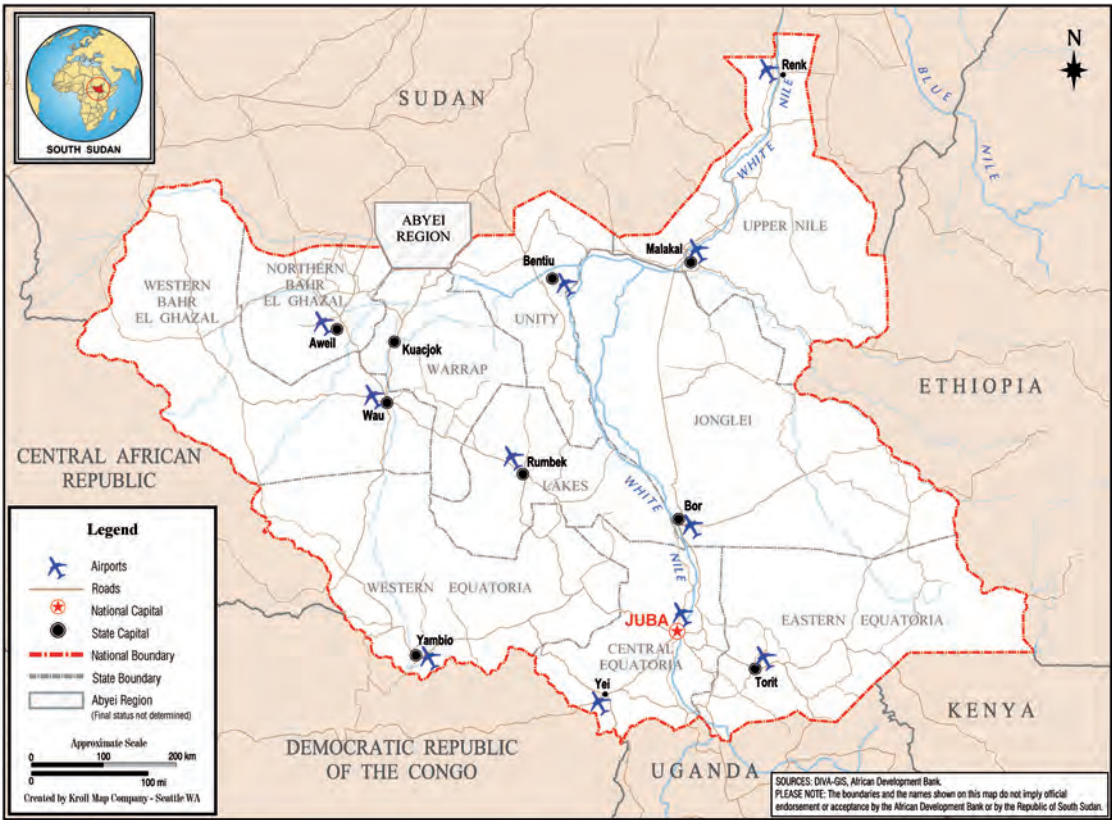
7.5 Air Transport Infrastructure
and Services

7.5.1 Current Status of
Civil Aviation

Air transport infrastructure. Air Transport infrastructure is composed of an international airport in Juba, a domestic

airport in each state capital of the other nine states and around 300 airstrips (see Map 7.4). These airstrips emerged during the civil strife to provide military logistics bases and served later on, as hubs for humanitarian relief supplies by international relief agencies and NGOs. Only Juba and three domestic airports (Rumbek, Wau and Malakal) are manned. Malakal and Wau receive occasional international flights. Juba and Malakal are the only airports with paved runway, measuring 2,400 and 2,000 meters long respectively. The paved runways are in fair condition. Existing airport facilities, are inadequate and lack proper maintenance.

MAP 7.5: Main Airports in South Sudan



Juba airport is the main gateway to South Sudan. It links the country to the rest of Africa and the world. However, the existing airport conditions are very poor. The airfield does not comply with International Civil Aviation Organization (ICAO) standards. The actual runway of 2,400 meters length and 45 meters width imposes a drastic restriction on aircraft payloads. There is no Instrument Landing System (ILS) and no visual Precision Approach Path Indicator (PAPI); operation only during the day in Visual Meteorological Conditions (VMC).

