MINISTRY OF WORKS AND TRANSPORT (MOWT)
THE REPUBLIC OF UGANDA

THE PROJECT FOR RURAL ROAD NETWORK DEVELOPMENT IN ACHOLI SUB-REGION IN NORTHERN UGANDA

FINAL REPORT

VOLUME 1: SUMMARY REPORT

APRIL 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD.
EIGHT-JAPAN ENGINEERING CONSULTANTS INC.
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN

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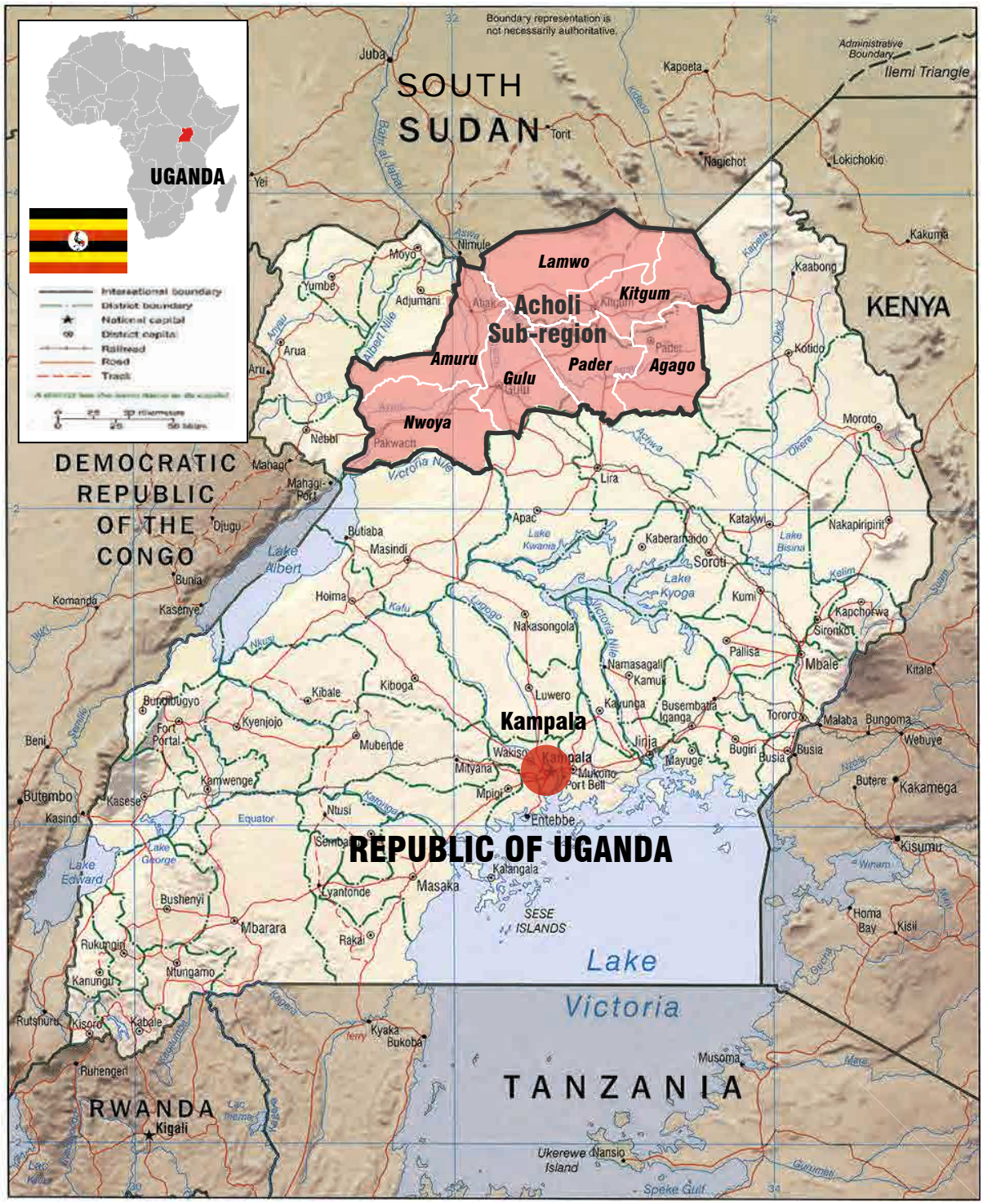
The exchange rate applied in this Study is:

1.00 USD = 2,522.7 Ushs.* (Ugandan Shillings)

(*The average exchange rate in 2011)



■Area	241 thousand km^2	■GNI per capita	US$ 460 (2009, WB)
■Population	32.7 million (2009,WB)	■Economic Growth	7.0% (2009, WB)
■Capital	Kampala (with a population of 1.2 million in 2002)	■Major Economic Sectors	[Agriculture] Fish, Coffee, Tea, Cotton [Mining] Copper, Mineral Phosphate, Tungsten [Industry] Textiles, Tobacco, Cement
■Ethnic Groups	Buganda, Langi, Acholi etc.		
■Language	English, Swahili, Luganda, etc		
■Religion	Christian (60%), Traditional Belief (30%), Muslim (10%)		
■Currency	Ugandan Shillings (Ushs.)		

Location Map of Study Area

Outline of the Project

1. Country: Republic of Uganda

2. Project Name: The Project for Rural Road Network Development in Acholi Sub-region in Northern Uganda

3. Execution Agency: Ministry of Works and Transport (MoWT)

4. Study Objective: The overall goal of the Study is to accelerate the IDP's resettlement process and to improve the livelihood of people who have returned to their original place through establishing a Master Plan for the rural road network and enhancing regional development in Northern Uganda.

5. Study Contents:

1) Establishing a Regional Development Plan

To establish mid term (2018) and long term (2030) regional development plans for Acholi Sub-region through SWOT analysis based on a social situation survey.

2) Current Road Condition Survey

To comprehend road operation and maintenance issues and future traffic demands in Acholi Sub-region through traffic and road inventory surveys.

3) Establishing Rural Road Network Master Plan

To propose a Rural Road Network Plan which will have positive effects on the regional development plan for Acholi sub-region. To select priority projects which are to be realized within the target years of mid term (2018) and long term (2030).

4) Implementation of Pilot Projects

To study an appropriate organizational structure for Community Access Road (CAR) maintenance work adopting Labour Based Technology (LBT) involving MELTC and the District engineer as well as the sub-county officers.

5) Selecting High Priority projects

To select high priority projects to be realized immediately and to prepare preliminary design, cost estimation and "IEE level" environmental studies on those high priority projects in order to support the Ugandan side in attempting to obtain financing for the projects.

6) Technical Transfer

To implement technical transfer regarding Road Network Master Planning to district engineers. To implement technical transfer of GIS to district and MoWT engineers.

6. Study Results and Recommendations

(1) Study Results

1) Based on the existing development plans and relationship between South Sudan and Acholi Sub-region, a spatial structure for future Acholi Sub-region with a "Double Corridor" was proposed. The double corridor consists of two international roads, namely the "Kampala- Gulu- Juba" route and the "Lira- Kitgum- Torit" route.

2) One of the goals of mid-term (2018) regional development is "to improve accessibility to social services". Community Access Roads (CARs) have an important role in achieving that goal, therefore, the best maintenance method to maintain CARs in good condition through daily and periodic maintenance was studied by implementing pilot projects. As a result, it was found that involving MELTC is important, especially to adopt LBT, which is expected to benefit IDP returnees. As for LBT, it was also confirmed that the "Donou Method" is quite useful for the maintenance work.

3) The other goals of mid-term (2018) regional development are "to increase production of commercial agriculture and to encourage inter and intra regional trade and commerce" and "to promote small and medium scale industry". In order to achieve these goals, three alternatives for the road network were studied and evaluated by a "Strategic Environmental Assessment". As a result, it was found that the alternative that considered a balance of economically focused and environmentally focused criteria is the most appropriate for the road network in Acholi Sub-region. The priority projects have been derived from this study and the result of reviews of reports regarding such projects as the "Municipal road improvement" and "public transportation improvement".

4) Regarding the action plan for high priority projects, it is recommended that two national road projects (IR1 and IR2) are to be listed in the next phase of the Road Sector Development Plan (RSDP). One of the national road projects, IT1, has high feasibility; therefore, it is recommended to apply foreign loan assistance. Gulu Municipal Roads Improvement project is recommended to apply for a Japanese Grant Aid Program, and MoWT has prepared the application.

(2) Recommendations

1) In order to expand economic activities in Acholi Sub-region, It is recommended to start the High Priority Projects as soon as possible, expecting the synergic effects with the loan projects currently in progress between Gulu and Nimule.

2) In the rural area of Acholi Sub-region where almost all IDP had already resettled, it is expected to activate the regional economy through exploiting the close market of South Sudan and providing technical assistance which will lead the current dominant subsistence agriculture into commercial agriculture.

3) For two major service centres, Gulu city and Kitgum city, it is recommended to promote small and medium scale industries such as food and processing, through providing software measures such as the "borderless framework" and "deregulation of taxation" as well as hardware measures such as developing infrastructure and future land use plans.

4) It is viewed that "capacity development" for each district will be required considering the new government policy of using a "force account" to maintain district roads. Regarding maintenance of CARs, improvement of management ability of contractors and awareness-rising for residents regarding LBT will also be required. To respond to these requirements, it is recommended to request "technical assistance programs" provided by donor countries including Japan.

5) It is recommended to utilize GIS maps for appealing the priority of specific projects among the road sector development plan, with cooperation of MoWT in the field of graphic processing.

THE PROJECT
FOR
RURAL ROAD NETWORK DEVELOPMENT
IN ACHOLI SUB-REGION IN NORTHERN UGANDA

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- ABBREVIATIONS -

A	AASHTO	American Association of State Highway and Transportation Official
	ACF	Action Centre la Faim
	ACTED	Agency for Technical Cooperation and Development
B	B/C	Cost Benefit Ratio
	BQ	Bill of Quantities
	BS	British Standards
C	CAD	Computer Aided Design
	CAR	Community Access Road
D	DANIDA	Danish International Development Agency
	DBST	Double Bituminous Surface Treatment
	DDP	District Development Plan
	DFID	Department for International Development
	DIT	Dar es Salaam Institute of Technology
	DUCAR	District, Urban and Community Access Roads
	DUCARIP	The 10-year District, Urban and Community Access Roads Investment Plan
E	EC	European Commission
	EIA	Environmental Impact Assessment
	EIR	Environmental Impact Review
	EIRR	Economic Internal Rate of Return
	EIS	Environmental Impact Study
	EU	Europe Union
G	GIS	Geographic Information System
	GKMA	Greater Kampala Metropolitan Area
	GPS	Global Positioning System
H	HC	Health Centre
I	IDP	Internally Displaced Person
	IEE	Initial Environmental Examination
J	JICA	Japan International Cooperation Agency
K	KTC	Kisii Training Centre
L	LBT	Labour Based Technology
	LCS	Low Cost Sealing, Low Cost Surfacing
	LRA	Lord's Resistance Army
	LRFD	Load and Resistance Factor Design
M	MELTC	Mt. Elgon Labour-based Training Centre
	MoLG	Ministry of Local Government
	MoWHC	Ministry of Works, Housing and Communications
	MoWT	Ministry of Works and Transport
N	NDP	5-year National Development Plan
	NEMA	National Environment Management Authority
	NGO	Non-Governmental Organizations

	NPV	Net Present Value
	NTMP	National Transport Master Plan
	NUDEIL	Northern Uganda Development of Enhanced Local Governance Infrastructure and Livelihoods
	NUREP	Northern Uganda Rehabilitation Programme
	NUSAF	Northern Uganda Social Action Fund
	NUTI	Northern Uganda Transition Initiative
O	OD	Origin and Destination
	O&M	Operation and Maintenance
P	PCU	Passenger Car Unit
	PEAP	Poverty Eradication Action Plan
	PPDA	Public Procurement and Disposal Act
	PRDP	Peace, Recovery and Development Plan for Northern Uganda
R	RAMPS	Rehabilitation and Maintenance Planning System
	RC	Reinforced Concrete
	ROW	Right of Way
	RSDP	Road Sector Development Programme
S	SPRING	Stability, Peace and Reconciliation in Northern Uganda
	STRADA	System for Traffic Demand Analysis
	SWOT	Strengths, Weaknesses, Opportunities and Threats
T	TTC	Travel Time Cost
U	UBOS	Uganda Bureau of Statistics
	UDSM	University of Dar es Salaam
	UGX	Uganda shillings
	UNHCR	United Nations High Commissioner for Refugees
	UNOCHA	United Nations, Office for the Coordination of Humanitarian Affairs
	UNRA	Uganda National Road Authority
	URF	Uganda Road Fund
	USAID	United States Agency for International Development
	USD	United States Dollar
	Ushs.	Uganda shillings
	UXO	Unexploded Ordnance
V	VOC	Vehicle Operating Costs
W	WB	World Bank

1. INTRODUCTION

1.1 Background of the Survey

Northern Uganda had been a self-sustained area showing a steady economic growth, underpinned by its arable land suitable for rice, beans, millet, maize, and cotton production. In addition, the country's villagers had the additional means to gain cash by exporting to Sudan their surplus crop products. However, Northern Uganda currently has the largest proportion of people living in poverty in the country, estimated to account for 61 % of the region's population, or almost twice the national level. This high level of poverty can be attributed to the Lord's Resistance Army (LRA) insurgency. During the 20 year conflict beginning in the 1980s, much of the basic social infrastructure was destroyed or abandoned, and the local government became non-functional in the region. In particular, 90 % of the population were displaced (IDP: Internally Displaced Person) from their original villages in the Acholi Sub-region. Since the cease-fire agreement concluded between LRA and the Government of Uganda in August 2006, the Government of Uganda has emphasized and facilitated the return process of IDPs. However, many challenges still remain in the process since houses and social infrastructures such as roads, water wells, and health centres had been destroyed during the conflict.

The National Peace, Recovery and Development Plan (PRDP) was established in October, 2007 in order to guide the IDPs return, resettlement and rehabilitation. PRDP and the District Development Plans (DDPs) in Northern Uganda recognize the importance of, and give priority to, road improvement. However, the priority projects suggested in PRDP and DDPs lack due regard to the budget constraints. Although some of the road and bridge projects in Acholi Sub-region have been implemented by donors such as the World Bank and the EU, the road conditions of Amuru and Nwoya Districts were still worse than those of the other districts because of lack of funds from donors and the central government.

In 2009, the Government of Uganda submitted an application to Japan for "The Project for Rural Road Network Planning in Northern Uganda (hereinafter called the Previous Survey)" in order to support the lagging two districts; Amuru and Nwoya. The Previous Survey has been conducted by JICA since August 2009 and the Master Plan for Rural Road Network was proposed.

1.2 Rationale and Objectives of the Survey

As mentioned above, basic infrastructure, especially road infrastructure, deteriorated in Northern Uganda due to the 20 year-conflict. Improvement of the road network and condition is expected to greatly contribute to IDPs return process and by extension, the post-war rehabilitation in Northern Uganda.

The Previous Survey, accordingly, formulated the Master Plan for the rural road network and targets Amuru and Nwoya District[1)] as the focus area. Although the focus of the Previous Survey was limited to Amuru and Nwoya Districts, the methods and techniques for master planning explored in the Previous Survey were applicable to the wider Acholi Sub-region in Northern Uganda.

The overall goal of this Survey is to accelerate IDPs' resettlement process and to improve the livelihood of people who have returned to their original home villages through establishing a

[1)] Amuru District was divided into two districts in July 2010. The other districts in Acholi Sub-region, Kitgum and Pader, were also divided into two districts in January and July 2010 respectively.

Master Plan for the rural road network and enhancing regional development in Northern Uganda.

1.3 Structure of the Report

This Draft Final Report for "the Project for Rural Road Network Planning in Acholi Sub-region in Northern Uganda" is composed of the following twenty three chapters.

In Chapter 1 "Introduction", the background and objectives of this survey were overviewed.

Chapter 2 "Regional Context: Northern Uganda and Acholi Sub-region". Chapter 3 "Present Status of the Study Area" includes the current situation of Achol Sub-region and the surrounding area. The result of the review on related national and district development plans and assistance situation of international donors are stated in Chapter 4 "Review of Existing Development Plans".

Chapter 5 and Chapter 6 include road conditions and transport situation of Acholi Sub-region and the result of an additional survey for South Sudan. In Chapter 7 and Chapter 8, social economic framework and regional development issues are analyzed to introduce Chapter 9 "Regional Development Plans".

Chapter 10 "Traffic Demand Forecast" was implemented to prepare data for Chapter 11 "Road Network Development Plan". Chapter 12 "Strategic Environmental Assessment" shows the result of evaluation of alternatives of priority trunk road networks and working group meetings on it.

Chapter 13 and Chapter 14 include preset situations and plans for the road maintenance and operation system in Acholi Sub-region.

Technical transfers on road surveys using GPS and GIS Processing techniques are presented in Chapter 15.

Chapter 16 includes objectives, scope and implementation plan of pilot projects on road maintenance works of CARs by LBT method.

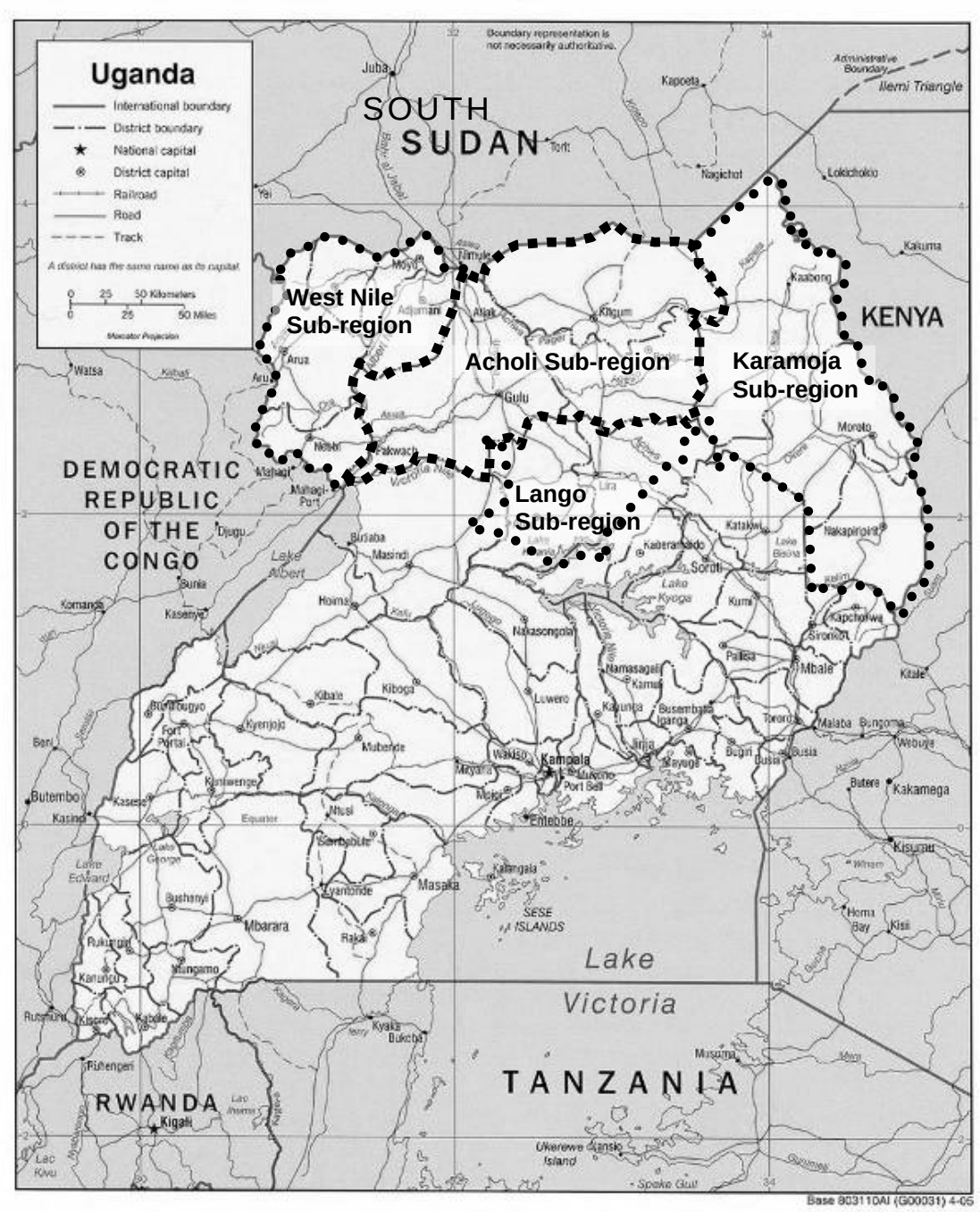
Chapter 17 shows the result of selection for high priority road projects in the mid-term and long term periods. The preliminary design, cost estimate and environmental considerations for the high priority projects are stated in Chapter 18, Chapter 19 and Chapter 20 respectively.

In Chapter 21, the high priority projects are evaluated. The methods of realization of those high priority projects are proposed in Chapter 22, and finally "Conclusions and Recommendations" are stated in Chapter 23.

2. REGIONAL CONTEXT: NORTHERN UGANDA AND ACHOLI SUB-REGION

2.1 Northern Region of Uganda

The Northern Region occupies the northern part of Uganda. Its area accounts for 35% of the total area of Uganda. The Northern Region is composed of four sub-regions, namely Acholi, West Nile, Karamoja and Lango.



Source: JICA Study Team

Figure 2-1 Acholi Sub-region in Northern Uganda

2.2 Acholi Sub-region

In the 1970s, the former Acholi Province was divided into Gulu and Kitgum Districts. In 2001, two counties of Kitgum District were broken off and a new district, Pader District, was made out of them. In July 2006, Kilak and Nwoya Counties of Gulu District were carved out and became Amuru District. Furthermore, Lamwo County of Kitgum District was upgraded to a new district in early 2010. Nwoya County of Amuru District and Agago County of Pader District were also upgraded to new districts in July 2010. As a result, at present, Acholi Sub-region is composed of seven districts.

The area of Acholi Sub-region is 28,279 square km, which accounts for 12% of the total area of Uganda. In August 2009, the population of Acholi Sub-region was about 1,227,000, which accounted for 4% of the total population of Uganda.

Acholi Sub-region developed 120 IDP camps in Gulu, Kitgum, Lamwo, Pader, Agago, Amuru and Nwoya Districts and accommodated over 1.3 million IDPs in those camps. About 184,000 people still lived in 120 IDP camps in Acholi Sub-region in August, 2009. However, compared to the original population of IDP camps in 2005, 86% of the people who used to live in IDP camps had already moved out of the IDP camps to return to their home villages or move to transit sites. Examining the IDP return rates in the districts, it is apparent that Gulu District has the highest percentage of people who have moved out of the camps already. On the other hand, 80% of the people who lived in the camps moved out of them in Amuru and Nwoya Districts.

Table 2-1 shows population of IDP camps, transit sites and home villages in seven districts in Acholi Sub-region in 2011. In Acholi Sub-region, 0.2% of the population still lives in the camps, 4.2% in transit sites and 95.7% in home villages. Among the districts, 8.2% of the population still lives in transit sites in Pader and Agago Districts, while 0.8% of the population lives in transit sites in Gulu District. On the other hand, 99% of the population lives in home villages in Gulu District, while 91.8% of the population lives in home villages in Pader and Agago Districts.

Table 2-1 Population of IDP Camps, Transit Sites, and Home Villages, July 2011

District	Total Population in District (counted)	Number of IDP Camps	Population in IDP Camps (% in IDP Camps)	Number of Transit Sites	Population in Transit Sites (% in Transit Sites)	Population in Home Village (% in Home Villages)
Amuru	275,439	0	0 (0.0%)	50	11,268 (4.1%)	264,171 (95.9%)
Nwoya						
Gulu	234,762	1	366 (0.2%)	13	1,963 (0.8%)	232,433 (99.0%)
Kitgum	328,819	6	2669 (0.8%)	65	6,582 (2.0%)	319,568 (97.2%)
Lamwo						
Pader	397,416	1	27 (0.0%)	154	32,546 (8.2%)	364,843 (91.8%)
Agago						
Total	1,236,436	8	3062 (0.2%)	282	52,359 (4.2%)	1,181,015 (95.5%)

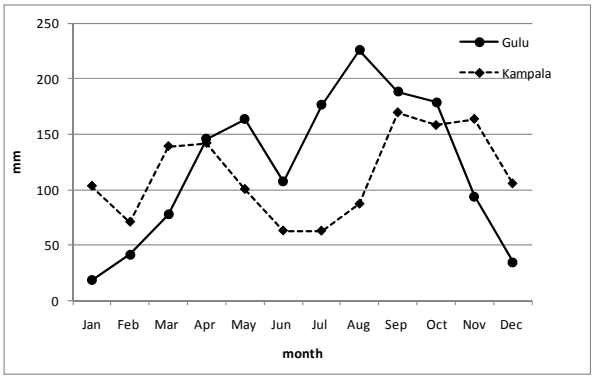
Source: UNHCR

3. PRESENT STATUS OF STUDY AREA

3.1 Natural Conditions

Acholi Sub-region is categorized as a tropical dry climate similar to the southern part of Sudan. The land itself is generally well watered in rainy season and fertile. Most of land is covered by wood and green. According to the data in 2005, woodland, bush and grass land comprise approximately 48% of total land.

Acholi Sub-region enjoys dry and rainy seasons the same as the rest of Uganda. The rainy season occupies from late March to the end of November and hits two peaks in a year. The average rainfall was approximately 1,450mm per annum during 2006 to 2010. Compared to the southern part of Uganda, such as Kampala, the rain and dry seasons in Acholi Sub-region are clearly distinct in terms of rainfall.



Source: Statistical Abstract 2011, UBOS

Figure 3-1 Average Rainfall in Gulu and Kampala 2006 - 2010

3.2 Local Government Administration

In Uganda, the local government is made up of five levels of hierarchy, i.e. from LC5 to LC1. LC1 is District, LC2 is County, LC3 is Sub-county, LC2 is Parish and LC1 is Village.

The District Council is the highest decision-making body with fully-fledged legislative and executive powers. The District Chairperson, who is elected through universal adult suffrage, is the political head of the District. The Chief Administrative Officer (CAO), who is appointed by the District Service Commission (DSC), is the administrative head of the District, and is the chief accounting officer for the district.

3.3 Population

The population of Acholi Sub-region was estimated to be 1,464,000 in 2010 by Uganda Bureau of Statistics (UBOS). This accounts for 4.6% of Uganda's total population. The population growth rate of Acholi Sub-region was 3.8% per annum between 2002 and 2010. Compared to the national rate, this growth rate is relatively high. UBOS estimated that Gulu Town had a population of 149,900 by mid-year. Kitgum Town is the second largest urban centre in Acholi Sub-region. The urban population was 41,821 in 2009, and was estimated to be 57,300 by mid-year 2010. The population density of Acholi Sub-region was 38 persons/sq.km in 2002. In 2010, the population density of was estimated to be 52 persons/km^2. The highest population density is in Gulu district to which the largest contributor is the urban population of Gulu Town.

3.4 Agricultural Sector

Agriculture is the backbone of the regional economy in Acholi Sub-region. The major source of household incomes is sale of crops. More than 80% of the population is estimated to engage in agriculture according to the interviews with district offices in Acholi Sub-region. Maize, sorghum and millet are principal foods for the people that live in the study area. Upland rice is recently in fashion to be grown as a cash crop. Cotton came down in price in the past, however, it has tended to recover recently. Estimated production in Acholi Sub-region per year is 90,000ton of Cassava, 46,000ton of Sorghum and 34,000ton of Ground nuts. Sweet potato and cassava can be harvested over a relatively long period and as a result, they are planted for food security as well.

3.5 Commercial Sector

The private sector of Acholi sub-region is still weak. There are no large-sized factories and only a few small-scale agro processing industries such as grinding mills, making yogurt and rice hullers. Besides, only few construction companies are there as well. Service industries have developed in urban areas such as Gulu and Kitgum towns. In these towns, some service industries are operating such as commercial banks, restaurants, small-sized supermarkets, retailers, hotels, hair salon shops, motorcycle taxis (boda-boda) and coach stations. Although electricity is not available in most parts of the district, a mobile telephone network covers both rural and urban areas, which makes it possible to provide easy and fairly affordable telecommunication services. In order to trade in agricultural products, there are many trading centres and large-sized trading centres in Acholi Sub-region.

The tourism sector is one of the economic sectors promising to earn foreign currency in Uganda. In Acholi Sub-region, Murchison Falls National Park is located over two districts, namely Nwoya District and Masindi District.

3.6 Social Infrastructure

People in Acholi Sub-region basically get water from boreholes, shallow wells, springs, motorised wells (for piped water system) and so on. The total number of water points in Acholi Sub-region was 2,766 in 2010 according to the database established by UNOCHA. Gulu enjoys the highest rate of accessibility to safe water. A total of 92% of the population of Gulu district, 86% of Kitgum and Lamwo districts, and 58% of Pader and Agago districts had access to safe water. Since the national level was 65%, Pader and Agago districts were below of average.

The delivery of health services in Uganda is done by both the public and private sectors. Public health services in Uganda are delivered through health centre IIs (HC II), health centre IIIs (HC III), health centre IVs (HC IV), general hospitals, regional referral hospitals (RRHs) and national referral hospitals (NRHs). In Acholi Sub-region, there are 150 health units; 7 hospitals, 6 HC IVs, 46 HC IIIs, and 91 HC IIs. In fact, several of these health centres are not operated currently.

In the study area, there are 646 primary schools, 76 secondary schools, 1 tertiary school and 1 university. Education accessibility level of the study area was evaluated to be below the national average. As for primary and secondary schools, there should be at least two teachers per class, of whom one should be qualified. Unfortunately, most of the schools in the study area do not satisfy these requirements at present.

4. REVIEW OF EXISTING DEVELOPMENT PLANS

4.1 Government Development Plans and Programmes

For the development of Uganda and Northern Uganda, the following three national development plans were established and have been implemented, aiming at human development, economic growth and reduction of poverty and regional disparity. In this chapter, these four development plans were reviewed to understand future development directions of the study areas and road sub-sector.

- **Poverty Eradication Action Plan (PEAP),** 2004/5-2007/8

  The PEAP 2004/5-2007/8 is the government's national framework for all actors in the country and it was designed to achieve a number of key objectives in order to enable Uganda to meet its Millennium Development Goals and economic growth objectives.

- **Peace, Recovery and Development Plan for Northern Uganda (PRDP)**, 2007-2010

  The PRDP is the regional stabilization and reconstruction plan intended to regain peace, recovery and development in Northern Uganda, which covers three sub-regions, namely West Nile, Acholi and Karamoja Sub-regions. It was drafted for implementation in the 3-year period of 2007-2010. However, in actuality, its implementation was started in the fiscal year of 2009/10.

- **5-year National Development Plan for Uganda (NDP)**, 2010-2015

  The NDP of 2010-2015 intended to set Uganda on the path to becoming a middle-income economy. It replaces the PEAP and outlines the government's intention to improve road and rail networks, create employment opportunities, improve labour force distribution and use the private sector as the "engine of growth and development".

4.2 National Road Development Plans

(1) National Transport Master Plan (NTMP) 2008-2023

Uganda has drawn up a national transport master plan that sets out a framework for development of the transport sector over the next 15 years (2008-2023). The plan includes a transport master plan for the Greater Kampala Metropolitan Area – (GKMA). The plan provides analysis and a 15 year sector investment plan, addresses the necessary management framework and reflects the role transport plays in facilitating economic and social development. It aims at creating highly effective trading links through the Northern and Central Corridors to the ports of Mombasa and Dar es Salaam and will contribute to regional cooperation in transport within the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA).

For the road sub-sector, the plan includes promotion of the local consulting and contracting capacity including the performance of labour based maintenance. The investment plan for the road sub-sector is based on the Road Sector Development Programme (RSDP), the UNRA Strategic Plan and the District and Urban Roads Improvement Programme (DUCARIP) of 2008.

(2) The Ten Year District, Urban and Community Access Roads Investment Plan (DUCARIP)

The objective of the DUCARIP is to provide a financing framework for investments in district, urban and community access roads, based on the Strategy for Sustainable Maintenance of District, Urban and Community Roads, which was approved by the parliament in April 2005.

To reflect exiting conditions of community access roads, the DUCARIP considers the following different access levels for community access roads:

- Access Level I: Accessible during dry seasons and most periods of wet seasons.
- Access Level II: Accessible during dry seasons and limited periods of wet seasons.
- Access Level III: Accessible only during dry seasons.

Most of the community access roads are presently not in motorable condition and hence not even to access level III.

4.3 Review of Assistance Situation and Policies of International Donors

In 2004, with the support by UNOCHA, the government of Uganda developed the National Policy for Internally Displace Persons. The document defined the role of different actors and consequently established the Inter-Agency Technical Committee (IATC) as a planning and coordinating body. The committee consists of the Office of Prime Minister (OPM), relevant ministries, private sectors, UN agencies, NGOs and donors.

Since 2007, the government of Uganda has officially tried to implement transition policies. IDP camps were supposed to be closed by the end of 2009. The returning process of IDP is moving forward even though there is some delay. As of August 2011, only 8 camps still remained in Acholi Sub-region, out of 121 camps 2005. Most of the IDPs have settled in either their original villages or new sites.

Under such circumstance, UN, NGOs and international donors decided in 2010 that the humanitarian situation in Uganda no longer warranted the consolidated appeal process in 2011. Accordingly, many programmes of donors related to rehabilitation have been phasing out in northern Uganda such as the Northern Uganda Social Action Fund (NUSAF) by World Bank, Northern Uganda Rehabilitation Programme (NUREP) by European Union (EU), Northern Uganda Transition Initiatives (NUTI) by USAID, and Stability, Peace and Reconciliation in Northern Uganda (SPRING) by USAID.

In this situation, the following donors have implemented programmes and projects not only for IDPs but also social and economic development in northern Uganda.

(1) Northern Uganda Social Action Fund Phase 2 (NUSAF 2)

The second phase of the Northern Uganda Social Action Fund (NUSAF) was launched in February 2010 with approximately 124 million USD finance support by World Bank. NUSAF 2 covers 40 districts in northern and eastern Uganda including the entire Acholi sub-region. NUSAF corresponds to one of the strategic objectives established by PRDP which is "Revitalization of the Economy". NUSAF in northern Uganda therefore mainly focuses upon

(2) Agricultural Livelihood Recovery Project for Northern Uganda (ALREP)

ALREP has started to finance agricultural projects in northern Uganda since March 2009 after closure of NUREP funded by EU in order to increase the ability of returnees in Northern Uganda to restart productive life through access to necessary agricultural inputs.

(3) Northern Uganda Development of Enhanced Local Governance Infrastructure and Livelihood (NUDEIL)

The NUDEIL program is a transitional development programme designed by USAID in line with the Peace, Reconciliation, and Development Plan (PRDP) of the Ugandan government. The purpose of NUDEIL is to provide technical support to district local governments to improve their capacity in engineering design, procurement process, financial management, transparent reporting and public outreach, and to deliver services at the community level through rehabilitation of public infrastructure. At first, NUDEIL was going to be operated three years, from 2009 to 2012. However, it was extended one year due to delay of the infrastructure development part. The target area is part of Acholi Sub-region including Amuru, Nwoya, Gulu, Lamwo and Kitgum districts.

Objectives of NUDEIL phase 2 are to encourage district development in northern Uganda and consultation to the local governments. The program includes infrastructure development (road, water, education and health), and capacity building of local governments. The program is also developing a GIS database with the aim to identify the location of their projects and to use as a tool for the district planning. The GIS database is basically compiled from a variety of existing sources. Base upon this, they add their own data of some water points and community access roads.

The target of the road sector is community access roads. Initially, the target length of the roads was 5,000 kilometres, however, it is difficult to achieve this target due to delay of selection of the construction process. The NUDEIL program specified 12 criteria to select road projects. Each district selects candidate roads following the district plan and the needs of the local people and the program management consultant assesses the projects.

(4) Restoration of Agricultural Livelihoods in Northern Uganda Phase 2 (RALNUC2) and Development Assistance to Refugee-hosting areas Phase 2 (DAR2)

RALNUC2 and DAR2 aim to improve livelihoods in refugee hosting and returning IDP areas by providing support for increased agricultural production and productivity. These programs are financed by DANINA, and aligned with the Peace, Recovery and Development Plan for the Northern Uganda (PRDP). The implementation period is from 2009 to 2013, and the total budget is USD 20 million. Program area is Amuru and Nwoya of Acholi Sub-region (RALNUC2), and Adjumani, Moyo, Yumbe, Koboko, Maracha and Aura of the West-Nile Region.

(5) Livelihoods and Enterprises for Agricultural Development (LEAD)

LEAD has launched in August 2008 by USAID in order to support visible and sustainable results through increased incomes, improved livelihoods and expanded rural employment opportunities. The programme shall continue for a five year period. LEAD basically does not supply any equipment to farmers for agricultural development, but only technical supports and awareness.

(6) UNHCR SO Gulu

Sub Office (SO) Gulu has been covering the entire internally displaced persons (IDP) operation in Acholi Sub-region, with one field staff based in Pader and one in Kitgum. Activities of UNHCR SO Gulu are mainly to support sustainable return of IDPs and to backup their living environment.

(7) UNICEF Gulu Office

Basic philosophies of UNICEF are three: 1) to keep children alive called ALIVE related to the health sector, 2) to keep children and mothers safe, and 3) to keep children learning. UNICEF Gulu Office is covering the activities in Acholi Sub-region.

UNICEF Gulu Office understands the issues in Acholi Sub-region in terms of education as follows and is tackling them.

- Lack of the number of teachers in remote areas is one of the most serious issues in Acholi Sub-region. Many schools do not have teacher's accommodation due to the damage by war in this area. No teacher's accommodation and inconvenience of commuting to the school causes a decrease in the number of teachers and discourages them.
- The rate of dropouts in primary school is higher than in other regions. Limited school facilities including desks, chairs, and classrooms tend to cause many dropouts.
- Economic condition of parents also causes pupils to leave school.

(8) Community Agricultural Infrastructure Improvement Program (CAIIP)

CAIIP is implemented by the Government of Uganda through the District local Government and is funded by the African Development Bank. It's not a post-war reconstructive program but a program targeting the Whole country in phases and its main focus is the rural areas.

The project has two components i.e.

1. Socio-Economic
2. Infrastructural components.

The road infrastructure with the nature and scope of intervention in community access roads are summarized as bellow (phase II program).

Table 4-1 CAIIP Phase II Program in Acholi Sub-region

District	Number of selected sub-counties	Road length (km) projected for intervention/sub-county	Nature of intervention
GULU	5 out of 12	50	Full rehabilitation
PADER	3 out of 11	45	Full rehabilitation
AGAGO	3 out of 13	45	Full rehabilitation
KITGUM	3 out of 9	35	Full rehabilitation
LAMWO	3 out of 9	35	Full rehabilitation

Source: JICA Study Team

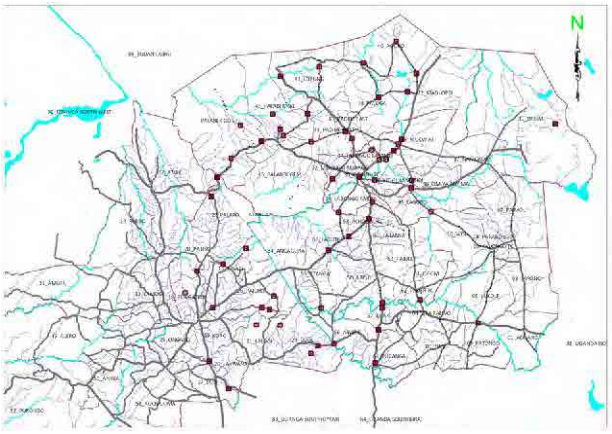
CAIIP projects are in Phases of three years with each phase targeting one geographical region of the county (north, south, east, west or central) the above table is for phase II. Phase I covered the east and central regions while Phase III is expected to benefit the western region.

The selection of the CARs in the sub-county for CAIIP intervention was done using a bottom up approach from the levels of village, parish, and sub-county up to the District level with the district providing the technical guidance to the sub-county.

5. ROAD CONDITION IN STUDY AREA AND SOUTH SUDAN

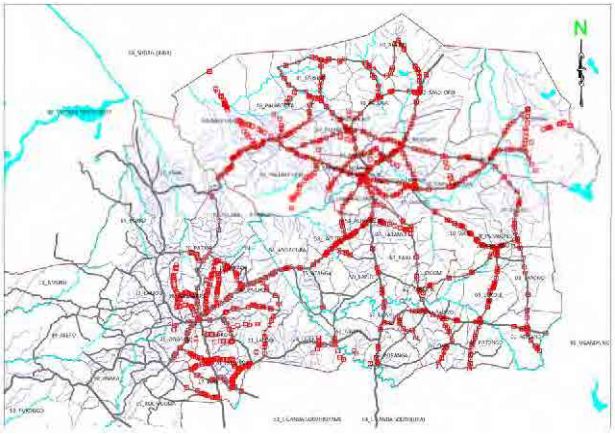
5.1 Survey Results of the Study Area

The network in the study area has been identified in a previous JICA Study. Some road sections which have not been identified in the previous JICA study were added to the network and the inventory survey was conduced accordingly. The drainage structures in the study area were surveyed and there were 1,531 surveyed drainage facilities. There are 74 of bridges included in the 1,531 drainage facilities in the study area.



Source: JICA Study Team

Figure 5-1 Location of Existing Bridges

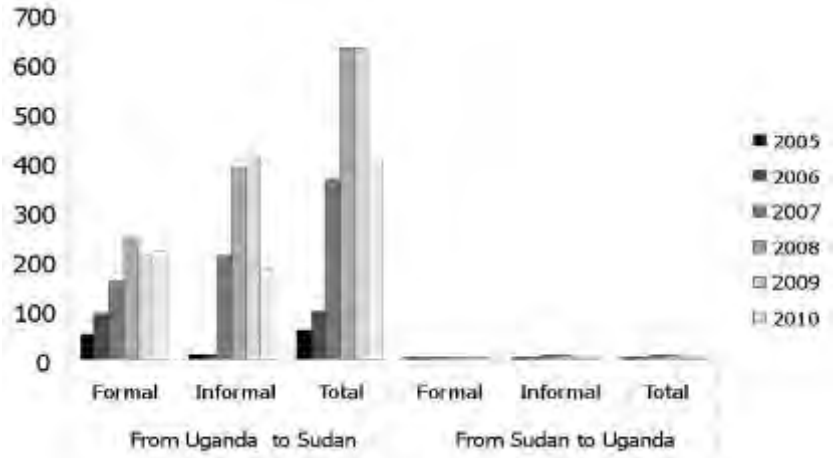


Source: JICA Study Team

Figure 5-2 Location of Existing Culverts

5.2 Present Status in South Sudan

South Sudan and Uganda have had strong ties, even before the independence, because of their historical and ethnic backgrounds. Recently, many Sudanese tourists are observed in Gulu town and it was realized that their purpose of travelling to Gulu was to purchase daily necessities. In response to such a state of affairs, there are many private sector investments such as construction of mega-scale super markets and hotels with foreign capital in Gulu and this trend is expected to continue. Gulu is, therefore, expected to develop as a commercial centre in not only Northern Uganda but also in the region covering the southern part of South Sudan. Cross-border trade, especially exports from Uganda to Sudan, has increased remarkably since 2007. In contrast, exports from Sudan to Uganda were very little.



Source: Enhancing the Recent Growth of Cross-Border Trade between South Sudan and Uganda (2011), World Bank,

Figure 5-3 Trade between Sudan and Uganda (million USD)

(1) Gulu –Atiak- Nimule- Juba Road

The existing road had not been tarmacked (i.e. murrum road) and no proper drainage system had been provided either, despite the fact that the road had been identified as an international corridor connecting South Sudan, Uganda and Kenya. As the importance of the road was recognized in terms of providing good transport to South Sudan, the rehabilitation project to upgrade it to a bituminous standard (DBST) road was formulated by the development partners. The road is divided into 3 sections in terms of financial resources in its implementation. The first section (Gulu –Atiak, 67km) is financed by WB, the second section (Atiak- Nimule, 34.9km) is financed by JICA and the third section (Nimule-Juba, 192km) is financed by USAID. The current status of the implementation is that the third section is now under construction and its anticipated completion is October 2012 according to the supervising consultant. To obtain an effective custom clearance system, construction of a gate and digitalized system shall be introduced that will improve the transparency of the procedure.

Long Queue of Trailers for Immigration/Custom Clearance on Uganda side

Immigration/Custom Office on Uganda side

Parking Area for Custom Clearance on South Sudan side

Immigration Office on South Sudan side

Source: JICA Study Team

Photo 5-1 Uganda - South Sudan Border at Nimule

(2) Juba City

Juba is the capital city of South Sudan; it is expanding towards the west and most of the 400,000 returnees from Northern Sudan have settled in the area. The project for construction of the New Nile Bridge is on-going with financial assistance from the Government of Japan and its completion is expected to be in 2015. This New Nile Bridge is expected to bring a stable and reliable connection with Uganda and Kenya via Juba- Nimule Road.

(3) Transport Sector Development Plans

There are two major transport modes in the country; the primary mode is road transport and the secondary is river transport. Generally, the road network is not well developed in the

northern region because there is a huge swamp that makes road construction work difficult and expensive. The busiest road is Juba- Nimule road (Central Corridor) and it is the only corridor connecting between Kenya, Uganda and the county. The corridor has catered to the transportation of the majority of import goods after independence.