The runway and apron at Juba airport have significant problems of pavement deterioration. The passenger terminal is used in a mixed process for domestic and international departures and arrivals. The terminal facilities are inadequate: limited capacity of departure lounge and arrival hall, few rudimentary check-in counters, a hand operated balance, no information display for passengers or operators, no stand allocation or planning system, no computer connections to airline reservation systems or to the air traffic control for updated information, no baggage conveyor belts. There were no dedicated cargo facilities despite noticeable cargo traffic. The general aviation uses the same terminal facility as the commercial traffic and passengers. Support facilities are limited to several carts for luggage transport, several services vehicles, few fire fighting vehicles and stockpile of fire extinguishing materials. There is no fuel storage facility which adds another constraint to the aircraft payload.

Institutional arrangements. Prior to Independence, GoSS and GoNU had to cooperate on civil aviation and airports operations in the South. According to ICAO requirements, only one Civil Aviation Authority (CAA) can be established in a country. Therefore, the CAA based in Khartoum had the overall responsibility for the development of civil aviation and air transport services in Sudan, including South Sudan. Regulations, Search And Rescue (SAR) functions, international matters and air traffic management operations were under the CAA, while airstrips operations fall under the responsibility of the States. In addition, CAA operates all international and national airports. This can create major conflict of interest and a clear separation of the functions of regulator and service provider is required.

Notwithstanding overlapping responsibilities, GoSS established the Directorate of Air Transport within MTR with primary functions for policy formulation, approval of tariffs, international conventions, bilateral air services agreements and multilateral and regional agreements. The Directorate was also responsible for the development of international and national airports in South Sudan while the States' airports and airstrips fall under the State MoPI.

The Yamoussoukro Decision and South Sudan. An important initiative for South Sudan is to become a signatory to the Yamoussoukro Decision of 1999 (Sudan is already a signatory), the main objective of which was the gradual liberalization of scheduled and non-scheduled intra-African air services, abolishing limits on the capacity and frequency of international air services within Africa, liberalizing fares and universally granting traffic rights up to the "fifth freedom of the air."⁸⁷ Signatory states were obliged to ensure the fair opportunity to compete on a non-discriminatory basis. Even though the decision was a pan-African agreement to which most states abound, the parties decided that it should be implemented by separate regional economic communities (RECs).

Following the First COMESA-EAC-SADC Tripartite Summit in October 2008, the Joint Competition Authority (JCA) on Air Transport Liberalization was established to oversee the full implementation of the Yamoussoukro Decision in the three RECs. Subsequently the RECs undertook individual assessments of various implications related to full implementation of the Decision. In February 2011, COMESA signed a Grant Protocol Agreement with the AfDB for \$8.6 million for funding the Tripartite Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) system project

Air navigation and security. The air navigation infrastructure is substantially lacking. The airspace management was under the responsibility of GoNU. Indeed, all of Sudan makes up one Flight Information Region (FIR) with the Area Control Centre (ACC) located in Khartoum. There is no radar for surveillance purposes and the ACC relies on contact by radio. Air traffic management is thus by voice communication and pilots have to communicate among themselves by HF radio to identify other aircrafts. One shortcoming of the present system is that the radio system does not cover the entire Sudan and many black spots are in South Sudan. Aviation oversight in Sudan is considered poor.

Civil aviation operations. Civil aviation services and air traffic have expanded rapidly in recent years in South Sudan. The presence of United Nations missions and many humanitarian aid donors has contributed significantly to the demand for aviation services. Currently, the country is served by about ten Local Air Operators and thirteen International and Regional Carriers. At Juba airport, aircraft movements increased from 11,652 in 2007 to 33,140 in 2010, an average annual growth of 42%, passenger traffic reached 189,356 in 2010 with an average annual increase of 22% from 2007, and mail traffic witnessed an annual increase of 20% while freight traffic remained stagnant. At the time this Report was prepared there was

no information available on the numbers of passengers passing through the other main terminals in the country.

Assuming that there will be steady improvements in domestic security, sustained strong economic growth and considerable development in tourism potential in South Sudan this may result into an average annual increase of 15% in domestic and international passengers, at this rate the total passenger traffic will increase to about 900,000 by 2020. The proposed Action Plan therefore calls for a substantial investment in upgrading the air navigation system of the country.

7.5.2 Proposed Program for Air Transport

The proposed program for the improvement of civil aviation in South Sudan is crafted around a phased approach that includes high priority programs for implementation in the short-term (2011-2015) and in the medium- and longer-term (2016-2020).

Ongoing improvements in civil aviation infrastructure and the short-term program (STP). The STP will consist of five main components: (i) restructure and upgrade institutional arrangements for the civil aviation industry; (ii) complete the ongoing upgrade of Juba domestic and international airport; (iii) upgrade selected airports in state capitals and other locations; (iv) formulate and implement an air transport policy; and (v) design and implement a capacity building and training program for technical staff.