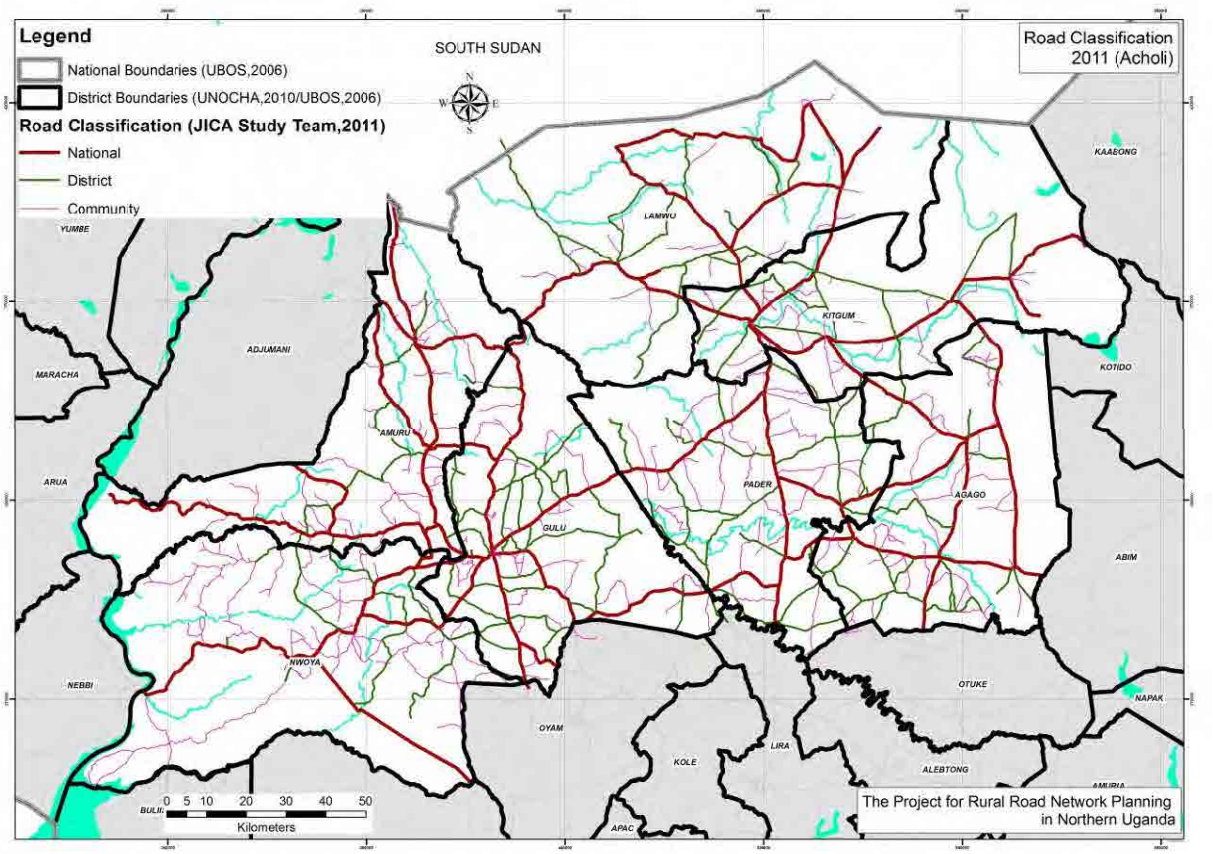
(4) Regional Development Plans

The Ministry of Transport and Roads has conducted the Feasibility Studies, Detailed Design and Preparation of Bidding Documents for the Phased Rehabilitation of about 7000km of Rural Roads in South Sudan with financial assistance from USAID. Its objective was to open up the secondary network to provide access roads that were expected to contribute to the development of the regional economy. The WB, UN and Ministry of Agriculture, GOSS have also focused on feeder road improvements with the same objective. In particular, some feeder roads in the area bordering Uganda have been identified as high priority.

5.3 Community Access Road Survey

Since this study is expected to establish a regional-wide road network, wider than the Previous Study, the proposed functional road classifications were arranged as indicated in Chapter 11 Table 11-2. As in this table, community access roads (CARs) are not included in those roads to be studied for traffic demand forecast and were not selected as priority roads based on the economic point of view. The priority sections of CARs which are required to be motorized roads shall be selected based on the social impact point of view by each sub-county who know the realistic conditions of the local area.

The priority sections of CARs selected by each sub-county are shown in Figure 5-4.



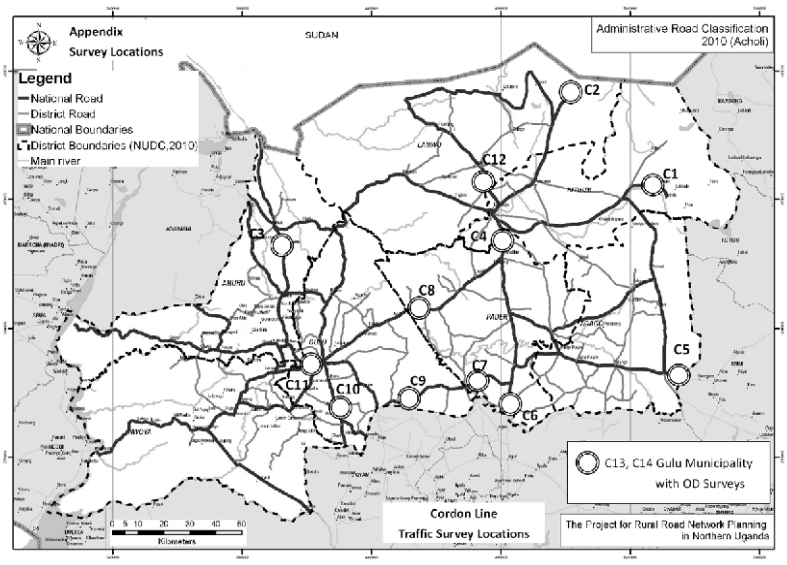
Source: JICA Study Team

Figure 5-4 Acholi Road Network including Priority Sections of CARs

6. TRAFFIC SURVEY

6.1 Traffic Situations in Acholi Sub-region

A cordon-line Traffic Survey was conducted at 14 locations mainly located along the national roads at district boundaries. The following map shows the survey locations.



Source: JICA Study Team

Figure 6-1 Cordon-line (Traffic Count) Survey Locations

The survey was performed for consecutive two (2) days on working days. Time of the survey is 12 hours (from 7:00 a.m. to 7:00 p.m.) for each survey location. Average daily traffic count results at the survey stations are shown in Table 6-1.

Table 6-1 Traffic Count Results

Category/Stations	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
Saloon cars, & Taxis	2	-	13	18	2	14	3	34	1	239	187	17
Light goods (vans, pickups & 4WD)	26	5	56	61	25	51	16	80	24	310	460	66
Small bus (minibuses and matatus)	3	1	3	24	-	13	3	2	1	51	106	-
Medium bus (Coaster)	6	-	1	5	-	3	1	-	-	8	14	-
Large bus (inter-region bus)	-	-	21	12	-	8	1	13	-	50	20	-
Light single unit truck(2 axle)	13	6	68	33	12	19	12	31	8	88	109	13
Medium - large single unit truck (3 axle)	4	7	32	11	-	10	2	10	1	95	69	10
Truck Trailer and semi trailer	-	-	88	6	-	4	-	3	1	112	83	1
Total	52	18	281	168	39	120	37	172	35	952	1,047	106
Motor-Bike	34	21	84	155	140	82	58	60	170	510	2,418	115
Bicycle/Cart	99	122	414	488	475	157	242	189	376	532	604	140
Pedestrian	234	192	1,108	906	1,181	445	443	837	796	389	784	187

Source: JICA Study Team

6.2 Traffic Features in Acholi Sub-region

A Home Interview Survey was conducted with approximately 671 individual households selected from Sub-counties in Gulu, Kitgum, Lamwo, Pader, and Agago Districts. These surveyed households were randomly selected to comprehend traffic features in Acholi Sub-region, regarding;

- Family attributes (no. of family members, monthly income, car ownership)
- Personal attributes (employment, monthly income and car ownership)
- Trip information (frequency, trip purpose, travel time and distance, mode of transport)

7. SOCIO ECONOMIC FRAMEWORK IN THE STUDY AREA

7.1 Population Projection in Acholi Sub-region

The following table tabulates the population projections in Acholi Sub-region.

Table 7-1 Summary of Results of Population Projection in the Study Area

District / Sub-county	2010	2018	2030	Growth Rate (2010/18)	Growth Rate (2018/30)
Gulu District	374,900	462,700	619,900	2.7%	2.5%
Awach	14,100	17,400	23,600	2.7%	2.6%
Bar-dege	46,000	56,900	76,400	2.7%	2.5%
Bobi	20,900	26,000	35,000	2.8%	2.5%
Bungatira	28,800	35,500	47,400	2.6%	2.4%
Koro	22,800	28,200	38,000	2.7%	2.5%
Lakwana	16,800	20,900	28,300	2.8%	2.6%
Lalogi	23,000	28,300	37,800	2.6%	2.4%
Laroo	26,700	32,800	43,800	2.6%	2.4%
Layibi	32,000	39,400	52,600	2.6%	2.4%
Odek	30,500	37,600	50,500	2.7%	2.5%
Ongako	18,000	22,200	29,600	2.7%	2.4%
Paicho	31,200	38,400	51,100	2.6%	2.4%
Palaro	8,300	10,200	13,400	2.6%	2.3%
Patiko	10,500	12,800	16,900	2.5%	2.3%
Pece	45,300	56,100	75,500	2.7%	2.5%
Kitgum District	228,900	309,600	475,300	3.8%	3.6%
Kitgum T.c.	57,300	77,400	118,900	3.8%	3.6%
Kitgum Matidi	16,000	21,600	33,100	3.8%	3.6%
Labongo Akwang	17,700	24,000	37,000	3.9%	3.7%
Labongo Amida	14,600	19,800	30,400	3.9%	3.6%
Labongo Layamo	12,100	16,200	24,600	3.7%	3.5%
Lagoro	17,800	24,100	36,800	3.9%	3.6%
Mucwini	20,600	27,800	42,400	3.8%	3.6%
Namokora	19,300	26,100	40,100	3.8%	3.6%
Omiya Anyima	22,700	30,800	47,600	3.9%	3.7%
Orom	30,800	41,800	64,400	3.9%	3.7%
Lamwo District	158,100	213,500	328,000	3.8%	3.6%
Agoro	22,700	30,600	46,800	3.8%	3.6%
Lokung	27,500	37,100	56,900	3.8%	3.6%
Madi Opei	14,100	19,000	29,000	3.8%	3.6%
Padibe East	17,400	23,300	35,700	3.7%	3.6%
Padibe West	16,300	21,900	33,300	3.8%	3.6%
Palabek Gem	17,300	23,600	36,700	4.0%	3.7%
Palabek Kal	17,500	23,700	36,500	3.9%	3.7%
Paloga	13,600	18,400	28,400	3.9%	3.7%
Parabek Ogili	11,700	15,900	24,700	3.9%	3.7%
Pader District	210,100	306,900	529,900	4.9%	4.7%
Acholibur	13,200	19,300	33,100	4.9%	4.6%
Angagura	14,800	21,600	37,000	4.8%	4.6%
Atanga	17,500	25,600	44,400	4.9%	4.7%
Awer	28,400	41,600	72,200	4.9%	4.7%
Kilak	7,100	10,500	18,500	5.0%	4.8%
Laguti	14,100	20,600	35,500	4.9%	4.6%
Lapul	23,500	34,400	59,700	4.9%	4.7%
Latanya	15,600	22,700	39,200	4.8%	4.7%
Ogom	10,800	15,500	26,100	4.6%	4.4%
Pader T.c.	12,800	18,700	32,500	4.9%	4.7%
Pajule	31,100	45,300	78,100	4.8%	4.6%
Puranga	21,200	31,100	53,600	4.9%	4.6%
Agago District	271,700	396,900	685,300	4.9%	4.7%
Adilang	27,500	40,300	69,800	4.9%	4.7%
Kalongo T.c.	14,400	20,600	35,100	4.6%	4.5%
Lapono	20,600	30,100	52,100	4.9%	4.7%
Lira Palwo	39,200	57,200	98,600	4.8%	4.6%
Lukole	22,200	32,400	56,000	4.8%	4.7%
Omot	25,600	37,400	64,600	4.9%	4.7%
Paimol	30,800	44,900	77,200	4.8%	4.6%
Parabongo	18,000	26,500	45,900	5.0%	4.7%
Patongo	44,000	64,400	111,400	4.9%	4.7%
Wol	29,400	43,100	74,600	4.9%	4.7%
Study Area	1,243,700	1,689,600	2,638,400	3.9%	3.8%

Source: JICA Study Team based on UBOS and UN data

8. REGIONAL DEVELOPMENT ISSUES IN THE STUDY AREA

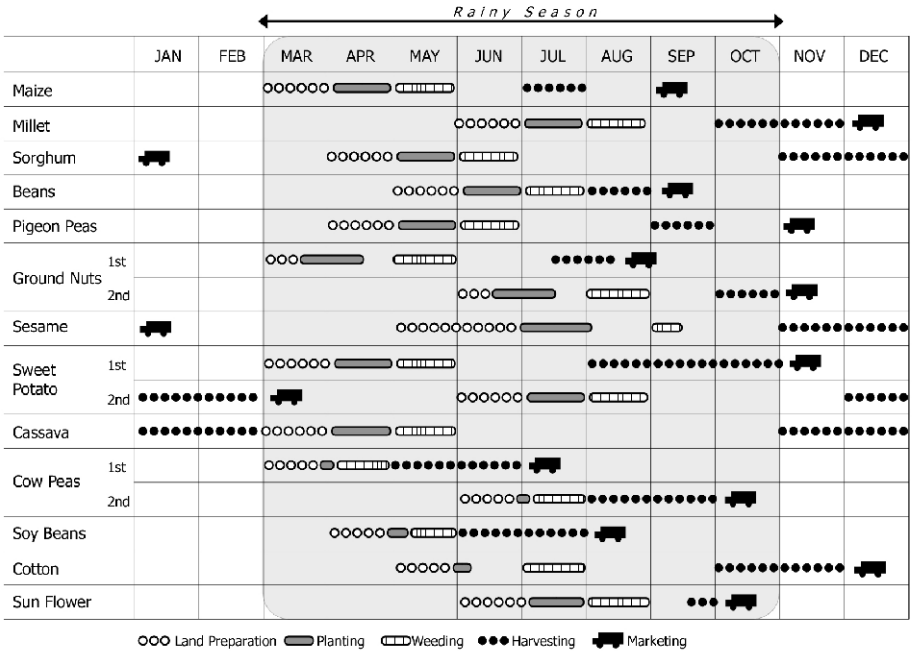
8.1 Land Development Issues

Agriculture is the backbone of the regional economy in the study area. In other words, improvement of the agricultural industry shall be efficient to boost the regional economy in the study area. The major issues of the agricultural system are considered as follows.

At this moment, subsistence agriculture is still dominant in the study area. More than 50% of the total food comes from the growers own products. Shortage of cash income and dependence on subsistence agriculture has caused a negative spiral. To shift from subsistence to commercial agriculture could contribute to increase their livelihood. Information distribution and technical training regarding commercial agriculture have been enhanced by local governments, donors and NGOs. Further efforts are necessary to disseminate the information.

Issues of agricultural productivity are pointed out as well. Firstly, hand-ploughing is still the main method of land cultivation. The difference in cultivation capacity between hand-ploughing and ox-ploughing is considered to be a factor of ten. If the farmers shift to mechanized cultivation such as ox-ploughing and tractors, the productivity is expected to increase drastically. Secondly, the agricultural productivity is limited to the dry season due to being completely dependent upon rain-fed cultivation at this moment. In the study area, only a limited area is provided with irrigation even though many water resources are available such as rivers and swamps.

Distribution of agricultural products is one of the issues for improvement of trading. Many agricultural products, especially cash crops, are harvested in the rainy season due to dependence upon rain-fed cultivation. Figure 8-1 illustrates the cropping calendar of major products. However the transportation cost in the rainy season is higher than that in the dry season since the roads in the study area become muddy due to the rain. Sometime trucks become stuck in the middle of road due to the rough road condition. Improvement of the roads is vital for encouraging the distribution system.



Source: Production office of Pader District, compiled by JICA Study Team

Figure 8-1 Cropping Calendar

8.2 Transportation Issues

8.2.1 Road Network

The Road Network in the Study area has been developed centred on the area from Gulu to Kitgum and the network is formed as radial pattern in the area. The Kampala – Gulu – Atiak – Nimule Road and the Lira – Kitgum – Musingo form the two (2) main axes of the road network which have been identified as important roads in the Northern Uganda and therefore their upgrade feasibility studies and detailed engineering designs have been conducted and completed by the UNRA. No bottle neck in terms of road capacity has been recognized by the traffic analysis in the area; the road network is still adequate for the traffic demands, even in the future

The one physical bottle neck is insufficient road width which does not comply with the standard cross section. Particularly, shoulders at trunk roads are heavily damaged due to erosion. The erosion is caused by un-maintained grass aside the shoulders. The grass block storm water flow from the carriageway and makes the shoulder eroded. Pot holes are being developed during the rainy season in the entire network. Such problems are related to inadequate Road O&M works that is discussed in Chapter 13. The other physical bottlenecks identified in the Study are insufficient road structure such as the drainage system.

The city road network in Gulu has been formed with a frame pattern. The road space varies from 13-16m and no walkways and no parking spaces are provided next to the carriageway. The carriageway is heavily damaged due to inadequate capacity of the drainage system and improper maintenance and this makes road performance low. The structural improvement of the city roads is essential for further development.

There is no reliable public transport system in the Study Area. The only scheduled commercial public transport system is a long distance bus connecting to Kampala and/or Juba. Gulu has two long distance bus terminals in a busy area although the city size is not large enough to require two terminals. Furthermore, there is a mini bus (matatu) terminal along Kampala – Gulu Road. The facilities of these terminals are observed as poor.

8.3 Social/Natural Environmental Issues

Population growth pressure with higher annual population growth rate at 3.8%[2)] for the average of the Sub-region without job/business opportunities except subsistence farming and proper social services is one of the major reasons for the poverty and it tends to affect the regional environment. In the urban areas of district centres and trading centres, economic activities are more intense and social services are better than in the rural areas. However, they have higher population density with insufficient infrastructure systems and this causes poor hygiene and sanitation conditions, especially due to lack of solid and liquid waste management and infrastructure.

Gulu town has a lower annual growth rate (2.8%), however, many South Sudan shoppers and traders visit Gulu Town from Nimule border and economic activities are stimulated in Gulu. Kitgum Town, the second largest service centre in the Sub-region, has a higher annual growth rate (4.0%) and the built-up area is expanding. If their economic activities are accelerated without attention to the other areas, migration toward them can increase. Consequently, without any infrastructure improvement deterioration of hygiene and sanitation will accelerate.

Natural resources around the former IDPs have especially been over-exploited due to increased demand for fuel wood and charcoal, for both domestic and commercial purposes.

2) Annual growth rate 2001 – 2010 (UBOS)

9. REGIONAL DEVELOPMENT PLAN

9.1 Introduction

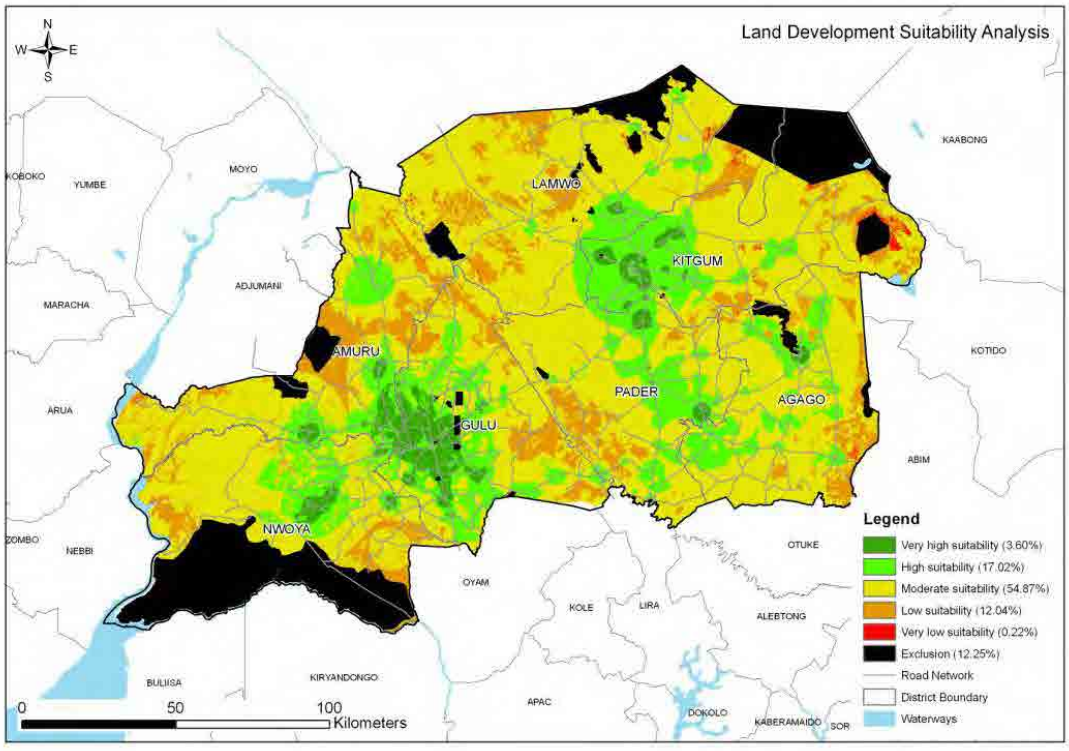
The returning process of the IDP is almost completed in Acholi Sub-region as described in previous chapters. This region will make the next step toward sustainable development based upon ensuring a safe and peaceful living environment and reconstruction of the regional economy. A comprehensive regional development contributes to these dynamics of Acholi Sub-region. Furthermore the road network development needs to be implemented to facilitate the regional development.

9.2 Spatial Structure

Acholi Sub-region stretches about 150 km from north to south, 270 km from east to west and the area of land comprises approximately 28,278 sq.km[3)] which accounts for 11.7% of the total land of Uganda. There are neither air nor railway transportation at this moment. Therefore, in this region, people's mobilization, logistics and economic activities completely rely on road transportation.

9.3 Potential of Acholi Sub-region

The Acholi Sub-region has rich resources for the agricultural industry including favourable climate and water, and vast land and human resources. Figure 9-1 shows the land development suitable area. Areas coloured with dark green are the most suitable for development while areas coloured with dark brown need to be protected from development. According to this figure, Gulu town and the surrounding area have a large potential for development from the land condition view point, then Kitgum town and Pader town follow.



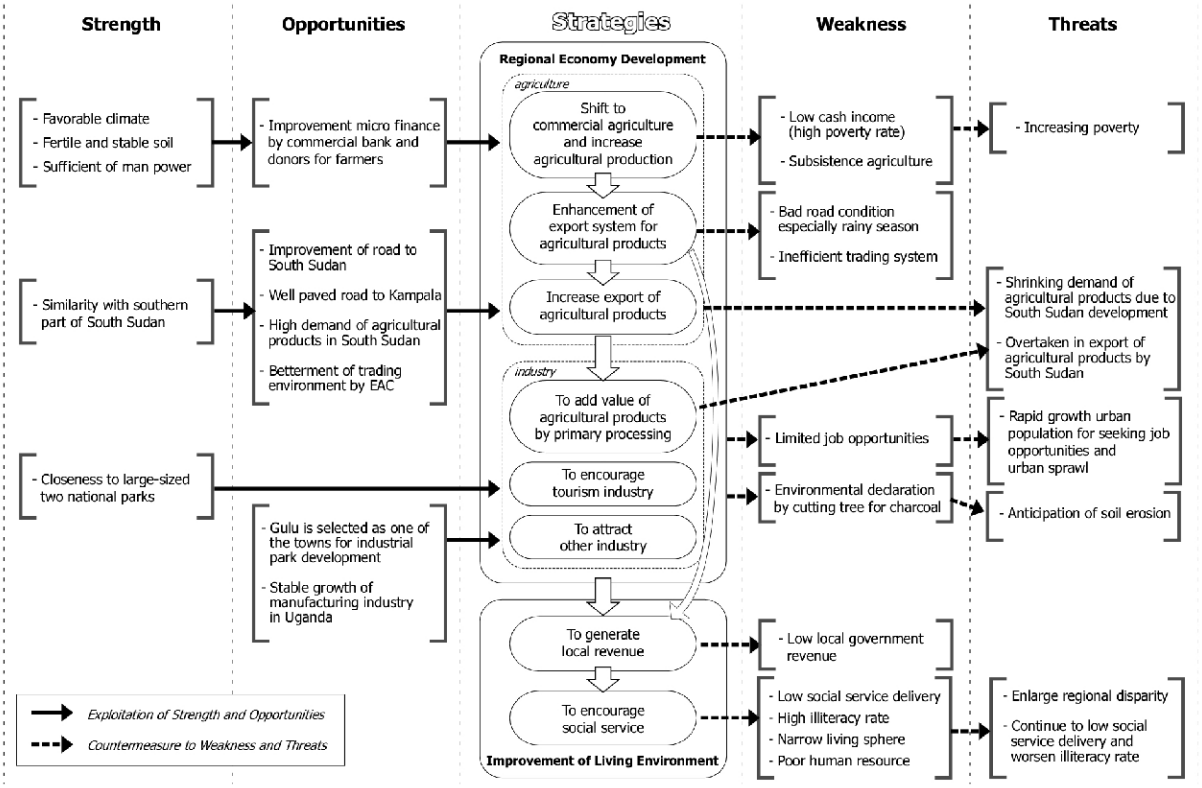
Source: JICA Study Team

Figure 9-1 Land Development Suitability Map

3) Data is in 1995, refer from Statistical Abstract 2011, UBOS

9.4 SWOT Analyses

Based upon the information regarding the current condition, issues referred to in Chapter 8 and the potentials described in the above section, a SWOT analysis was carried out through analysing strengths, weaknesses, opportunities and threats in order to clarify the situation and to establish the future objectives. Figure 9-2 illustrates the relationship between results of the SWOT analysis and the strategies.



Source: JICA Study Team

Figure 9-2 Relation between the Result of SWOT Analysis and Strategies

9.5 Objective and Strategies of Regional Development

The visions of the 5 year Development plan of each district are shown in Table 9-1.

Table 9-1 Vision of 5 Year Development Plan of each District

District	Vision of 5 Year Development Plan
Gulu	A district with quality life, sustainable and holistic development
Kitgum	A prosperous and peaceful district with good communication links
Lamwo	A sustainably developed, prosperous and peaceful district
Pader	A Prosperous and self-sustaining local economy
Agago	A prosperous and peaceful people of Agago who are able to cope with global dynamics and can contribute towards national development

Source: 5 year district development plan Gulu, Kitgum, Lamwo, Pader and Agago

Based on the visions of the districts in the study area and taking account of the results of the SWOT Analysis, the overall objective of regional development in Acholi Sub-region is set out targeted for a 2030 time horizon.

- Quality living standard through sustainable development in the regional economy and social services

In order to achieve the overall objectives of regional development in Acholi Sub-region, a step by step approach is effective. Hence the development goals for the medium term targeted for the 2018 time horizon and long term targeted for the 2030 time horizon are established as follows.

Three goals for the medium term (2018) development are considered as follows.

- To increase production of commercial agriculture and to encourage inter and intra regional trade and commerce
- To promote small and medium scale industry
- To improve accessibility to social services

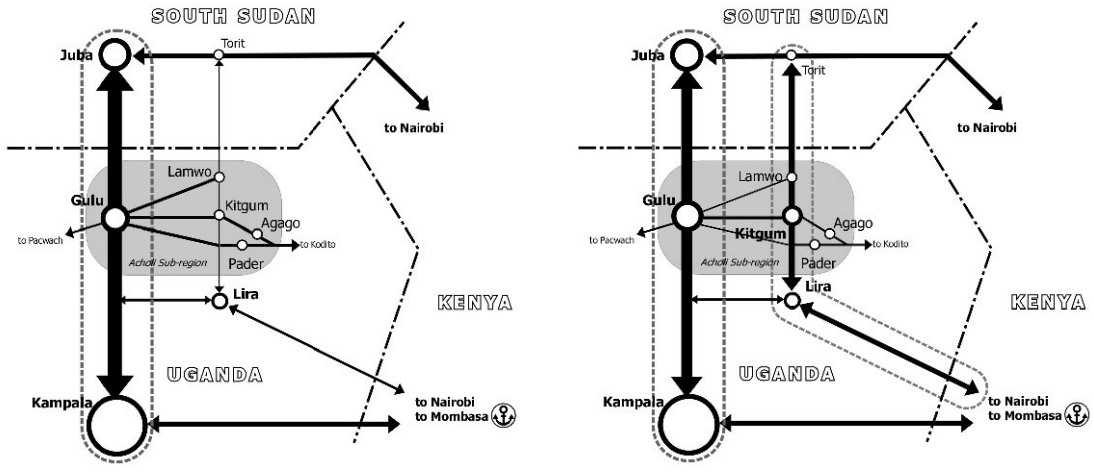
Three goals for the long term (2030) development are considered as follows.

- To encourage added value to agricultural products and to expand trade volume
- To diversify industries
- To enlarge the living sphere so as to access high level social services

9.6 Proposed Spatial Structure

Looking at a future spatial structure in Acholi Sub-region for achieving the objective of regional development, it is formed in two steps. First, the spatial structure will be considered based upon how to connect with areas outside Acholi Sub-region, such as linkage with Kampala and South Sudan. Second, corresponding to the broad structure, a regional spatial structure will be considered. The structure needs to include an efficient network and distribution for major service centres such as an administrative centre and trading centre with consideration for improvement of accessibility to social services and transportation of agricultural products.

To take account of the future spatial structure for connection with areas outside Acholi Sub-region, two alternatives are considered. One is a single corridor structure the other is a double corridor structure as shown in Figure 9-3.



1st Alternative: Single Corridor Structure **2nd Alternative: Double Corridor Structure**

Source: JICA Study Team

Figure 9-3 Schematic Image of Alternatives of Spatial Structure

The 1st alternative, the single corridor structure, focuses upon one route to areas outside the sub-region, given the road from Kampala to Juba via Gulu that is to be implemented soon. In this pattern, Gulu takes the role of regional gateway.

The 2nd alternative, the double corridor structure, focuses upon not only the road between Kampala and Juba, also on another route connecting with South Sudan and Acholi Sub-region. Beyond the border with South Sudan, there are plans to implement feeder roads linked with the border and the road to Juba. Anticipating the road development plans in South Sudan, a road linked between South Sudan and Kenya, via Kitgum and Lira is considered as an additional corridor for supporting the main corridor from Kampala to Juba.

The spatial structure influences the process of regional development. Table 9-2 shows positive and negative impacts of each alternative for making a comparison between the two patterns.

Table 9-2 Comparison between Single and Double Corridor Development

Perspective	Single Corridor	Double Corridor
Economy	Economic Activities tend to concentrate into Gulu and surrounding area. It may cause regional disparities within Acholi Sub-region. **=> [Negative impact]**	Economic activities will be spread between Gulu and Kitgum. Balanced development is expected. Increase of Job opportunities and income generation are assumed. **=> [Positive impact]**
Traffic	Traffic will concentrate on the road linked between Kampala and Juba. Traffic congestion may occur on this road. Under emergency situation, security is not secured without an alternative road. **=> [Negative impact]**	Two routes may contribute to reduce traffic congestion. Under emergency situation on one road, the other road becomes an alternative route and allows the continuation of economic activities and people's mobilization. **=> [Positive impact]**
Service	Social services are likely to accumulate in Gulu. Travel from the eastern area becomes a long distance. It may act to exacerbate regional disparities. **=> [Negative impact]**	Social services are likely to accumulate in Gulu and Kitgum. Accessibility to the service centre is not greatly different for those inside the sub-region. The service will be delivered equally. **=> [Positive impact]**
Trade	Transportation cost of agricultural products in the eastern area becomes higher than other areas. Agricultural development may be delayed in remote areas. **=> [Negative impact]**	Transportation cost of agricultural products becomes similar. Balanced agricultural development is expected. **=> [Positive impact]**
Public Intervention	Only development of Gulu is needed since the road linked between Kitgum and Juba has been implementing. **=> [Positive impact]**	It is necessary to develop two centres and the road from the border to Lira **=> [Negative impact]**
Total Evaluation	Negative	Positive

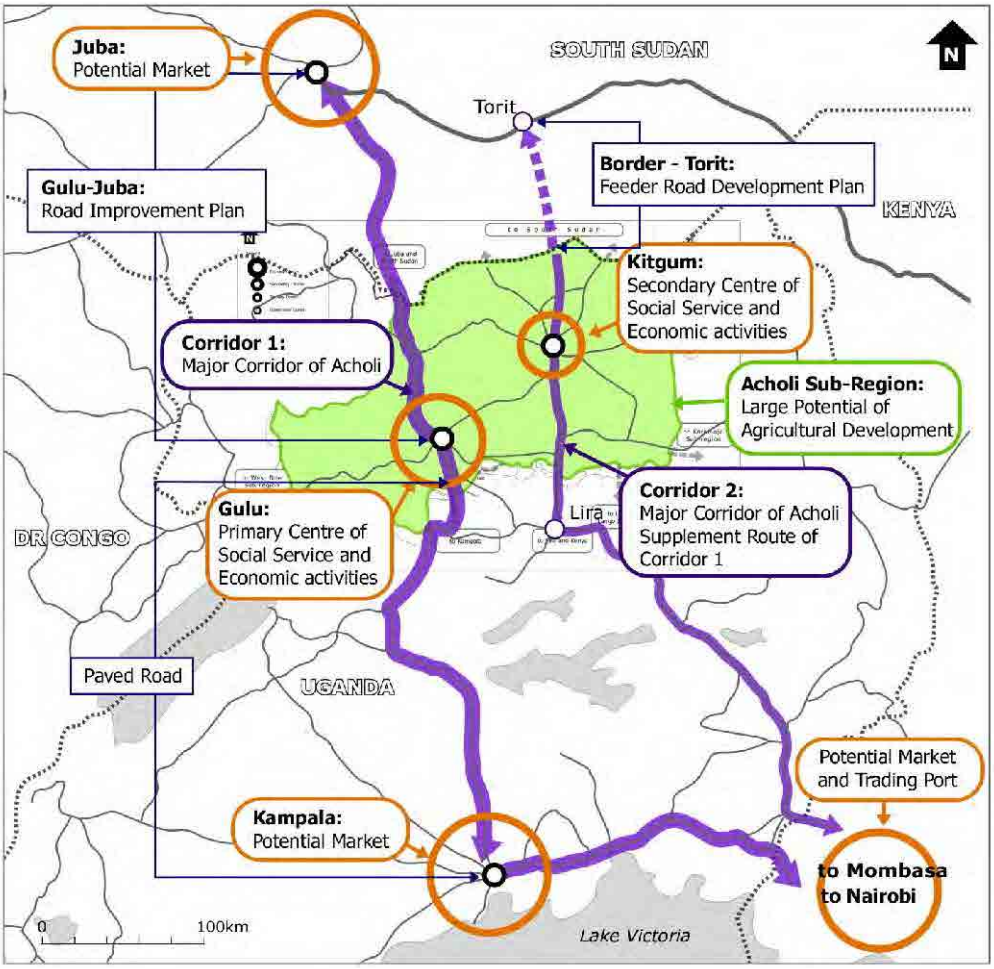
Source: JICA Study Team

As a result of the comparison above, the double corridor structure is appropriate for regional development in Acholi Sub-region. Two main corridors connected to other regions are pillars of this spatial structure in Acholi Sub-region. To take account of potentials in Acholi Sub-region, these corridors contribute to enhance the trading and commerce of agricultural products.

The road linked between Kampala and Juba via Gulu (hereafter called Corridor 1) is a predominant route which stimulates economic activities. This road connects to large potential markets namely Kampala and Juba in terms of demand for agricultural products. After the completion of the road improvement project from Gulu to Juba by several donors such as JICA, USAID and World Bank, this road becomes able to provide stable passage of vehicles and people all year round. In addition, liberalization of cross border trade by EAC is expected to contribute to improve the trade with South Sudan. Under such condition, trading and commerce by using Corridor 1 has large potential for Acholi Sub-region. Gulu is located in the middle of Corridor 1 and takes a role of gateway for the Acholi Sub-region. Gulu will need to become a large centre of economic activities such as trading, tourism and other service industries.

On the other hand, the road linked between Lira and Torito via Kitgum (hereafter called Corridor 2) is a secondary pillar of the spatial structure. The section between Lira and South Sudan Border has already taken a role as the main corridor for the eastern side of Acholi Sub-region namely Kitgum, Lamwo, Agago and Pader districts. The remaining section is dependant upon the policy of the South Sudan government. However, there are some implementation plans for feeder road improvement. In any case the road is expected to come from Torito up to the border and form Corridor 2. This corridor has large potential for enhancement of trading and commerce and takes a role of a supplemental route of Corridor 1 and leads to balanced development in Acholi Sub-region. Furthermore, this road would be a security road in case of emergency on Corridor 1. Kitgum is located in the middle of Corridor 2. This town is expected to be a secondary centre of Acholi Sub-region which accommodates functions for economic activities like Gulu.

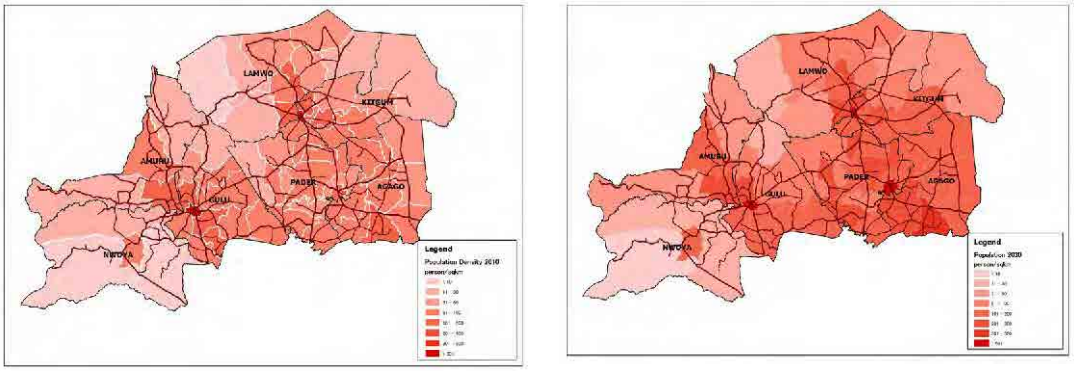
These two corridors and two towns, Gulu and Kitgum, complement each other in terms of function and service delivery. Improvement of the roads and towns will contribute not only to stimulate trading and commerce but also to attract other industries here in Acholi Sub-region. Figure 9-4 illustrates the relationship between the spatial structure and the scenario for regional development.



Source: JICA Study Team

Figure 9-4 Spatial Structure and Development Scenario in Broad Context

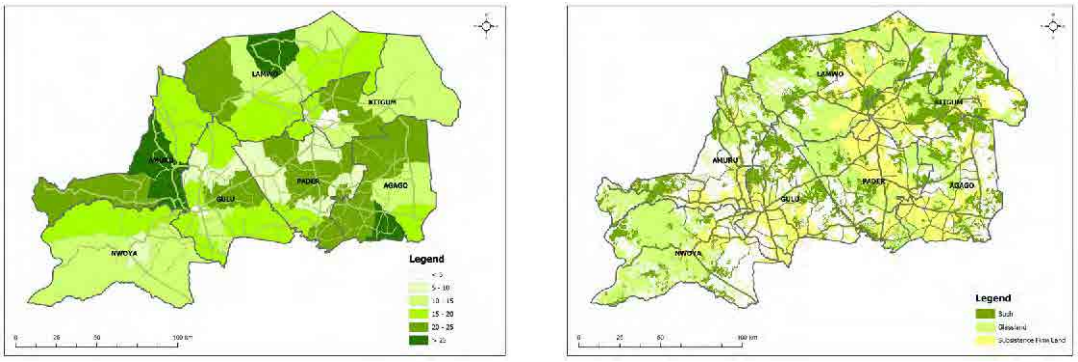
The road network should connect with service centres selected in the above section and run through large populations, agricultural land, and high productivity areas. The roads which accommodate many schools, health facilities and water points are selected as high priority. Hence the following data is taken account of in formulating the preferable road network.



2010 **2030**

Source: UBOS compiled by JICA Study Team

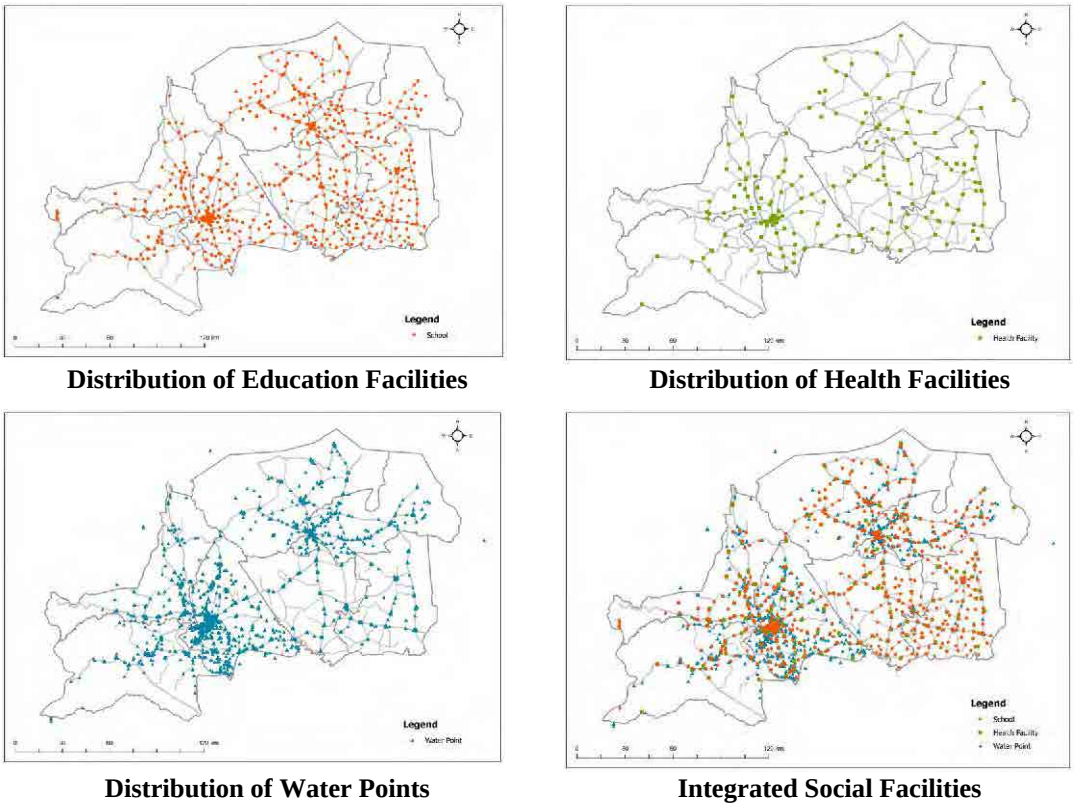
Figure 9-5 Population Density with Road Network in 2010 and 2030



Productivity Area (2008) with Road Network **Agricultural Area (2005) with Road Network**

Source: UBOS compiled by JICA Study Team

Figure 9-6 Agricultural Area with Road Network



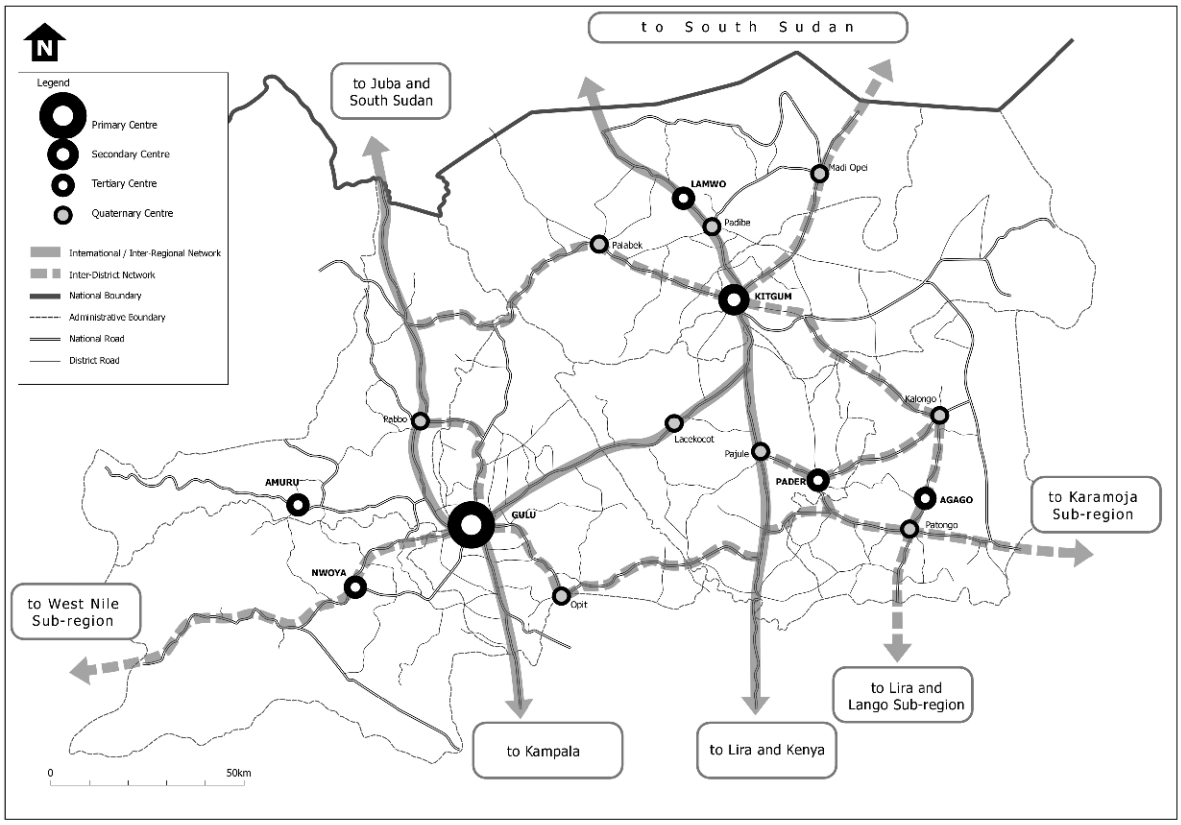
Distribution of Education Facilities **Distribution of Health Facilities**

Distribution of Water Points **Integrated Social Facilities**

Source: UNOCHA compiled by JICA Study Team

Figure 9-7 Distribution of Schools, Health Facilities and Water Points

Considering the service centres and preferable network of Acholi Sub-region, the following spatial structure is proposed.