Restructure and upgrade institutional arrangements for the civil aviation industry. One of the primary tasks of the Government of South Sudan will be to design and implement a new institutional framework for civil aviation, including the establishment of a Civil Aviation Authority (CAA). Through this framework, the Government will set clear and separate functions performed by central Government, state governments, aviation and airport authorities, air transport operators and other private sector activities. Under the proposed new institutional framework, the functions of the regulator and the airport service providers will be clearly separated and performed by distinct entities.

This Report proposes that the new institutional framework and the establishment of the CAA take priority before the rolling out the proposed short-term program. However, South Sudan will remain in the same FIR controlled by the ACC in Khartoum at least for the immediate future. Moreover, the proposed CAA will be responsible for

promoting, regulating and enforcing civil aviation and security standards consistent with the requirements of the ICAO. The authority will be mandated to generate some of its funding requirements from user fees, a charge on departing scheduled passengers and a fuel levy payable by the general aviation industry. Other sources of revenue will include charges for various services, including aircraft registration, examination and registration of pilots, and various licensing activities.

The creation of the CAA will be accompanied by formation of a separate public company, referred to in this Report as the South Sudan Airport Services Company (SSASC). The SSASC will own the airside and some landside facilities at airports on behalf of the government. It will be essential for the SSASC to begin its operations with a strong set of financial accounts.

The ICAO requires member states to charge aeronautical fees on a cost-recovery and not a profit-making basis. Given this requirement, the profitability of airport operations will depend on the amount of income that can be generated from airport concessions and other services such as car rentals and parking services. The likelihood of the continued strong growth in traffic will generate increasing revenues resulting from airport linked services such as landing, parking, passenger fees and other usage fees. This will favour a concession PPP type arrangement in which a private company, perhaps in partnership with the SSASC, will manage selected airports, operate services and undertake required rehabilitation or upgrading of infrastructure. For the purposes of this Report, it is assumed that the concession will be operational from 2015. Until then, sources of funding will be the national budget and public institutions which collect air traffic fees.

Juba domestic and international airport. The master plan of Juba Domestic and International Airport, which was completed in 2007, recommended an orderly development in four phases corresponding to four time horizons, i.e., short-term, medium-term, long-term and very long-term. Each phase of development is planned to meet aviation activity forecast needs in compliance with international design standards as prescribed by ICAO.

A high priority will be accorded to completion of the remaining works under phase 1 of Juba Airport Development Master Plan. The works related to the first phase are on-going and consist mainly of the following: (i) extension of a runway from 2,400 m to 3,100 m to meet B767-200-ER requirements - extension of 700 m, (ii) strength pavement and runway edge light system; (iii) extension of the taxiway; (iv) navigation aids to facilitate approaches and permit night operations⁸⁸;

⁸⁷ The regulation of international air transport is guided by the so-called eight "freedoms of the air." The first and second are technical freedoms to over-fly a foreign country or to land for refueling. The third and fourth are commercial freedoms to carry passengers from a carrier's home country or another or vice versa. The fifth, sixth and seventh freedoms concern the rights to carry passengers between two foreign countries, either as an extension of a flight from the home country (fifth), through as top in the home country (sixth), or without ongoing service to the home base (seventh). The eighth freedom, pure cabotage, is the right to carry traffic between two points in a foreign country.

⁸⁸ Given the current situation between the two countries, South Sudan may look for other arrangements in close coordination with ICAO and neighbouring countries

passenger facilities improvements, including apron and parking extension, and new passenger terminal fully equipped and furnished with distinct areas for domestic and international flights; (v) dedicated cargo facilities, including apron, parking and terminal; (vi) general aviation facilities, including apron, fuel pump; (vii) fuel farm; (viii) fire fighting station; (ix) rehabilitation of the air traffic control tower; (x) aircraft maintenance hangar; (xi) autonomous power supply; (xii) heliport, including helipad, SALS, helipad light system; and (xiii) perimeter fence. The on-going works which have secured financing shall be completed by end-2011. The remaining works of the phase 1 development, including runway extension and passenger terminal equipment will be part of the proposed short-term program for Air Transport.

Upgrade of airports in state capitals and other locations. The SSDP calls for the upgrade of six state airports during 2011-2013 to meet ICAO standards. Actions on this proposal do not appear to be on-going activity, contrary to the indication in the SSDP matrices. As a first step, this Report proposes a study of the aviation infrastructure to: (i) determine the most viable airports and airstrips; and (ii) design rehabilitation or upgrading works for selected airports and airstrips. The airports selected to be upgraded (or) and extended will depend on the outcome of the study. However, for the purposes of this Report, it is assumed that the Malakal and Wau airports will be upgraded to attract more regional flights. Rough estimates of the costs involved are incorporated for the short-term period. These estimates are substantially lower than those of SSDP.