Source: JICA Study Team

Figure 9-8 Proposed Future Spatial Structure

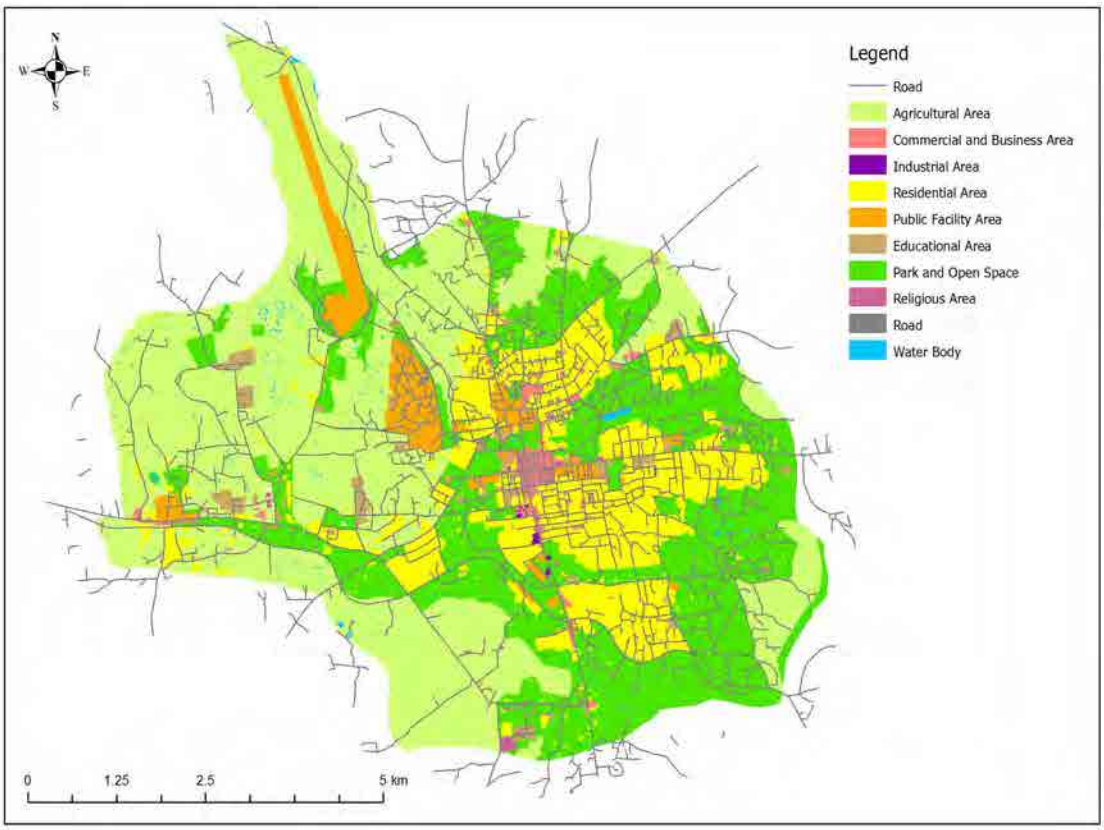
9.7 Proposed Development Plan of Major Service Centres

Gulu Municipality has a future land use plan without a target year. Kitgum has not prepared an urban plan so far.

Gulu municipality consists of four wards namely Bar-dege, Laroo, Layibi and Pece which accommodated a population of 150,000 in 2010. The eastern side of the town has developed as residential and green areas, while the western side, which is at a slightly lower altitude compared to the eastern side, is exploited as agricultural fields. In the middle of the town there is a small river which contributes to divide the town into two areas. Government offices and the university are located on the north side of the river. Commercial activities and high density residences are mainly located in the centre of the town.

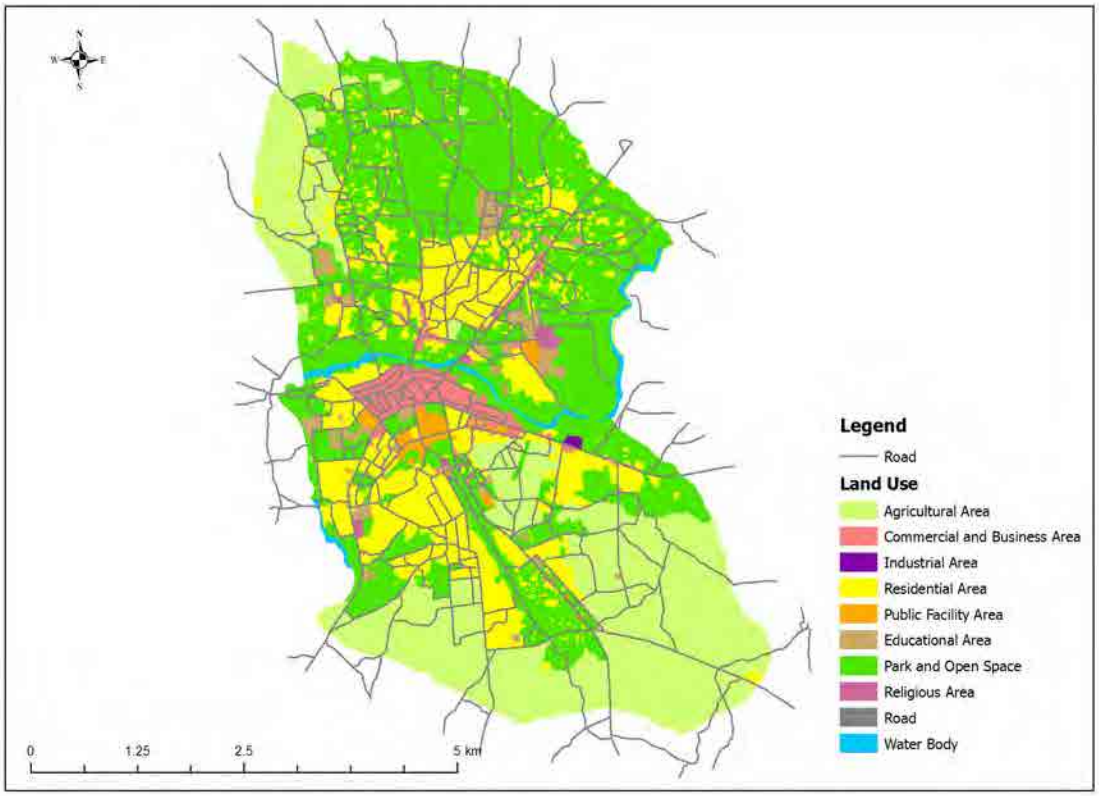
Kitgum Town Council accommodated a population of 57,300 in 2010. Kitgum is divided into north and south sides by Pager River. There is only one small bridge connecting both areas. Commercial activities are concentrated close to the river on the south side of Kitgum which accommodates a large-size market, retail shops, restaurants, small size accommodations, a coach station and commercial banks. An unused airstrip and certain size of farm land behind the residential area are also located in the southern part of the town. Meanwhile the north side is occupied mainly by residences and retail shops.

Existing land uses of Gulu and Kitgum are illustrated in the following figure.



Source: Gulu Municipality compiled by JICA Study Team

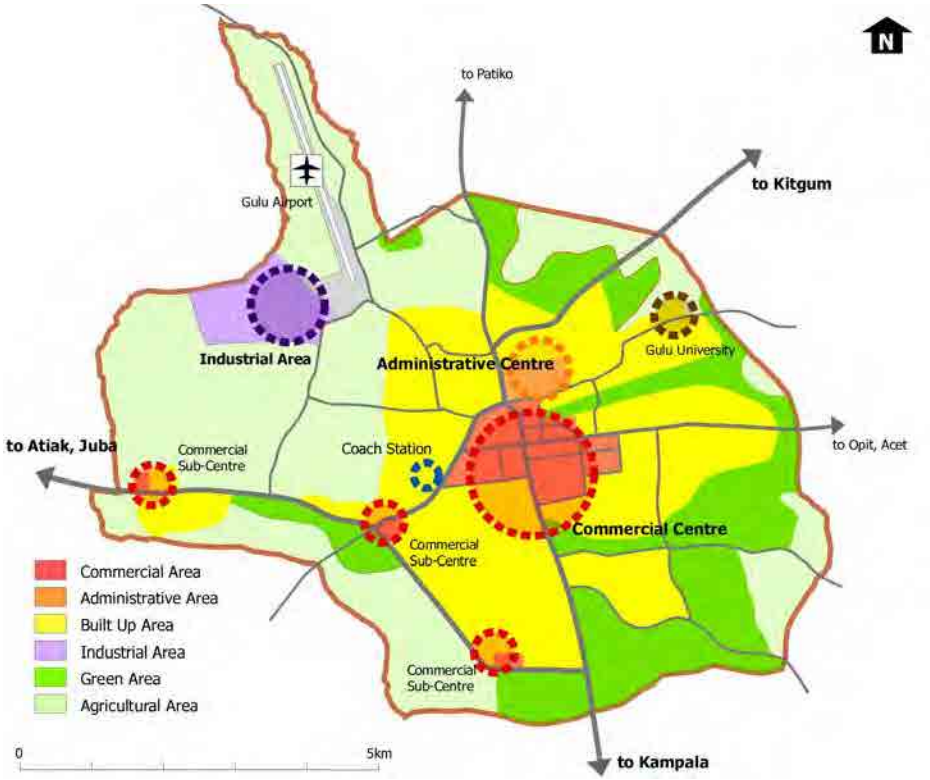
Figure 9-9 Existing Land Use in Gulu Municipality



Source: Kitgum Town Council Compiled by JICA Study Team

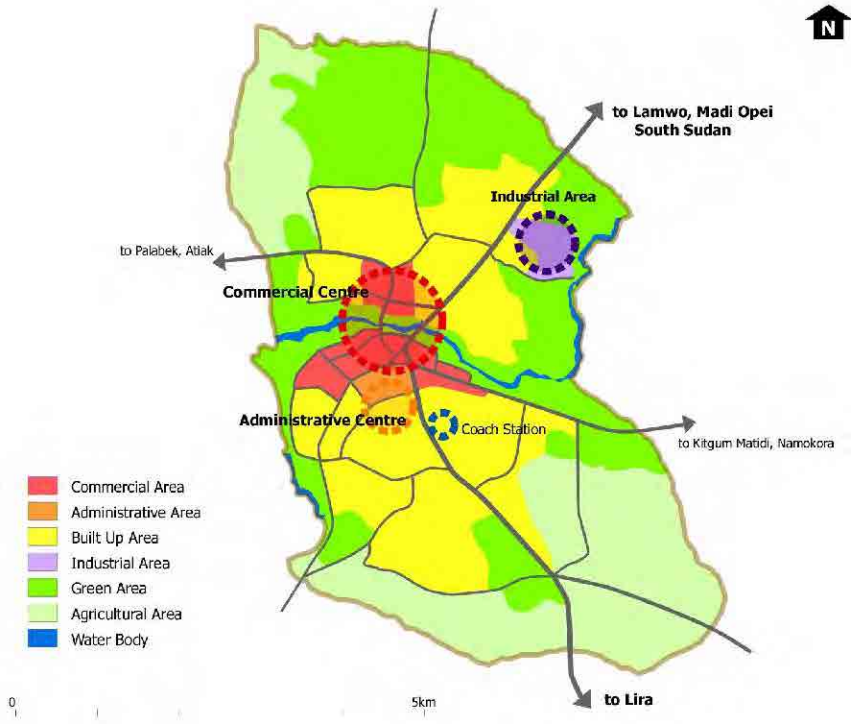
Figure 9-10 Existing Land Use in Kitgum Town Council

Concept Plan of proposed urban land uses are illustrated in the following figures.



Source: JICA Study Team

Figure 9-11 Concept Plan of Proposed Urban Land Use in Gulu



Source: JICA Study Team

Figure 9-12 Concept Plan of Proposed Urban Land Use in Kitgum

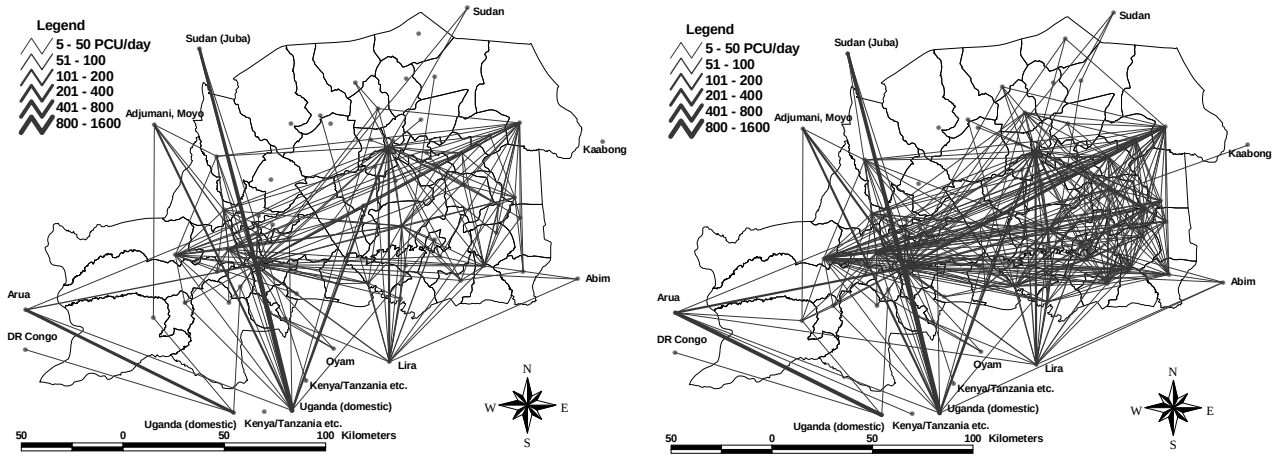
10. TRAFFIC DEMAND FORECAST

10.1 Basic Approach for Forecast

In the previous JICA Study in Amuru/Nwoya Districts, the traffic forecast study was carried out for the Study Area. Since the study was carried out recently and no major changes in the socio economic framework were recognized, the traffic demand forecast study respects and refers to this pervious JICA study approach and result. In particular, the OD pattern of the previous JICA Study is applied for the demand forecast.

10.2 Traffic Demand Methodology

The future traffic demand in Acholi sub-region is forecast based on the current traffic demand estimated by the roadside traffic count and driver interview survey conducted in the previous JICA Study and this Study and population projection prepared by UBOS and UNHCR. A model-based forecast future in Acholi Sub-region and external demand are combined into the future traffic demand in 2018 and 2030. Desire Lines in 2018 and 2030 are shown in Figure 10-1.



(2018) (2030)

Source: JICA Study Team

Figure 10-1 Desire Lines in Acholi Sub-region (Total Vehicle)

10.3 Future Traffic Assignment Result

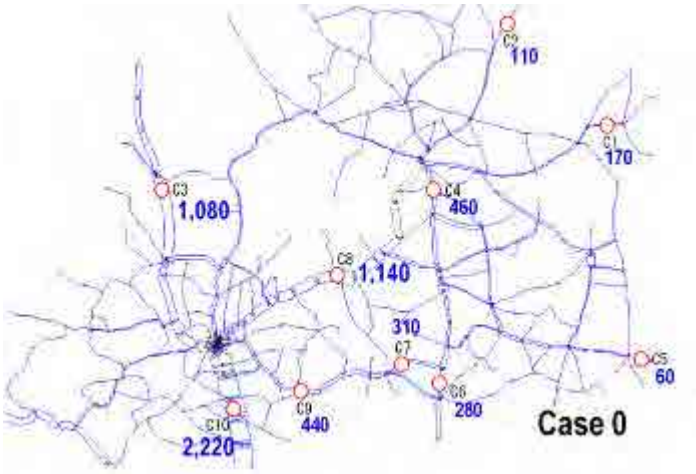
One of the objectives of the traffic forecast is to evaluate the projects to be proposed in the Master Plan. In particular, national road improvements in the study area are considered as most possible and feasible projects. The following table summarizes the traffic assignment cases.

Table 10-1 Traffic Assignment Cases

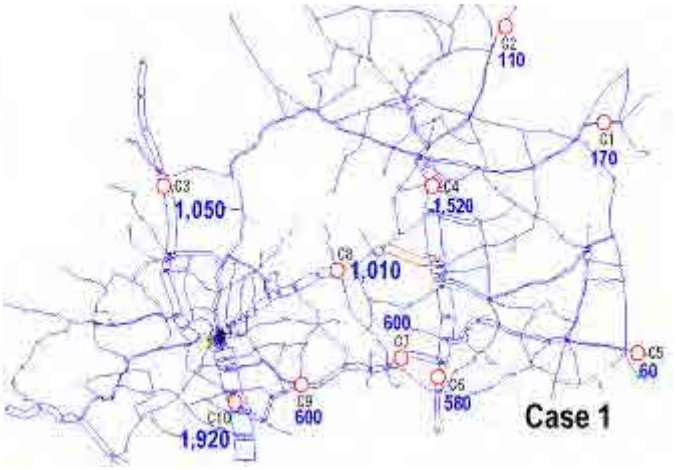
Case		Description	Road Network	Traffic Demand
-	Existing		2011 Network	
0	Without Project	Do Nothing	2011 Network	2018
1	With Lira-Kitgum Rd.	Improvement of Lira-Kitgum Rd.	2011Network + Lira-Kitgum	2018
2	With Gulu- Kitgum Rd.	Improvement of Gulu-Kitgum Rd.	2011Netwok + Gulu-Kitgum Rd.	2018
3	All Projects	Improvement of above Roads in the Area	2018 Network	2018

Source: JICA Study Team

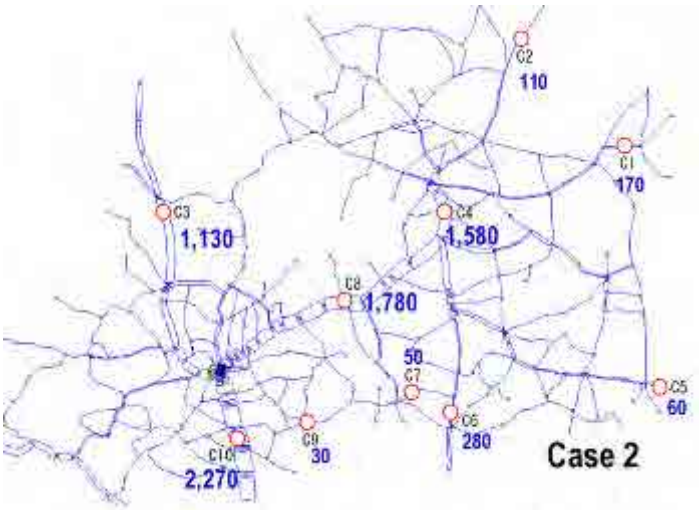
Traffic assignments by the above cases are illustrated in the following figures.



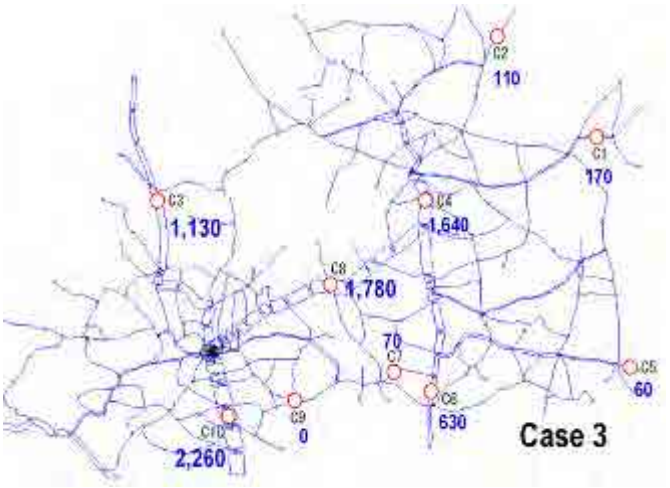
(Case 0: Do nothing)



(Case 1: With Lira-Kitgum Road Project)



(Case 2: With Gulu Kitgum Road Project)



(Case 3: With Both Projects)

Source: JICA Study Team

Figure 10-2 Traffic Assignment Result in 2018

11. ROAD NETWORK DEVELOPMENT PLAN

11.1 Planning Approach

In Uganda, there are two road manuals/design guidelines which are the Road Design Manual and the District Road Manual, and both were published by the Ministry of Works, Housing and Communications. The Road Design Manual was prepared for national road planning and design while the District Road Manual was for district roads administrated by the Ministry of Local Governments. In both manuals, there were different explanations for functional road classification. Since those two kinds of classification systems were prepared for different subject road systems (National and District), the previous JICA Study Amuru/Nwoya has tried to integrate the two systems into one so as to overview the road network regardless the road system, and concluded and proposed an integrated functional road classification systems as follows.

Table 11-1 Proposed Method of Functional Road Classification in an Integrated Manner

	Integrated Method of Using Existing Two Systems of Functional Road Classification	Functional Classification for Rural Roads	Functional Classification for District Roads
A	International Trunk Road	International Trunk Road [A]	
B	Inter-regional Trunk Road	National Trunk Road [B]	
C	Inter-district Road	Primary Road [C]	District Class I Road
D	District-level Arterial Road	Secondary Road [D]	District Class II Road
E	District-level Collector Road	Minor Road [E]	District Class III Road
F	Important Community Access Road		(Community Access Roads)
G	Other Community Access Road		(Community Access Roads)

Source: Previous JICA Study Amuru/Nwoya

The approach which the previous JICA Study Amuru/Nwoya took is generally applicable to this study as well. Since this study is expected to establish region-wide road network development plans; the proposal of improvement/development of international, inter-region and inter-district traffic/transport is the primary objective, therefore, more overview/wider viewpoints are required as compared to that of the previous JICA Study Amuru/Nwoya. Hence, the following functional road classification regardless of the current road system (National/District) is proposed for planning purposes. This classification system makes it possible to identify road functions, simply and applies to both Ugandan manuals.

Table 11-2 Proposed Functional Road Classification

	Functional Road Classification	General Functional Assignment	Coincidence	
			National Road System	District Road System
1	International Trunk Road	Road that links major international cities and caters to international cargos and passengers	[A] International Trunk Road	N/A
2	Inter-Region Trunk Road	Road that links major regional centres and caters to domestic cargo and passengers.	[B] National Trunk Road	N/A
3	Inter-District Road	Road that links district centres and caters to regional cargos and passengers	[C] Primary Road, [D] Secondary Road	District Class I Road
4	City Road	Roads that developed in city centres and connect to upper class roads	N/A	Urban Road
5	Feeder Road	Road that links villages and district centres and	[E] Minor Road	District Class II Road District Class III Road

Source: JICA Study Team

Level of service (LOS) is a measure used in traffic analysis to determine effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways by categorizing traffic flow with corresponding safe driving conditions. The choice of LOS shall generally be based on economic considerations. Ugandan Road Design Manuals state six (6) levels of service which are varied from A to F. The following table explains the definition of the LOS.

Table 11-3 Level of Service Characteristics by Road Type

Level of Service	Two Lane Rural	Multilane Rural without Access
A	Average travel speed of ≥ 93km/hr. Most passing manoeuvres can be made with little or no delay. Service flow rate a total of 420 PCU/hr for both directions and about 15% of capacity can be achieved.	Average travel speed of ≥ 9km/hr Under ideal conditions, flow rate is limited to 720 PCU/lane/hr or 33% of capacity.
B	Average travel speed of ≥ 88km/hr. Flow rate may reach 27% of capacity with continuous passing sight distance. Flow rate of 750 PCU/hr total for both directions.	Reasonably free flow. Volume at which actions of preceding vehicle will have some influence on following vehicles. Flow rates will not exceed 55% of capacity or 1,200 PCU/lane/hr at 96km/hr average travel speed under ideal conditions.
C	Flow still stable, average travel speed of ≥ 84km/hr. Flow rates, two directions, at 64% of capacity with continuous passing opportunity, or a total of 1,800 PCU/hr for both directions.	Stable flow to a flow rate not exceeding 75% of capacity or 1,650 PCU/lane/hr, under ideal conditions maintaining at least a 95km/hr average travel speed.
D	Approaching travel speeds in neighbourhood of 80km/hr. Flow rates, two directions, at 64% of capacity with continuous passing sight distance or 1,200 PCU/hr total for both directions	Approaching unstable flow at flow rates up to 89% of capacity or 1,940 PCU/lane/hr at an average travel speed of about 92km/hr under ideal conditions.
E	Approaching travel speeds in neighbourhood of 72km/hr. Flow rates under ideal conditions, total two way, equal to 2,800 PCU /hr. Level E may never be attained. Operation may go directly from D to Level F	Flow at 100% of capacity or 2,200 PCU/lane/hr under ideal conditions. Average travel speeds about 88km/hr.
F	Forced congested flow with unpredictable characteristics. Operating speed less than 72km/hr.	Forced flow congested conditions with widely varying volume characteristics. Average travel speed of less than 50km/hr.

Source: Road Design Manual, Vol.1 Geometric Design, Ministry of Works, Housing and Communications

11.2 Development Goal

Mid term is set as the target year of 2018.

The existing road network accommodates the future traffic volume in 2018 as shown in the future traffic demand forecast; however, physical bottlenecks such as narrow width of the road and drainage problems were identified by the road inventory survey. The other bottlenecks identified are uncontrolled traffic behavior and ineffective bus terminal locations in Gulu city. As explained, the regional development depends on the improvement of access to the two main axes in the network and the improvements of the axes themselves are also a key. The creation and improvement of the development centres is essential.

Increasing of reliability on the International/ Intern-Regional Trunk Roads Network and securing of passability of the Inter-District Roads Network throughout the year is the primary objective in the mid -term. The city road improvement in Gulu is strategically considered at this stage for future urban planning.

Considering the above, the general targets by 2018 are set as follows,

- To improve accessibility to high agricultural potential areas and between trading centres,
- To improve accessibility for men and materials to food processing industry near the agricultural production area; and,
- To improve accessibility to health care facilities, educational facilities and water sources.

Concluding above, the following development goals are established with the target year of 2018.

- International Trunk Roads: to meet international road standards by tarmac and widening, the design LOS is D,
- Inter –Regional Trunk Roads: to meet national trunk standards by tarmac and widening, the design LOS is F,
- Inter District Roads: to secure passability throughout the year by bottleneck improvements such as for drainage systems,
- City Roads: to regulate and increase efficiency of traffic movements by improvement of road structure and pavement, and
- Feeder Roads: to remove bottle necks so the road can perform as access to the distinct roads.

Long Term is set as the target year of 2030.

The existing road network will still be adequate to carry the traffic in 2030. Therefore, no additional roads are theoretically required. The basic access on main roads and to main roads would be provided by 2018. The main objective by 2030 would be the improvement of inter-district and inner district traffic.

It is envisaged that the agricultural processing industry in the region will launch by 2030 and that it will need many employees from the area and the living activity space also is must be expanded as the industry develops. To accommodate this, the provision of a reliable road network in the district and inner district is essential by 2030.

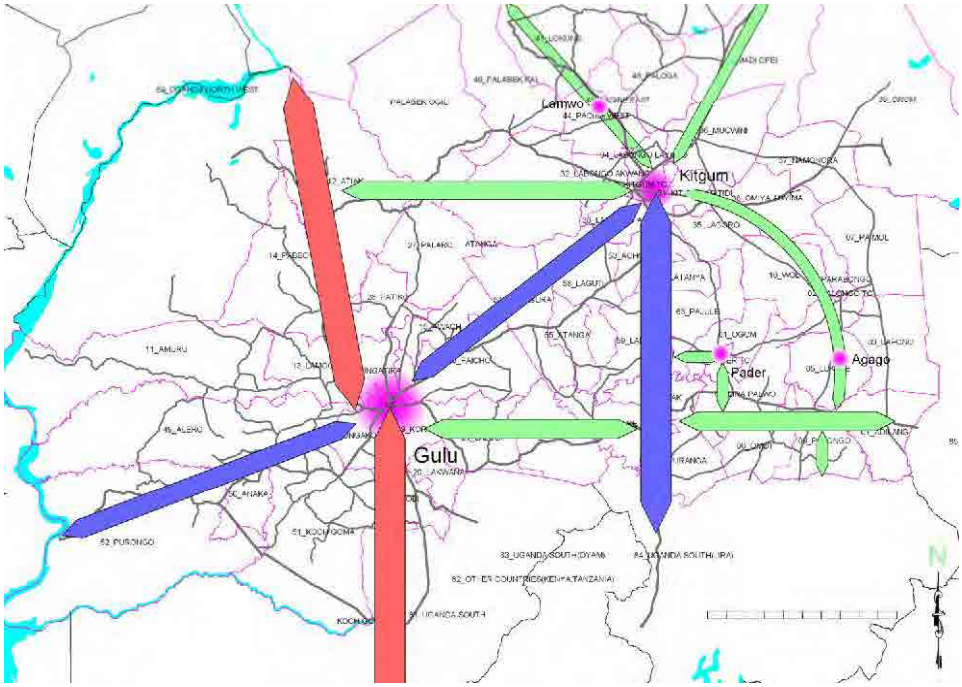
To attain further development in the region, regional and international competitiveness will be required of the products. Hence, highly efficient road transport network will be required since the transportation cost reflects on the price of the product. To accommodate this, the international truck roads need to be improved, one facet of which is to bypass mid to large scale trading centres, villages and towns.

Although the Gulu-Atiak-Nimule-Juba road will still be adequate to carry the traffic in 2030, introduction of another route linking between South Sudan and Uganda would be desirable in consideration of redundancy. The Ngomoromo (South Sudan Border)-Kitgum-Lira road shall be considered as an optional route.

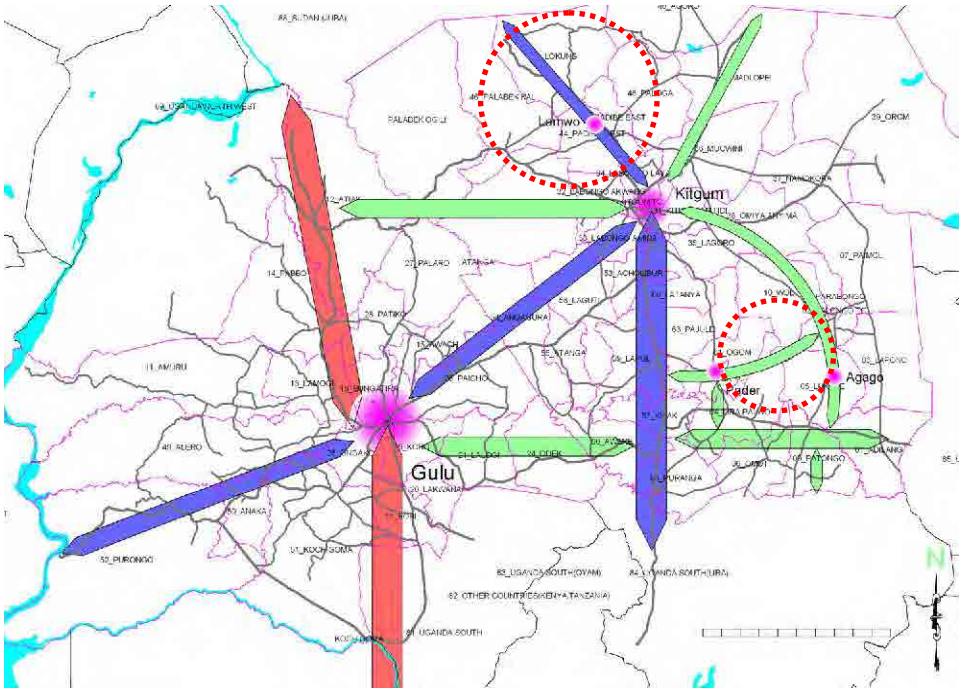
Considering the above, the general targets by 2030 are set as follows,

- To realize high mobility for International Trunk Roads such as to provide bypasses at trading centres,
- To increase the percentage of paved roads on the trunk road network, and,
- To improve the quality of CARs and public transportation.

Road network development concepts in 2018 and 2030 are shown in Figure 11-1.



(2018)



(2030)

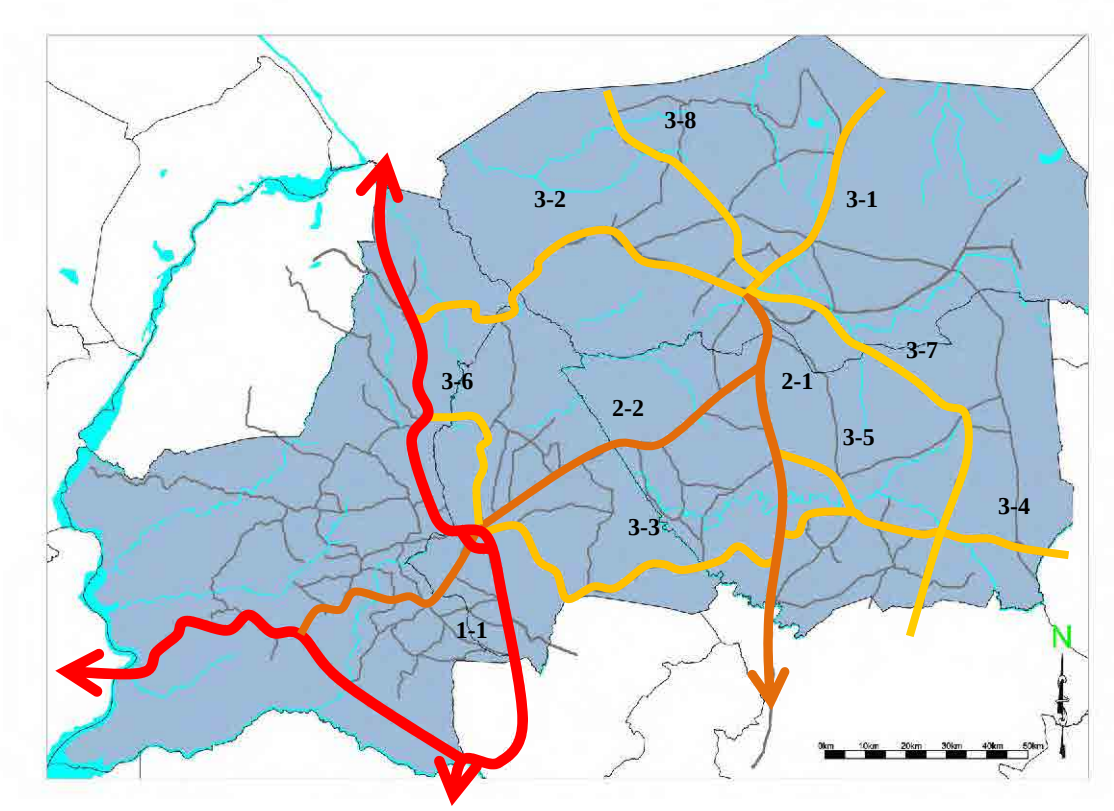
Source: JICA Study Team

Figure 11-1 Road Network Development Concept

11.3 Proposed Road Network in Study Area

(1) Mid Term

As explained, the general target by year of 2018 is to improve living standards to meet basic human needs. To reflect the development concept, the following road network is proposed.



Source: JICA Study Team

Figure 11-2 Proposed Road Network in 2018

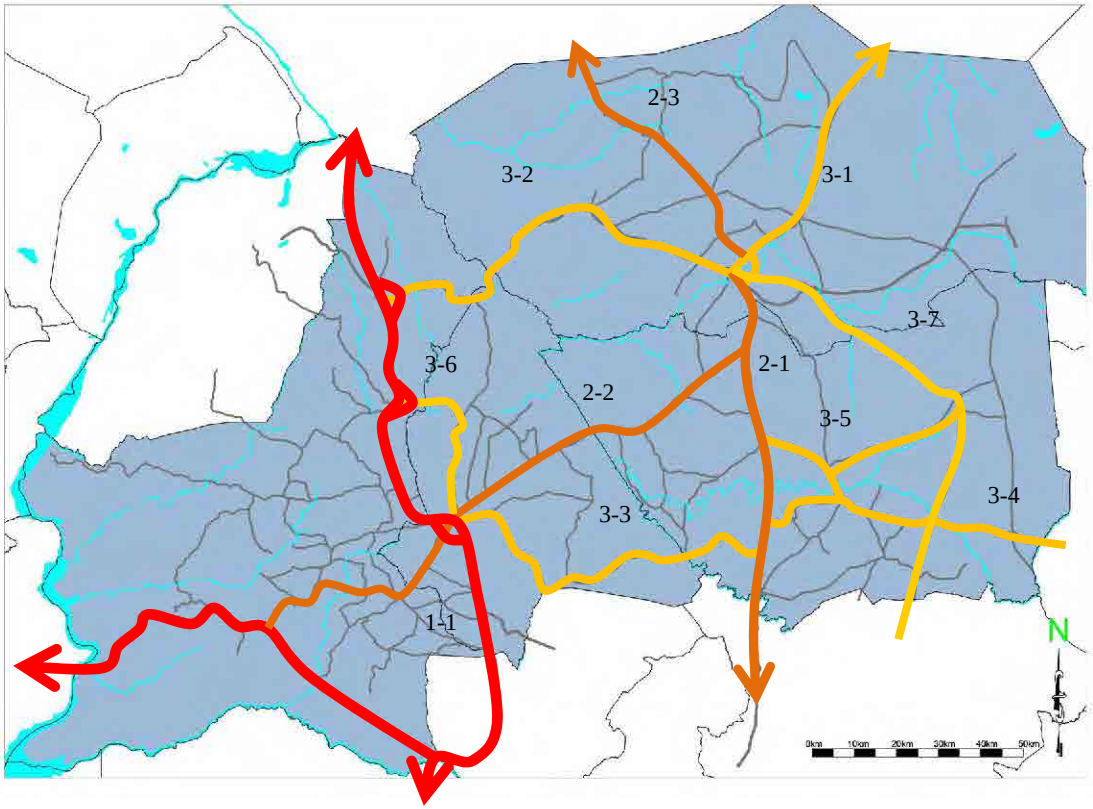
Table 11-4 Main Structure of Proposed Road Network in 2018

Functional Road		No.	Subjected Section
	1. International Trunk Rd.	1-1	Gulu/Amuru Dist. Border [Kali Kali] – Gulu - Gulu/Oyam Dist. Border [Karuma] (– Kampala)
	2. Inter-regional Trunk Rd.	2-1	Kitgum – Agago/Lira Dist. Border [Puranga] (– Lira – Kenya Border)
		2-2	Gulu – Acholibur [Pader Dist.]
	3. Inter-district Trunk Rd.	3-1	Kitgum – South Sudan Border [Musingo]
		3-2	Oroko [connect to Atiak] – Kitgum
		3-3	Gulu – Rackoko [Pader Dist.]
		3-4	Coner Kilak – Adilang [Agago/Abim Dist. Border]
		3-5	Pajule – Pader – Kwon Kic
		3-6	Gulu – Ajulu – Pabbo Border [Unyama]
		3-7	Kitgum – Kalongo – Patongo – [Agago/Lira Dist. Border]
		3-8	Kitgum [Pongdwongo] – Padibe [Lamwo] – South Sudan Border [Ngomoromo]
	4. Feeder Rd.		

Source: JICA Study Team

(2) Long Term

The general target by 2030 is to provide high mobility in the truck road network and increase the reliability in the district road network. To reflect the development concept, the following road network is proposed.



Source: JICA Study Team

Figure 11-3 Proposed Road Network in 2030

Table 11-5 Main Structure of Proposed Road Network in 2030

Functional Road		No.	Subjected Section
	1. International Trunk Rd.	1-1	Gulu/Amuru Dist. Border [Kali Kali] – Gulu - Gulu/Oyam Dist. Border [Karuma] (– Kampala)
	2. Inter-regional Trunk Rd.	2-1	Kitgum – Agago/Lira Dist. Border [Puranga] (– Lira – Kenya Border)
		2-2	Gulu – Acholibur [Pader Dist.]
		2-3	Kitgum [Pongdwongo] – Padibe [Lamwo] – South Sudan Border [Ngomoromo]
	3. Inter-district Trunk Rd.	3-1	Kitgum – South Sudan Border [Musingo]
		3-2	Oroko [connect to Atiak] – Kitgum
		3-3	Gulu – Rackoko [Pader Dist.]
		3-4	Coner Kilak – Adilang [Agago/Abim Dist. Border]
		3-5	Pajule – Pader – Kwon Kic
		3-6	Gulu – Ajulu – Pabbo Border [Unyama]
		3-7	Kitgum – Kalongo – Patongo – [Agago/Lira Dist. Border]
	4. Feeder Rd.		

Source: JICA Study Team

12. STRATEGIC ENVIRONMENTAL ASSESSMENT

12.1 Outline of Strategic Environmental Assessment

In the Master Plan Study, the Strategic Environmental Assessment (SEA) was adopted following the "JICA Guidelines for Environmental and Social Considerations (April 2010)" which describes that the SEA is an environmental assessment at an earlier study stage prior to the EIA at project level. Thus the SEA is normally conducted at the policy making level or planning and programming level before the project level. Based on this definition, the JICA Survey Team (JST) adopted the following steps for the SEA.

i) Study of the current social and environmental conditions

ii) Target policy set-up for SEA

iii) Indicator set-up through legal requirements, study of literature, site reconnaissance, and discussions with environmental officials

iv) Comparison and evaluation of alternatives of the Regional Trunk Road Network Priorities with likely impacts on social, natural environments and pollution

v) Involvement of stakeholders in the working group meetings

12.2 Institutions and Legislation

The National Environmental Management Agency (NEMA) takes the main role for environmental impact assessment in Uganda. Other major authorities for environmental management in Uganda are Uganda Wildlife Authority (UWA) on protected areas, National Forest Authority (NFA) on Central Forest Reserves, Directorate of Water Resources Management (DWRM) and Directorate of Environmental Affairs (DEA) on water resources.

NEMA, which was established in the National Environment Act, Cap. 153 in 1995, is responsible for environmental management in Uganda. NEMA coordinates, monitors and supervises all activities in the field of the environment.

The procedure of environmental assessment for road projects in Uganda is explained as follows. A project proponent should firstly prepare a project brief to describe project activities, environmental conditions of the project site, expected environmental and social impacts and mitigation measures, and submit it to NEMA.

- Submission of Project Brief to NEMA and to Lead Agencies
- Consultation on Project Brief by NEMA and Lead Agencies (screening 1: whether project is exempt from EIA), screening 2: whether project requires mandatory EIA, screening 3: whether adequate mitigation measures have been incorporated)
- Certificate of approval of EIA if EIA is not required through the screening
- If EIA is required through the screening, TORs of EIA are established after scoping and Stakeholder Consultations on Scope
- TORs are reviewed with NEMA, Lead Agencies and Stakeholder Consultations
- Environmental Impact Study (EIS), Collection of Information, and Public and Stakeholder Consultations
- NEMA reviews and comment on EIS with lead agency and public comments
- Approval of EIS, Certificate of Approval of the EIA

- Action by developer with the certificate
- Developer monitors the project with monitoring plan in EIS, NEMA and lead agencies monitor developer's activities

The Environmental Impact Assessment Guidelines for Road Projects provide detailed criteria regarding the EIA requirements in the road development sector. There are 4 basic criteria that guide the decisions regarding the EIA requirements for a project, and these are:

- Case 1: Projects that certainly do not have any significant impact on the environment
- Case 2: Projects likely to have some minor impacts on the environment but for which adequate and sufficient mitigation measures have been identified
- Case 3: Projects that have some significant environmental impacts, where adequate mitigation measures are readily available
- Case 4: Projects having a number of (very) significant impacts on the environment (whether adequate mitigation measures can be identified or not)

12.3 Current Social and Environmental Conditions

There are small-scale agro processing industries, grinding mills, yogurt making and rice hullers, which are the major manufacturing industries. Service industries are growing especially in Gulu and Kitgum towns. There are no large-scale economic activities that affect the regional environment.