Formulate and implement an air transport policy. The formulation of this component of the proposed program will need to be developed in close collaboration with the ICAO. It will include proposals for: (i) the design and implementation of a system for airspace surveillance and air traffic management that meets ICAO requirements and ensures a safe navigation and airport security; (ii) establishment of a proper funding framework to support aviation industry growth that includes ICAO guidelines on user charges and cost recovery; and (iii) the development of specific measures needed to achieve a strict alignment with ICAO standards and recommended practices (SARP) in the medium-term. A key objective of the proposed Action Plan is to meet the minimum requirements of the ICAO by 2015 and have South Sudan classified by the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA) as Category 1.

Capacity building and training. There is an urgent need for personnel training to ensure safe and secure air transport operations. Firstly, working with the ICAO, identify training needs and design an appropriate training program. The next step will be to implement this

training program and as may be required send personnel to training facilities elsewhere in the region and also in the interim retaining international personnel with the requisite skills for air traffic surveillance and management and airport security.

Proposed program for the medium- and longer-term. Investments proposed for subsequent phases shall enable the upgrade of Juba airport and others selected in order to meet the required international standards in medium- to long-term. To this end, a periodic update of the Juba Airport master plan is necessary to reflect the notable developments and dynamics in a fast changing environment regarding national and regional traffic demands, as well as technology requirements in the air transport.

Given the rampant expansion of Juba town, the option of relocating the airport well beyond the city outskirts will be considered. The consideration will be to have the existing airport dedicated to serving the domestic and some specific flights and developing a more modern international airport elsewhere.. This shall be done before initiating phases two and three of the development program. The new international facility will include a larger runway and substantial capacity for both cargo and passenger terminals.

As Chapter 6 indicates, the proposal is for a major expansion in production of high value fruits and vegetables (HVFV) for the domestic and export markets. Successful development of this industry will require substantial private sector investments in cold chain facilities for the domestic and international market. These facilities will require investment in cold storage facilities. As Map 6.4 in Chapter 6 indicates, the three areas identified for major private investment in irrigation development that will support production of these perishable products suggest that such cold chain facilities will be required in Juba, Wau, Malakal and perhaps Rumbek and Yambio.

Potential for private investment in civil aviation. In addition, given the above-mentioned traffic growth prospects for Juba airport and, to a lesser extent, Wau and Malakal airports, there are likely to be good opportunities for the provision of airport services under a PPP-type arrangement in which concessions are awarded to one or more private service providers. The concessionaire will enter into a partnership arrangement with the proposed South Sudan Airport Services Company, owner of airside and some landside assets at the major airports of the country. The proposed Action Plan for civil aviation includes provision for the retention of a transactions advisory team to provide technical support to the government in its negotiations with a potential investor.

7.5.3 Development Expenditures Required for the Program

As indicated in Table 7.17, total development expenditures for the proposed air transport program are estimated at about \$222 million, including a provision of around \$13 million for the much needed capacity building and technical services. The bulk of the new capital outlays will be for the rehabilitation or upgrading of airports, in particular Juba, Malakal and Wau, and the installation of

an air surveillance and air traffic management system that will ensure compliance with ICAO requirements.

The cost of the short-term program for 2011-2015 is projected to be \$105.8 million, including around \$40 million for remaining works on phase 1 of the Juba Airport development, \$2 million for specific HVFV logistics infrastructure, \$45 million for rehabilitation or upgrading of Malakal and Wau airports, \$15 million for installation of airspace surveillance and air traffic management system, and about \$9 million for capacity building and technical services.

Table 7.17: Development Expenditures for the Civil Aviation Program
(In \$ millions at 2010 constant prices and exchange rate)

Program	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capacity building and technical services								
Technical assistance	-	-	0.6	0.5	0.5	0.4	0.2	3.3
Training programs	-	-	0.7	0.6	0.6	0.5	0.3	4.1
Civil aviation master plan	-	-	-	1.0	-	-	-	1.0
Airspace surveillance& ATM study	-	-	0.5	0.5	-	-	-	1.0
Airport and airstrip studies	-	-	1.0	1.0	-	-	-	2.0
Transaction advisory team	-	-	-	-	-	0.6	-	1.8
Sub-total	-	-	2.8	3.6	1.1	1.5	0.5	13.2
Capital expenditures								
Juba airport phase 1	3.2	10.9	29.0	-	-	-	-	39.9
Juba airport phases 2 & 3	-	-	-	-	-	-	13.8	48.0
Rehabilitate & upgrade Malakal & Wau airports	-	-	-	10.0	15.0	20.0	-	45.0
Rehabilitate & upgrade of other airports	3.2	-	-	-	-	-	10.0	50.0
Airspace surveillance & ATM	-	-	-	3.0	7.0	5.0	-	20.0
Cold chain facilities at airports	-	-	-	2.0	-	-	-	6.0
Sub-total	6.4	10.9	29.0	15.0	22.0	25.0	23.8	208.9
Total expenditures	6.4	10.9	31.8	18.6	23.1	26.5	24.3	222.1
Financial arrangements								
Government	6.4	10.9	30.5	17.5	22.0	25.6	5.0	141.7
Donors	-	-	1.3	1.1	1.1	0.9	0.5	7.4
Private sector	-	-	-	-	-	-	18.8	73.0
Total expenditures	6.4	10.9	31.8	18.6	23.1	26.5	24.3	222.1

Source: Annex Tables 8.9 and 8.10.

The medium- to longer-term program would comprise: (i) a continuation of the development of Juba airport, phase 2 and 3, subject to clarification about the possible relocation of the international airport; (ii) further improvement of airspace surveillance and the air traffic management system; (iii) rehabilitation or upgrading of selected airports

and airstrips as determined under the STP study and (iv) further capacity building through technical assistance and training. The related cost is estimated at \$115.9 million, including \$1112 million for capital expenditures and \$3.9 million for capacity building.

7.6 Development Expenditures and Financing for the Transport Sector

7.6.1 Development Expenditures

As Table 7.18 indicates, total development expenditures for the transport sector program are projected to be \$6.55 billion for 2011-2020. These include about \$130 million for capacity building, technical support and studies, and \$6.42 billion for capital outlays. The road transport sub-sector accounts for 94.3% of these outlays, primarily for creation

of a functioning national road network by 2020. Civil aviation accounts for about \$220 million, or 3.4% of the total outlays. The river transport and railways account for the remaining 2.3% of the program. Full implementation of the proposed program will mean that capital outlays will build up rapidly in the short-term, rising from a little less than \$250 million a year in 2010-11 to \$530 million a year by 2015 and almost \$1.1 billion a year by 2020. As the discussion in Chapter 4 indicates, the bulk of the capital works associated with these expenditures will be contracted out to the private sector under competitive procurement procedures. As a result, the transport sector program will offer very substantial business opportunities for the private sector, especially in construction activities and supply of construction materials and equipment.

Table 7.18: Total Development Expenditures for the Transport Sector Program (In \$ millions at 2010 constant prices and exchange rate)

Category	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Capacity building & technical support								
Road transport	5.6	5.9	16.3	24.7	12.0	8.8	2.5	82.8
Rivers services and ports	1.1	0.8	4.6	1.5	2.5	3.5	0.1	14.0
Railways	-	0.6	1.3	2.2	3.5	3.0	-	10.6
Civil aviation	-	-	2.8	3.6	1.1	1.5	0.5	13.2
Sub-total	6.8	7.4	25.0	32.0	19.1	16.8	3.1	120.7
Capital expenditures								
Road transport	256.7	187.9	242.0	461.5	475.7	503.1	1 054.6	6 181.3
Rivers services and ports	13.1	9.1	4.9	3.2	1.0	5.7	5.4	52.8
Railways	-	0.6	0.5	0.5	-	-	-	76.6
Civil aviation	6.4	10.9	29.0	15.0	22.0	25.0	23.8	208.9
Sub-total	276.2	208.5	276.3	480.2	498.7	533.8	1 083.8	6 519.7
Total expenditures	283.0	215.9	301.4	512.2	517.8	550.6	1 086.9	6 640.3

Source: Annex Tables 8.9 and 8.10.

The proposed expenditure program for the transport sector differs substantially from that set forth in the SSDP. The latter proposes total development expenditures of \$2.8 billion for 2011-2013, including an amount of \$1.7 billion for air transport infrastructure. The proposed total development expenditures for the same period under the IAP are \$1.03 billion with \$55 million for air transport. As discussed in Section 7.5 above, the cost of airport upgrading appear to have been substantially overestimated in SSDP; the need for prior feasibility

studies that examine the economic costs and benefits of these investments would defer decisions on some of these SSDP proposals. The latter applies also to the construction of an additional rail line and, to a lesser extent, to the large program of dredging along the Nile. Conversely, as discussed in Section 7.2, the IAP proposes a larger program for the roads sector, particularly for rural and urban roads; moreover, the SSDP appears to underestimate substantially the costs of the major trunk road projects.