In the subsistence economic activities, the situations of household income and expenditures reveal that the local households are still in the poorest level in the country. Housing conditions are also poor and they consume firewood for cooking fuel with primitive three stone kitchen ranges. Charcoal is also commonly used, especially in urban areas, which is an immediate cash source for the households because they can produce it without skill and in little time.

This situation causes a great consumption of trees in the Sub-region and it is leading to deforestation and loss of vegetation. Charcoal is in high demand, especially for urban households and service sectors and consumption even in South Sudan. The firewood is also consumed to produce bricks as a fuel for burning. This poses a great threat to the natural environment with deforestation and loss of vegetation leading to soil erosion, reduction of soil fertility and land degradation.

The agricultural productivity level is still low because of the high cost of inputs for farming and inaccessibility to modern farming technologies. The farmers cannot maintain soil fertility and productivity. Also, the farmers are out of marketing measures. Market information and storage are not available and the farmers raise mostly the same crops in the same season. Besides, the farmers depend on middlemen for selling the products. Low quality products and high competition without marketing measures force the product price down. This lowers the income level of the local households and it also accelerates felling trees and producing charcoal.

National and district roads have low reliability and poor drainage facilities. Community access roads are also not maintained well. This makes mobility of farmers and merchants to markets worse.

12.4 Strategic Environmental Assessment (SEA)

For the prioritization of regional trunk road networks, indicators of economic and social service factors were set-up to follow the Regional Development Plan and Road Network Development Plan.

The socio-economic indicators were set-up as follows.

Economic indicators

- Traffic Volume: Intermediate value of traffic demand 2018 (forecast by JICA Study Team)
- Population/km ratio: Populations 2018 of sub-counties the trunk road section passes (estimated by JICA Study Team with UBOS data up to 2017)
- Agricultural productivity: The average grades of agricultural productivity of sub-counties the section passes (the grading of sub-counties was studied by JICA Study Team in Chapter 10)
- Land Suitability: Under study (studying in Chapter 10)

Social service indicators

- School number/km ratio: Number of schools located within 1km from the trunk road sections (data source: UNOCHA)
- Health Center Number/km ratio: Number of health centres located within 1km from the trunk road sections (data source: UNOCHA)

Environmental Indicators

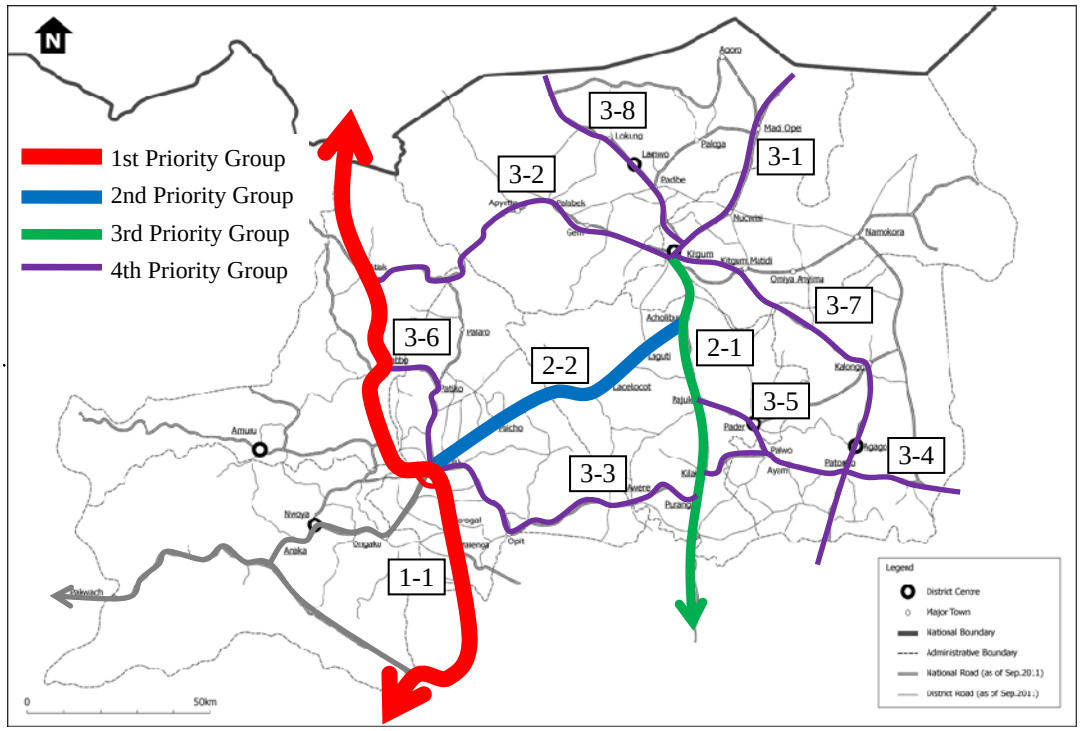
For the environmental factors, forest, wetland, resettlement and slope were suggested as the indicators in the policy making level along with legal requirements, and the present environmental problems. JST also discussed the environmental indicators with NEMA, UNRA and district environment officers.

The environmental indicators were set-up as follows.

- Wetland/River Length (%): The length of wetlands, rivers, streams along the trunk road sections (surveyed by JICA Study Team, the lengths of bridges and culverts from the road condition survey were included as they are regarded as the width of the rivers and streams along the trunk road sections)
- Forest Length (%): The length of forests (especially Central Forest Reserves) along the trunk road sections (surveyed by JICA Study Team and based on NFA maps)
- Trading Center (TC) Length (%): The lengths of TCs along the trunk road sections as a potential resettlement factor (surveyed by JICA Study Team)
- Slope: The existence of over 10% slope angle in the road sections (data source: NFA map); the slope angles are according to a NFA topography map

Alternative-1: Economy Focused Priority

The priority of 1-1 is the highest based on economic indicators and the total score differences between it and the other priority groups are the most. The international trunk road 1-1 is the highest followed by two inter regional trunk roads, 2-2 and 2-1, with a clear gap. The other inter-district trunk roads made the 4th group. This pattern of priority groups corresponds to the "1st Alternative: Single Corridor Structure".



Source: JICA Study Team

Figure 12-1 Alternative-1 of Priority Trunk Road Network: Economy Focused

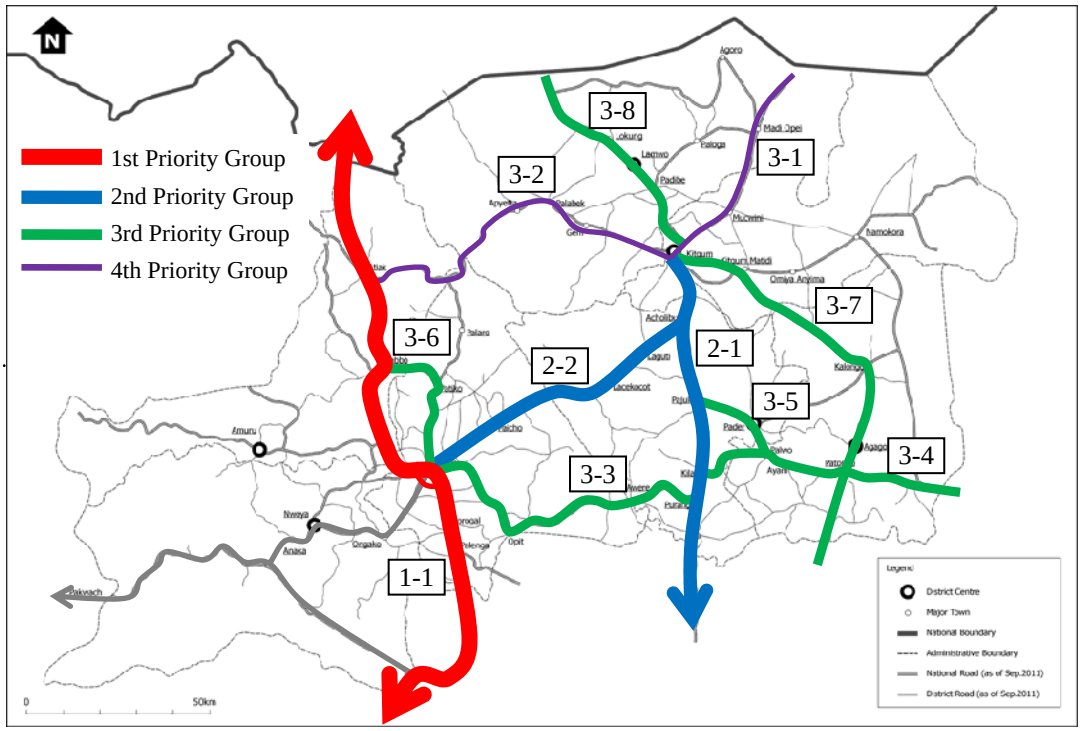
Table 12-1 Rating of Alternative-1

Functional Road	No.	Traffic Volume (PCU/day)	Population 2018	Agricultural Productivity	School	Health Centre	Wetland/ River/ Stream	Forest	Trading Centre	Slope	Total Score	Priority Group
		6.00	**1.00**	**1.50**	**0.25**	**0.25**	**0.25**	**0.25**	**0.00**	**0.00**	**10.00**	
International Trunk Rd.	1-1	10	10	1	4	9	1	5	3	10	**76**	**1st**
Inter-regional Trunk Rd.	2-1	4	4	7	2	8	7	10	10	10	**45**	**3rd**
	2-2	7	2	6	7	2	4	6	6	10	**58**	**2nd**
Inter-district Trunk Rd.	3-1	1	2	7	1	1	6	10	4	10	**23**	**4th**
	3-2	1	1	6	3	1	9	9	6	1	**22**	
	3-3	2	2	6	6	1	10	1	4	10	**28**	
	3-4	1	2	10	8	2	5	10	3	10	**29**	
	3-5	2	3	6	3	1	2	10	1	10	**28**	
	3-6	2	3	3	10	10	10	10	9	10	**30**	
	3-7	2	2	9	1	2	4	10	9	10	**32**	
	3-8	1	3	7	3	1	10	10	2	10	**26**	

Source: JICA Study Team

Alternative-2: Balance Focused Priority

The priority of 1-1 is also highest and the total score differences between it and the other priority groups are moderate. Two inter-regional trunk roads, 2-2 and 2-1, made the 2nd priority group. The other inter-district trunk roads made the 3rd and 4th groups. This pattern of priority groups is starting to show the "2nd Alternative: Double Corridor Structure".



Source: JICA Study Team

Figure 12-2 Alternative-2 of Priority Trunk Road Network: Balance Focused

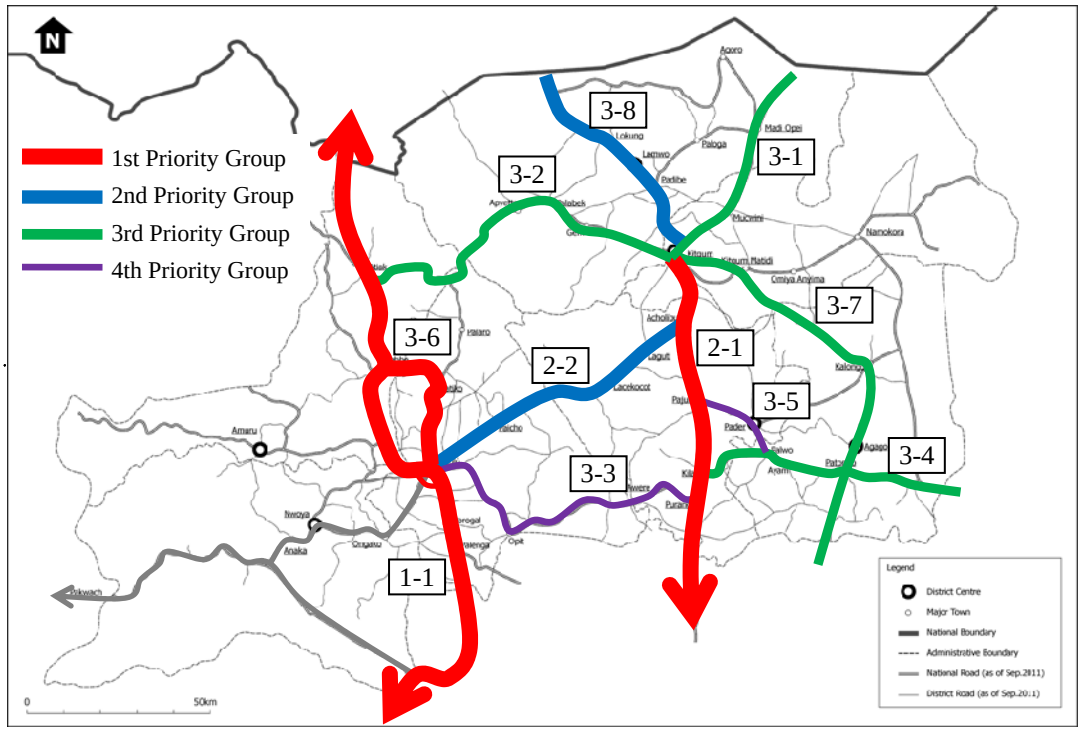
Table 12-2 Rating of Alternative-2

Functional Road	No.	Traffic Volume (PCU/day)	Population 2018	Agricultural Productivity	School	Health Centre	Wetland/ River/ Stream	Forest	Trading Centre	Slope	Total Score	Priority Group
		4.50	**1.00**	**1.50**	**0.50**	**1.00**	**0.50**	**0.50**	**0.25**	**0.25**	**10.00**	
International Trunk Rd.	1-1	10	10	1	4	9	1	5	3	10	**74**	**1st**
Inter-regional Trunk Rd.	2-1	4	4	7	2	8	7	10	10	10	**55**	**2nd**
	2-2	7	2	6	7	2	4	6	6	10	**57**	
Inter-district Trunk Rd.	3-1	1	2	7	1	1	6	10	4	10	**30**	**4th**
	3-2	1	1	6	3	1	9	9	6	1	**28**	
	3-3	2	2	6	6	1	10	1	4	10	**33**	**3rd**
	3-4	1	2	10	8	2	5	10	3	10	**38**	
	3-5	2	3	6	3	1	2	10	1	10	**32**	
	3-6	2	3	3	10	10	10	10	9	10	**46**	
	3-7	2	2	9	1	2	4	10	9	10	**39**	
	3-8	1	3	7	3	1	10	10	2	10	**34**	

Source: JICA Study Team

Alternative-3: Environmentally Focused Priority

The score gaps among the networks were reduced. An inter-district trunk road 3-6 was grouped into the 1st priority group with the international trunk road 1-1 and the inter-regional trunk road 2-1 as 3-6 has the fewest forests, wetlands, and trading centres along the section. The other trunk road networks made the priority groups disordered. This pattern of priority groups corresponds to the "2nd Alternative: Double Corridor Structure".



Source: JICA Study Team

Figure 12-3 Alternative-3 of Priority Trunk Road Network: Environmentally Focused

Table 12-3 Rating of Alternative-3

Functional Road	No.	Subjected Section	Traffic Volume (PCU/day)	Population 2018	Agricultural Productivity	School	Health Centre	Wetland/ River/ Stream	Forest	Trading Centre	Slope	Total Score	Priority Group
		Weight	**3.00**	**0.50**	**0.50**	**0.50**	**1.00**	**2.00**	**2.00**	**0.25**	**0.25**	**10.00**	
International Trunk Rd.	1-1	Gulu/Amuru Dist. Border [Kali Kali] – Gulu - Gulu/Oyam Dist. Border [Karuma] (– Kampala)	10	10	1	4	9	1	5	3	10	**62**	**1st**
Inter-regional Trunk Rd.	2-1	Kitgum – Agago/Lira Dist. Border [Puranga] (– Lira – Kenya Border)	4	4	7	2	8	7	10	10	10	**66**	
	2-2	Gulu – Acholibur [Pader Dist.]	7	2	6	7	2	4	6	6	10	**55**	**2nd**
Inter-district Trunk Rd.	3-1	Kitgum – South Sudan Border [Musingo]	1	2	7	1	1	6	10	4	10	**45**	**3rd**
	3-2	Oroko [connect to Atiak] – Kitgum	1	1	6	3	1	9	9	6	1	**47**	
	3-3	Gulu – Rackoko [Pader Dist.]	2	2	6	6	1	10	1	4	10	**40**	**4th**
	3-4	Coner Kilak – Adilang [Agago/Abim Dist. Border]	1	2	10	8	2	5	10	3	10	**48**	**3rd**
	3-5	Pajule – Pader – Kwon Kic	2	3	6	3	1	2	10	1	10	**40**	**4th**
	3-6	Gulu – Ajulu – Pabbo Border [Unyama]	2	3	3	10	10	10	10	9	10	**69**	**1st**
	3-7	Kitgum – Kalongo – Patongo – [Agago/Lira Dist. Border]	2	2	9	1	2	4	10	9	10	**47**	**3rd**
	3-8	Kitgum [Pongdwongo] – Padibe [Lamwo] – South Sudan Border [Ngomoromo]	1	3	7	3	1	10	10	2	10	**54**	**2nd**

Source: JICA Study Team

"Zero Option", Do Nothing Alternative

Under this alternative it is assumed that there are no strategies for the trunk road improvements. It cannot attract the Government or donors to authorize the budgets for trunk road improvements. The priority can be decided impromptu. This can lead to disordered improvements and create less functional trunk road networks. If few roads will be improved, the risk of resettlement or loss of property and temporary negative impacts in the construction phase can be the least. However, the Zero Option cannot boost the local economy or prevent the existing negative impacts in the social and natural environments and it could deteriorate the social and natural environments in the Sub-region. Environmental recovery cost will be high.

Involvement of Stakeholders in Working Group Meetings

JST conducted the working group meetings with the following purposes.

- Explain the outline of the Study, schedule and progress to promote the understanding of the participants
- Explain the environmental and social impacts to promote the understanding of the participants at the policy level (the Regional Development Plan, the Regional Trunk Road Network Plan and Priority of the Regional Trunk Road Network)
- Obtain opinions from the participants and reflect them into the Study

The region has no local government, no leading actors which study strategies, or that plan and promote their implementation in Acholi Sub-region. The districts are the actors to develop the region. Besides, according to the decentralization policy of Uganda, the districts tend to consider only themselves and can never think of the regional development.

However, the districts cannot stand alone for the development. They need relationships and linkages between them and between other regions. Where and how the districts will link up with each other is a key issue for the regional development. Therefore, the area which will be linked together is regarded as the "Region", "Acholi Sub-region". A way for the linkage is the regional trunk road network. This is the point of view to discuss in the meeting.

The working group meeting consisted of the following three contents.

- Regional Development Strategy
- Regional Trunk Road Network
- Environmental and Social Considerations (Strategic Environmental Assessment: SEA) for prioritizing the regional trunk road networks

The following district officials were invited for the meetings.

- District Official Representatives from: Engineering Department, Environment/Forest Departments, Production Department, Planning Department, Community Development Department
- Representatives from UNRA Gulu/Kitgum Offices
- Representatives from MoWT Gulu Office
- Representatives from NFA Gulu/Kitgum Offices

13. RECENT ROAD MAINTENANCE AND OPERATION SYSTEM IN STUDY AREA

13.1 Present System of Road Administration

At present, in Uganda, roads are administratively classified as follows:

- National roads
- District roads
- Urban roads
- Community access roads

National roads are administered by MoWT and UNRA. District roads are the jurisdiction of district local governments under the technical guidance of MoWT. Urban roads are also the jurisdiction of the urban councils of local governments under the technical guidance of MoWT. Community access roads are supposed to be managed by sub-county local governments, while the development and maintenance are largely influenced by district local governments.

The network of national roads has been gradually expanded in terms of length from 9,300 km in 1996, to 10,500 km in 2001 and 20,000 in 2010. This expansion was made by reclassification of district roads and community access roads into national roads.

13.2 Road Funding

The funding for the Transport Sector is done by (1) Ministry of Finance, Planning and Economic Development (MoFPED) and (2) Uganda Road Fund. MoFPED is responsible for mobilizing and making available the funding as per the approved transport sector investment plan and provides oversight to the Road Fund Management Board in accordance with the provisions of the Act establishing the fund. The Uganda Road Fund is a body corporate established by an Act of Parliament as part of the overall government strategy to commercialize the road sub-sector by transferring the burden of maintaining roads from the general taxpayer to the road users.

The following table indicates the allocation of national road sector budget to stakeholders. Under “District road maintenance” and “Urban road maintenance”, it can be found that there has been no allocation since FY2010/11. This is because the budget for these roads is included in URF and the “Trunk Road Maintenance” to UNRA.

Table 13-1 Road Sector Investment and Recurrent Expenditure

No.	Category	Budget（Ushs. Billion）					
		2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
016	Works & Transport	126.74	95.16	119.22	123.93	168.21	171.33
		10.4%	10.3%	12.1%	11.4%	13.7%	13.3%
113	Uganda National Roads Authority (UNRA)	435.96	342.21	428.43	483.57	523.52	542.19
		35.9%	37.2%	43.6%	44.4%	42.7%	42.2%
113	Trunk Road Maintenance	67.70	-	-	-	-	-
		5.6%	-	-	-	-	-
118	Road Fund	116.24	301.86	383.42	481.87	534.87	572.31
		9.6%	32.8%	39.0%	44.2%	43.6%	44.5%
501-850	District Road Maintenance	53.70	-	-	-	-	-
		4.4%	-	-	-	-	-
501-850	Urban Road Maintenance	14.22	-	-	-	-	-
		1.2%	-	-	-	-	-
113	Transport Corridor Project	400.26	180.26	52.27	-	-	-
		32.9%	19.6%	5.3%	-	-	-
Grand Total		*1,214.83	919.50	983.33	1,089.36	1,226.60	1,285.83

Source: National Budget Framework Paper FY 2010/11 – FY 2014/2015

The level of investment to district roads was around 5-10 million USD per year during the last decade. Table 13-2 shows the budget and actual expenditure of DUCAR (District, Urban and Community Access Road).

Table 13-2 Budget and Actual Expenditure of DUCAR for 2003/04 -2006/07

Unit=Billion Ushs.