7.6.2 Funding Arrangements for the Program

The proposed funding arrangements for the transport sector program are set out in Table 7.19. The proposed program calls for a substantial increase in the allocation of donors funds for the transport sector, and in particular the roads sector as discussed above in Section 7.2. In recent years the donor community has, on average, been funding about 25% of the development expenditures under the ongoing transport development program. The proposed program put forward in this Report calls for the international donor community to fund about 30% of the program during 2011-2020 – equivalent to a total of about \$2 billion at 2010 constant prices and exchange rate. The expectation is that donors would fund the bulk of the \$130 million of capacity building and technical support proposed for the program, and a little less than 30% of the proposed capital works programs for the transport sector, especially in road transport. The areas where donors could perhaps make a major contribution are in support of regional integration, particularly through the upgrade to

paved standard of major links to neighbouring countries and the rural roads program of close to \$1 billion for the decade ahead.

The expectation is that PPP-type arrangements can be introduced in the civil aviation and river transport sub-sectors by about 2015 after the requisite legal and regulatory frameworks are in place and reliable public partners have been built up in the form of financially sound state enterprises. The amount mobilized from the private sector under these arrangements are likely to be quite modest in the decade ahead, but they will lay the foundations for a substantial enlargement in the provision of private transport services under concession arrangements in the following decade. The position taken in this Report is that the traffic densities on the trunk road network are much too low to be attractive for private investment in toll road arrangements. The rough rule of thumb for these types of arrangements in Sub-Saharan countries is that a traffic flow of at least 15,000 vehicles a day is required for toll road investments that will be attractive to the private sector. Even on the most heavily trafficked routes, South Sudan is a decade or more away from such traffic volumes.

Table 7.19: Funding Arrangements for the Transport Sector Program (In \$ millions at 2010 constant prices and exchange rate)

Category	2010	2011	2012	2013	2014	2015	2020	Total 2011-20
Government	213.7	154.9	214.7	365.3	342.0	343.2	754.8	4 540.0
Donors	69.2	60.9	86.7	146.9	175.8	207.4	310.6	2 011.8
Private sector	-	-	-	-	-	-	21.5	88.5
Total	283.0	215.9	301.4	512.2	517.8	550.6	1 086.9	6 640.3

Source: Tables 7.13, 7.15, 7.16 and 7.17.

The implication is that the Government will have to step up its budget allocations for capital works programs for the transport sector. As Table 7.19 indicates, government outlays for capital works and related development programs are currently running at the equivalent of about \$200 million a year. Under the proposed funding arrangement set forth in this Report, government spending on capital works and related activities would rise to about \$340 million a year by 2015 and \$750 million a year by 2020. If the foregoing proposals for the allocation of donor funding for the transport sector were adopted, the government would assume primary responsibility for the funding of the bulk of urban roads and the rehabilitation and upgrade of the national trunk road network of the country.

7.7 Maintenance of Transport Infrastructure

Lack of maintenance by national and state governments of existing transport infrastructure is an issue of major concern. According to the rough estimates made for the purposes of this Report, the value of transport sector infrastructure assets was in the range of \$950 million at end 2010. Desirable levels of routine maintenance on a public asset of this magnitude would typically call for budget allocations in the range of \$30-35 million a year. Budgets records suggest that actual allocations in 2011 were at best half of this level. If this underfunding of

routine maintenance were to persist, rehabilitated and upgraded infrastructure will soon deteriorate and the economy will then face a repeat of the need for much larger capital expenditures on rehabilitation to get the assets back into proper working condition. It is expected that the new

institutional arrangements for the sector, as discussed elsewhere in this Chapter, will ensure that much greater attention is given to routine and periodic maintenance of these transport infrastructure assets than has been the case in the past.

Table 7.20: Routine Maintenance Expenditures for Transport Sector Infrastructure
(In \$ millions at 2010 constant prices and exchange rate)

Sub-sector	Capital outlays				Capital stock					Maintenance expenditures				
	2012	2015	2016	2020	2011	2012	2015	2016	2020	2012	2015	2016	2020	Total 2012-20
Roads	242	503	726	1 055	913	1 155	2 595	3 321	6 906	18.3	41.1	48.0	108.8	496.5
Waterways & river ports	5	6	6	5	40	45	55	61	84	1.8	2.2	2.5	3.4	22.5
Railways	1	-	25	-	113	113	114	139	189	4.5	4.5	5.5	7.5	52.8
Civil aviation	29	25	28	24	88	117	179	207	286	4.7	7.2	8.3	11.4	72.1
Total	276	534	785	1 084	1 154	1 430	2 943	3 727	7 465	29.3	55.0	64.3	131.1	643.9

Source: Annex Table 8.11, Table 7.18 and estimates by authors.

As Table 7.20 indicates, if the proposed Action Plan for transport infrastructure is implemented in full in the decade ahead, the replacement value of these assets will be about \$7.3 billion in 2020 (at 2010 constant prices and exchange rate). These transport infrastructure assets will be among the most important publicly-owned assets in the country. They will require substantial annual outlays for routine maintenance. Routine maintenance expenditures are projected to be about \$30 million in 2012, rising steadily thereafter to about \$130 million a year by 2020. For the decade as a whole, outlays on routine maintenance will need to be about \$650 million if these assets are to be maintained in good working condition and in that way, support sustained strong economic growth in the country.

As much as possible, maintenance activities should be outsourced to the private sector through multi-year contracts. The build up in public spending on maintenance to about \$130 million a year by 2020 offers another substantial opportunity for the development of new business activity in South Sudan and the creation of substantial amounts of employment for unskilled and semi-skilled workers. Chapter 4 includes a more detailed discussion of these emerging business opportunities and the actions that will be required to promote the role of the domestic business community in these opportunities.

7.8 Management of Risks and Uncertainties

There are a number of risks and uncertainties associated with the proposed program for the transport sector. The major ones relate to the design, funding and implementation of a program of such magnitude. Design is severely hampered by information gaps. Funding availability is a major uncertainty given the significant build-up in the proposed annual development and maintenance expenditures, as compared to pre-independence years. Weak institutional and human capacities are cross-cutting issues in this new nation and affect particularly the transport sector where key institutions are being built up or are to be established. Thus, key concerns centre on the capacity of National Government and local authorities to oversee the design and implementation of this Action Plan for the development of the transport infrastructure needed in the country for sustained strong economic growth. Strengthening these capacities in the public sector will be a major challenge as will be the development of programs to strengthen the capacity of an embryonic domestic private sector to respond to the substantial business opportunities offered by the program.

7.8.1 Design Uncertainties

Roads. Very limited data on traffic and vehicle fleet, and lack of inventory and classification of the road network lead to significant uncertainties which affect mainly maintenance and medium- to long-term development programs. For the short-term program, economic importance and current conditions of the proposed roads are well known and the construction/upgrading to paved standard of two international roads and of urban roads in Juba, which represents 63% of the total short-term road capital expenditures program, was the subject of detailed studies.

Completion of the on-going inventory and classification exercise and contractual obligation for the newly established Road Authority to develop a five-year Road Investment Program, including development and maintenance priorities, and to prepare an annual work program, including maintenance, would offer opportunities to reduce uncertainties through proper adjustment of maintenance and the medium- to long-term development program. Moreover, the proposed development of a national transport master plan, which would be completed in the short-term period, would give more light and specificities for the direction ahead.

Rail, river and air transport. With regard infrastructures under the Ministry of Transport, limited information is available on existing rail track condition, morphological and hydrographic data on the White Nile River and its tributaries, and current condition of most airports and airstrips. Federal Units based in Khartoum had overall responsibility for air, rail and river transport before South Sudan independence. Limited delegation was given to the GoSS Ministry of Transport and Roads through the Directorates of Rail Transport, River Transport and Air Transport. One of the main and urgent challenges of the new Ministry of Transport is to set up the proposed new institutional framework for these three sub-sectors and make it operational.

Studies and technical assistance are proposed to have a better knowledge of the infrastructure, to deal with legal, institutional and regulatory framework including issues related to infrastructure asset ownership and management, and to explore the prospects for suitable PPP-type arrangements for private provision of services. These actions would help remove major uncertainties and allow timely adjustments to the programs.

7.8.2 Availability of Funding

As discussed above, it is imperative to close the huge gap in transport infrastructure to open up permanently several regions of this wide country, allow access to social services, improve connectivity between markets and potential agricultural lands, reduce significantly transport costs and remove the major impediments that transportation represents in doing business in South Sudan. . Against this setting, the proposed Action Plan for transport infrastructure calls for a program of \$6.5 billion of development expenditures and \$1.1 billion of routine and periodic maintenance expenditures during 2011-2020. Even so, key transport sector indicator for South Sudan in 2020 will still be lower than the current indicators of comparator countries. The exceptional efforts required from the donor community and from the Government have to be put in this context. The proposed financing of the development expenditures for the program calls for about \$2 billion of donor funding, \$4.5 billion of funding by government and public entities, and a very modest amount of private funding under PPP-type arrangements. The program calls for a build-up in donor funding for the transport sector from an average of about \$65 million a year to about \$220 million a year from 2013. This build-up poses significant challenges for the donor community. In the past few years, donor allocations for infrastructure have accounted for about 7% of total donor disbursements of development assistance (excludes humanitarian assistance). Under the program proposed in this Report the donor allocation for transport infrastructure would rise to about 15% of total development assistance during 2013-2020, after which demands on donor support for infrastructure would decline steadily.

Funding for maintenance. There cannot be strong support from the donor community for the transport program without a clear and firm commitment to plan, finance and implement the necessary maintenance to preserve these transport assets. As indicated earlier, for example, a road which is not maintained routinely will cause significant traffic disruptions, increase vehicle operating costs and will have to be rehabilitated at a cost several times higher than the cumulative cost of maintenance. Financing requirements evolve with the length of roads in maintainable condition.

The main source of funding for maintenance is the Government budget. Given the pressing demands on the budget, maintenance works, which have had low political

and social visibility, were neglected. To ensure a more reliable and consistent source of funding, the transport policy provides for the creation of a Road Maintenance Fund (RMF) with revenue deriving from road user charges. RMF resources should be ring-fenced to prevent use for purposes other than road maintenance. Establishment and start-up of the RMF, following the related study, are essential components of the short-term program and central to mitigate the high risk of under-spending on road maintenance. The key challenge here is to determine fair levels of charges to be applied for the use of the road, given the limited vehicle fleet at this time. There is a need to implement sound public information programs to explain how user fees will generate substantial benefits in improving road maintenance.

There is a similar need to build a maintenance culture in the other sub-sectors and to put it into practice. Maintenance cost recovery from pricing policy, under the primary responsibility of the River Transport Authority, Airport Authority and Rail Operator, would help to ensure that the required funding would be available.

Funding from government and public entities sources. Capital budget for transport was about 9% to 10% of national budget in 2010 and 2011. Relative to non-oil GDP, it stood at around 3%. At this level of spending there is no prospect to close the huge gap in transport capacities; at these levels of spending transportation would remain a major impediment to economic development. The challenge is to transform this vicious circle into a virtuous one which implies a significant increase in spending on maintenance and development of transport infrastructure.

In the proposed financing plan, Government and public entities funding would start at around \$1500 million in 2012, which is close to 2011, and increase steadily to about \$790 million in 2020. If funding could not be mobilized on the required scale, the implementation period of some components, like the much needed construction/upgrading to of national trunk roads, would have to be extended. This would have implications for the development of domestic and regional markets for agricultural products and hence for incomes, employment and livelihoods.

Private funding. Transport services are provided by private operators. All the works and consultancy services in the program will be contracted to the private sector. The program also gives room for the private sector to be involved in the funding for the provision of infrastructure through suitable PPP-type arrangements. The proposed

levels of private spending are modest in the decade ahead, but these initiatives would set the stage for a substantial expansion in the role of the private sector in the following decade.

The attractiveness of PPP options is closely linked to traffic volumes. Juba, Wau and Malakal airports offer good prospects of traffic growth. Transaction advisory team services are proposed for the presumed concession arrangements for one or more airports. Current volumes of traffic on rail and river are major concern. It is hoped that, with time, relations with the North would be normalized, enabling significant traffic growths. Planned studies, training and technical assistance in the short term would also help to reduce risks and uncertainties on private funding availability in giving more light and details in the way forward and supporting the implementation of the required actions.

7.8.3 Implementation Capacities

The newly established Road Authority, State MoPIs and other new entities that are being set up, will have a central role in building the implementation capacities of line agencies, in particular in the area of procurement and financial oversight during the design and implementation of the program. Multiple specific skills are needed at a time when the country is faced with a general dearth of qualified individuals. There are significant risks of mis-procurement, delays in start-up and completion, and cost overruns. As indicated elsewhere in this Chapter, the program provides for a significant technical support.

In the past, some donors decided to entrust international consultants with the overall management of projects they were funding, instead of going through the established Project Management Team under DRB. Such situations should be avoided in the future. Line agencies and authorities should be backed up in their official roles and responsibilities while providing them with strong institutional support thus, contributing effectively to capacity building.

Support to domestic private sector development would continue through multi-year maintenance contracts, small-scale labour force works and incentives in procurement procedures to encourage international and local joint ventures or sub-contracting. Donors should aim to manage workloads by agreeing on common rules of procedure, implementation modalities and shared reporting.