Category	2003/04		2004/05		2005/06		2006/07		Total	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
District Roads Maintenance	17.957	17.339	18.310	17.295	19.869	16.702	18.380	17.096	74.516	68.43
District Roads Development	18.315	19.121	13.460	16.193	13.870	14.909	10.400	9.256	56.045	59.48
Sub Total	*36.272*	*36.460*	*31.770*	*33.488*	*33.739*	*31.611*	*28.780*	*26.352*	130.561	127.91
Urban Roads Maintenance	4.078	3.862	3.992	4.057	3.946	3.745	4.100	3.901	16.116	15.57
Urban Roads Development	3.394	3.828	3.120	2.341	1.500	0.876	1.850	1.702	9.864	8.75
Sub Total	*7.472*	*7.690*	*7.112*	*6.398*	*5.446*	*3.829*	*5.950*	*5.603*	25.98	23.52
Community Access Roads	1.869	4.847	2.960	3.238	5.658	3.504	5.240	3.254	15.727	14.84
Total	45.613	48.997	41.842	43.124	44.843	38.944	39.97	35.209	172.268	166.27

Source: MoFPED

*Includes 15 billion Ushs for Kampala

13.3 Present Road Maintenance Operation and Organization of Districts

To respond to the increasingly deteriorating condition of the DUCAR, the government has decided to change the effective maintenance system as following.

1) The district will directly manage routine maintenance (force account) by utilizing LBT.
2) The government will establish private regional equipment centre to support

Following is a basic outline of the scheme according to the cabinet paper prepared in April 2010.

a. Routine maintenance of district and urban roads will be managed by the districts directly. Each district will be provided with light maintenance equipment such as a motor grader, tipper truck and pedestrian roller. This equipment will be utilized for light grading and re-graveling of roads expected to be carried out once every 3 months.

b. For routine manual Maintenance of district roads, workers organized in road gangs will be deployed. A gang of 6 under an overseer will maintain a road section of 12km. The gang will reside in a small camp and will be provided with the requisite road tools and implements.

c. The government will procure a firm to maintain and operate the road equipment to re-gravel the district roads and reseal/seal urban roads (which means periodic maintenance). The operator will execute the works at fixed rates that will at least cover direct and operational costs. The operator will be paid a management fee. The local government will pay for the works against pre-set unit rates from their conditional grant allocations.

d. Consultancy services will be provided to assist the local governments prepare the documentation required to execute the works. It is envisaged that the local governments

will be allocated adequate funds in the form of Conditional Grants to cover these financial requirements, and thereby enable the viability of the scheme.

e. Clear Guidelines for use of road gangs and light equipment will be prepared and local governments will be sensitised to the benefits of the scheme.

f. Annually, 2,000km of district roads will be rehabilitated and 3,500km will receive periodic maintenance treatment and 150km of urban roads will be resealed or sealed.

The maintenance of the district and community access roads is done by the district and the sub-counties which is the substructure of the Ministry of Local Government (MoLG). The district used to have their original income source which was called the G-TAX (Generation tax) until 2006. In 2006, the government abolished the G-tax and the ratio of independent revenue has declined from 30% to 7%. And even that 7% is spent for the running cost of the district itself. From this circumstance, for investment on the infrastructure, the district has come to depend on the grant from the central government. Currently, the budget for the road maintenance made up of the URF, PRDP and Grants from donors (mainly from DANIDA). However, there is almost no fund from the original source.

Further, road maintenance works are also done by CAIIP (Community, Agriculture, Infrastructure Improvement Program), and NUDEIL (Northern Uganda Development of Enhanced Local Governance Infrastructure and Livelihoods), which is the 4 year plan of MoLG. However these are implemented on a project basis and not included in the annual plan.

13.4 Present Road Maintenance Operation and Organization of UNRA

The road maintenance of UNRA is basically implemented by contracting out the work except for a few activities such as emergency maintenance. Also most of the works are equipment based and in some fields of routine maintenance, such as grass cutting (vegetation control) and de-silting drainage, LBT is applied. In road maintenance management, UNRA is using original software which is called “dTIMS”. “dTIMS” is a software combination of “HDM4” and “ROMAP” which was created by the World Bank. All Sub-stations are using “ROMAP” to do the road management and planning.

Allocation of URF for FY2011/12 was 181,865 million Ushs which was 64.7 % of the overall budget. This includes 4,080 million Ushs for the operation also.

Table 13-3 Allocation of URF to UNRA

Unit: million Ushs.

		FY2010/11	FY2011/12	Balance
UNRA	Periodic and Routine maintenance	189,057	177,785	-11,272
	Operational	6,913	4,080	-2,833
	Total	195,959	181,865	-14,105

Source 1: Declaration of budget ceiling for road maintenance in FY2010/11, The New Vision May 24, 2010,

Source 2: Final Indicative Planning Figures (FIP) to Uganda road fund designated agencies for financing maintenance of public roads in FY 2011/12, The New Vision June 2, 2011

14. ROAD MAINTENANCE AND OPERATION IMPROVEMENT PLAN

14.1 Issues and Considerable Countermeasures

The following table indicates the issues mentioned above in matrix description.

Table 14-1 Issues at the National and District/Regional levels in Road Maintenance

Causes	1) National Level	2) District/Regional Level
A) Institutional	**A-1-1:** Government force account policy delays	**A-2-1:** Low income compared with private sector
B) Technical /Engineering	**B-1-1:** Inadequate technical capability on LBT and its related technologies such as GIS. **B-1-2:** Lack of training opportunity	**B-2-1:** No manual/Guideline to prepare Force Account
C) Facilities	**C-1-1** No plant to provide adequate quantities of proper material.	**C-2-1:** Lack of equipment to operate force account in LBT (relate to **A-1-1**)

Source: JICA Study Team

Objective analysis to explain the solutions is shown in Table 14-2.

Table 14-2 Countermeasure in National and District/Regional level in Road Maintenance

Terms	1) National Level	2) District/Regional Level
A) Short Term	**A-1-1**: Facilitate Force Account Policy	**A-2-1**: Obtain training opportunity in LBT and structure planning & design A-2-2: Prepare Manual/Guideline to operate force account including equipment maintenance
B) Mid Term	**B-1-1**: Establish aggregate and gravel plants to provide qualified material **B-1-2**: Strengthening the training capability of the training centre including operation of RAMPS	**B-2-1**: Obtain PC literacy to create persuasive and effective reports including GIS which relates to RAMPS
C) Long Term	**C-1-1**: Establish practical structure planning and designing course in the University.	**C-2-1**: Obtain benefits the same as the private sector.

Source: JICA Study Team

14.2 Improvement Plan at the District/Regional Level

Short Term

According to the result of the capacity assessment mentioned at the previous section, and the above mentioned required capacity, it is necessary to conduct the following kinds of training:

Table 14-3 Training Options for Capacity Development

	CD Plan-1	CD Plan-2	CD Plan-3	CD Plan-4
Training Organization	MELTC	JICA	KTC	UDSM or DIT
Major Target	• District Engineers, Technicians, Private contractors, Foremen	• District engineer, engineer who is responsible for the section, Managers	• District Engineers, Technicians, Private contractors, Foremen and mechanics.	• District Engineers, Technicians, Private contractors, Foremen, Private consultants
Major Contents	• Refer to the following Table	• Refer to the following table	• Tailor made courses.	• (Not Known)

Source: JICA Study Team

These training programs shall be managed under the technical transfer project supported by the Japanese Government. This Project shall be comprehensive to cover the provision of hardware such as construction of mechanical workshops and mechanical tools which are necessary for the sustainable operation as well as the capacity development.

Mid Term

Budget for the road maintenance is made up of URF, PRDP and donor projects such as U-growth (DANIDA) and NUBILE (USAID). In Uganda, the road maintenance plan of the district is made through RAMPS. This is the standard software for the district in road maintenance. However, it can be found that the district is not using all the functions of RAMPS. The part related to planning such as input of the road inventory data and using GIS & GPS is almost abandoned due to lack of literacy.

From the comments mentioned above, it is necessary to have adequate training opportunities for district officers regarding presentations, which is mostly documentation skills using a PC, including operation of RAMPS. MELTC will be the proper organization to carry out the training, however, since MELTC doesn't have a training curriculum related to RAMPS or reporting, strengthening the institution of MELTC shall be considered also.

Long Term

One of the major causes of the bad personnel turnover rate is the difference in the salaries paid between the private sector and the public sector. After officers have gotten training to contribute to the district works, they go to the private sector with the skill that he obtained due to the higher income. Therefore, public sector salaries should be raised to the same level as the private sector.

14.3 Improvement plan at the National Level

Short Term

Equipment is the key to operate road maintenance properly even when using Labour Based methods, a minimum amount of equipment such as pedestrian rollers, tow graders and water dozers will be required. The equipment is expected to be provided by a loan agreement with the Chinese government. However, the negotiations between both governments are still ongoing and have not been concluded yet. The details of the Scheme, the part which concerns district road maintenance is shown in the following tables. (Source: The scheme for use of equipment in district labour (Force Account) operations in maintenance of district and urban roads, garbage collection and disposal, and fire-fighting, MoWT, April 2010)

Table 14-4 Equipment Provided to District and its Operation Cost

		No.	Fuel per day	No. of days work in a Month	Estimated fuel consumption per month	Total estimated fuel consumption per year
1	Motor Grader	1	150	15	2,250	27,000
2	Dump Truck	1	70	15	1,050	12,600
3	Pedestrian Roller	1	10	8	80	960
4	Pick up	1	20	10	200	2,400
5	Motorcycle	2	5	15	150	1,800
	Sub Total					44,760
	Fuel Cost	2,000	x	44,760	=	89,520,000
	Oil & Lubricants	0.1	x	89,520,000	=	8952000
	Total				Ushs	98,472,000

Source: The scheme for use of equipment in district labour (Force Account) operations in maintenance of district and urban roads, garbage collection and disposal, and fire-fighting, MoWT, April 2010

Mid Term

Through the Pilot Project of Amuru Bridge, it was found that construction material such as sand and aggregate which is suitable was difficult to find in the area, and had to be brought in from far away. For instance, sand was initially conveyed from Kampala before sand in Pakuwachi was found.

From this fact, establish a plant for aggregate and sand shall contribute to cost effectiveness directly. Also, gravel can be found quite a lot of places around the Sub-Region. However, there are gravels which have not passed the quality control at the laboratory before use. It will be recommended to mark the locations where suitable gravel can be found with confirmation by necessary laboratory tests.

As a suitable location, the northern part of Agago District shall be recommended to establish a crasher plant to produce aggregate and sand since exposed rocks are discovered in this area. The produced aggregate and sand to use for concrete and bituminous surfaces. Also, gravel can be excavated from the road reserve, but it is advantageous to find proper sites at constant intervals which can be developed as borrow pits.

Long Term

As mentioned above, district engineers are using standard drawings and tendering documentation in the road maintenance. However, there are sites that are difficult to manage by these standard materials. In this case, the District has to ask for technical assistance from the private sector, but it is difficult to evaluate the quality of the work of the private sector consultants properly. This is because there is no classroom that teaches practical structural engineering. Establishing a practical course in structural engineering will raise the level of engineers in Uganda, since every year the graduates will work as engineers in MoWT, UNRA and the districts.

14.4 Improvement Plan in the Sub-county Level

The Strategic paper issued in November 2011 mentioned that the total budget shall be 455 million USD where approx. 30% will be spent for infrastructure. The major target of the infrastructure in PRDP2 is the rehabilitation and maintenance of community access roads. It mentions that the funds received to maintain these roads only cover the routine maintenance. The PRDP2 will take over the periodic maintenance and rehabilitation by applying LBT as much as possible. Under PRDP2, the PRDP budget grant will be used to finance periodic maintenance and rehabilitation of the DUCAR network including bridges and culverts. It will also be used for special and off-budget projects where cooperation is expected from donors. Labour based methods will be prioritized in order to create local employment and inject money into the community.

Pilot Projects (PP) were implemented in both Gulu and Kitgum districts. The objective of the PP was to gain knowledge of applying LBT to CARs maintenance through actual construction works. Following are the lessons we learned from the PP. The following positive impacts were observed and expected during and after the pilot project.

- Income generation for residents by introduction of labor based technology, and
- Increased convenience for pedestrians and bicycle users
- Improvement in transport and walking during the rainy season.
- Supporting economic activities along the roads.

No negative impacts caused by the pilot project were observed.

14.5 Proposed Projects

The applicability of applying LBT was confirmed from the PP and it was also strongly stated in the PRDP2. So, the following are recommended from the above mentioned findings.

a. The periodic maintenance and rehabilitation shall be undertaken using the PRDP fund and the donors shall support in the field by clearing the bottlenecks as bridges and culverts are the most costly items.

b. The routine maintenance shall be conducted using the funds disbursed from the current URF. However, the following measures shall also be taken. The details are shown in Chapter 17.

- Establishment of Road Maintenance System Applying Community Workers
- Strengthening the Sub-County Administration Capacity
- Establishment of the Equipment Centre
- Strengthening of MELTC

MELTC is the only training centre for labour based technology in Uganda. The following table indicates the current training courses.

Table 14-5 Current Training Courses of MELTC

	Courses	Training Days
1	Labour-based Road Rehabilitation Course for Assistant Managing Directors	26
2	Labour-based Road Rehabilitation Course for Forepersons	70
3	Labour-based Road Rehabilitation Course for Assistant Forepersons	70
4	Training of Trainers for Routine Road Maintenance Course	70
5	Labour-based Road Contract Management Course for Engineers	10
6	Labour-based Road Contract Supervision Course for Supervisors of Work	30
7	Labour-based Road Contract Supervision Course for Road Inspectors	50
8	Labour-based Awareness for District Administrators and Policy Makers	10
9	Cross-Cutting Issues Related to Planning and Implementation of labour-Based Road Works for Community Based Services Officers	10
10	Community Access Innovations Course for Technical staff	15

Source: http://meltc.org/, MELTC =Mt. Elegon Labour Based Training Centre

The courses of MELTC tend to focus on LBT skills in both field and contracts, and there are no specific courses for the coming force account or RAMPS. RAMPS is a trunk system of road maintenance in Uganda, though it seems that the district is not managing the whole system. In particular, the planning part using GPS to collect inventory data from the field and to transfer that data to GIS system of RAMPS is almost abandoned.

Furthermore, one of the reasons why LBT is not preferred among the public can be said that there is a perception LBT is inferior to equipment basis. This belief comes from the poor result of LBT construction works which were caused by improper quality control. Improper quality control might one of the strongest reasons not choosing LBT, but another reason could be dissatisfaction with the cost and lengthy construction procedure. Considering that MELTC is the only training centre focused on LBT in Uganda, MELTC shall also take responsibility to try to spread the use of LBT in Uganda.

15. TECHNICAL TRANSFER

15.1 Contents of Technical Transfer

The aim of technical transfer activities is to impart necessary skills to counterparts on how to develop and maintain road inventory information. To achieve this aim, counterparts were trained on the following main topics:

- Road Survey Data Collection Techniques and
- Road Information GIS Processing Techniques

Two training workshops were conducted. The first workshop focuses on GPS skills necessary to collect road information effectively. This was held last May, 24-25, 2011 and was attended by district engineers from the districts covered by the study. The second workshop focused on GIS skills necessary to process road information and produce thematic maps and analyses. This consisted of three training sessions conducted in November, 2011 at three locations in Gulu, Kitgum for Acholi district engineers and at the Ministry of Works and Transport in Entebbe in November, 2011.

The training courses cover topics on GPS survey and GIS skills useful for road inventory work.

The GPS survey and GIS skill levels of the target participants range from beginner level to intermediate level. In order to address the varying skill levels of the participants, the courses cover topics from GPS and GIS concepts to practical applications of the technologies in road inventory development and maintenance. Exercises will be given to the participants to maximize their learning even outside the training room.

At the end of each lecture session, time will be given for the participants to question the lecturer regarding the topics covered and other topics pertaining to their work where GPS and GIS could be useful.

In order to avoid duplication of training topics with other donor agencies active in Acholi region, coordination meetings were held with USAID. USAID is also providing equipment, software and training on GPS in the Acholi area.

The following section discusses the contents of the road inventory technical transfer workshops:

15.2 Workshop 1: Training on Road Survey Techniques Using GPS

The "Training on Road Survey Techniques using GPS" workshop was conducted last May 24-25, 2011. The objectives of the workshop were:

- To enable the participants to handle processing of GPS centre line data coming from the district engineers
- Enable trainees to collect Road Inventory Information Properly

The workshop was participated in by personnel from the District Engineer's Offices of Agago, Gulu, Kitgum, Lamwo and Pader.

The workshop broke down the tasks necessary to effectively implement road survey tasks into simple step by step procedures which the participants can replicate on their own. The participants were given manuals, which could also be used as operating manuals that they could use when conducting their own road surveys.

Although many of the participants have received training on GPS before, the main difference of the workshop is its focus on simple and effective road survey techniques.

The workshop covered topics from pre-survey mission planning, to conducting the actual survey up to downloading and processing the GPS data. Road survey forms were provided in order

As much as possible, the workshop emphasized the use of simple software which the participants may already know. An example is the use of MS Excel software to encode survey data. In order to help the participants validate their survey, the participants were also shown techniques on how to display their survey data into Google Earth.

15.3 Workshop 2: Training on Road Inventory GIS Processing Techniques

The "Training on Road Inventory GIS Processing Techniques" was conducted in November, 2011. The objectives of the workshop were :

- Educate participants on the applications of GIS in Road Inventory Development and Maintenance
- Orient the participants on the contents of the GIS database developed by the JICA Study Team for the Acholi Sub-region
- To enable the participants to Process Road Centreline Data with Road Condition Information using GPS/CAD/GIS software
- To enable participants to produce Thematic Maps and Tabular Reports based on the Road Database

The training course consisted of lectures and exercises over four days. Three separate courses were conducted at different locations, namely, Gulu, Kitgum and MoWT in Entebbe. The training course was designed for district engineers and MoWT engineers to whom road condition information are necessary. This training course was also intended as a follow up to the training course on "Road Survey Technique Using GPS" conducted last May 2011. Emphasis was given to simplified and practical techniques to process road condition data.

The GIS skill levels of the participants ranged from beginner level to intermediate level. Many of the participants from the districts also attended the training course on road survey techniques using GPS conducted by the JICA Study Team last May 2011.

At the end of each training topic, assessment forms containing questions about the topics covered were distributed to participants to assess their understanding of the course. Based on the assessment forms, most of the participants were able to satisfy the requirements of the course and were able to acquire basic skills necessary to process road condition information. It is noted that some participants from the districts who missed the first training on road survey techniques by GPS previously by the study team last May, 2011 had some difficulty in performing some tasks involving GPS equipment. It is also noted that MoWT engineers who attended the training course in Entebbe showed high degrees of understanding and skill in processing road condition information.

16. SELECTION OF PRIORITY PROJECTS

16.1 Priority Projects for Mid Term (2018)

As discussed in "Chapter 11. Road Network Development Plan", the primary objective of the priority projects is to improve living standards and accommodate industrial potential by 2018. There are development ideas by the functional road classes as follows,

- International Trunk Roads: to meet international road standard by tarmac and widening, the design LOS is D,
- Inter –Regional Trunk Roads: to meet national trunk standard by tarmac and widening, the design LOS is F,
- Inter District Roads: to secure passability throughout year by bottleneck improvements such as on drainage systems,
- City Roads: to regulate and increase efficiency on traffic movements by improvement of road structure and pavement, and
- Feeder Roads: to remove bottle necks so as to allow the road to provide access to the distinct roads.

In addition to the above, a proposal for improvement of public transport systems was made because of the following.

There is no reliable public transport system in the study area except in the townships. People need to prepare their own transport means in case they need to move. This situation makes the activities of the public limited and transportation cost high.

The objective of the proposal for public transport improvement is to provide a reliable and reasonable transport system connecting district centres and remote areas, which is expected to contribute to improving living standards.

To follow the above ideas, the priority projects by 2018 are proposed as follows.

Table 16-1 List of Priority Projects

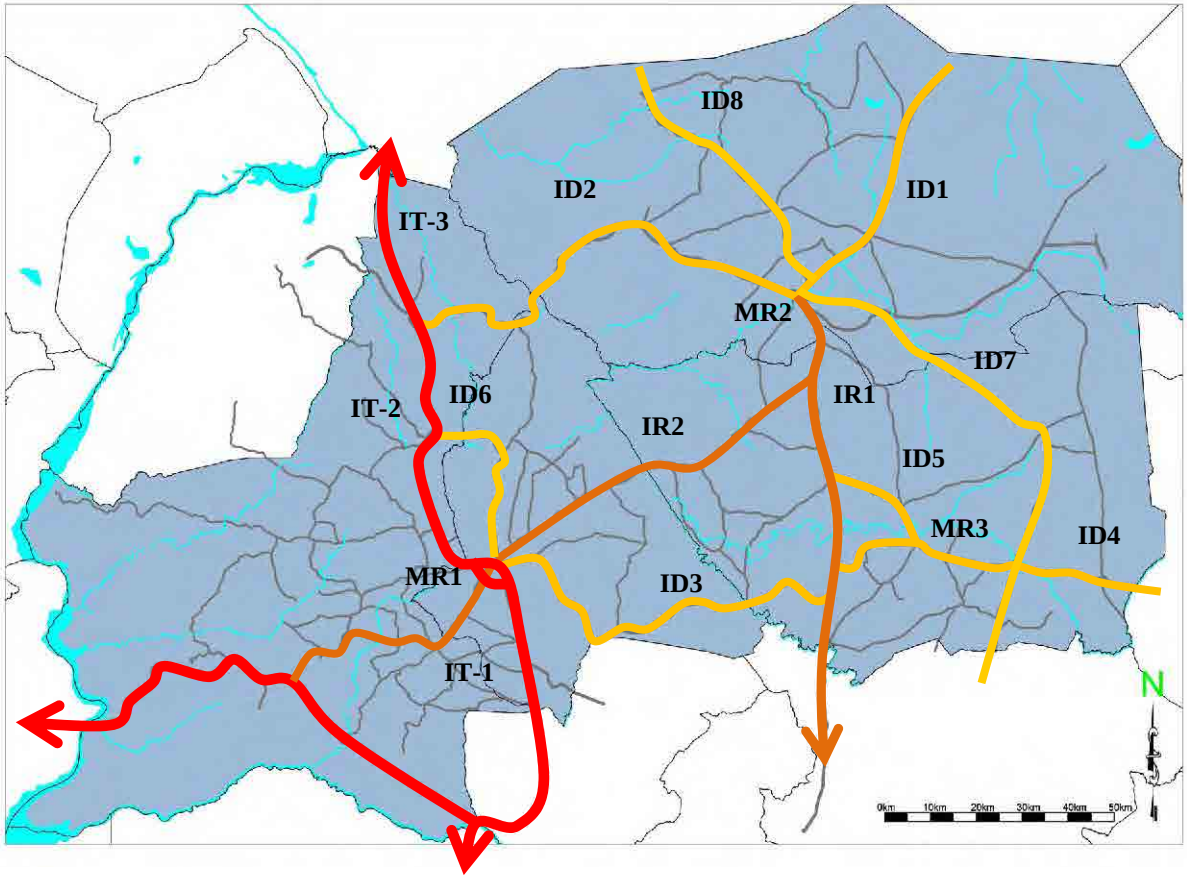
ID	Program Name	Scope	Description
International Trunk Road Improvements			
IT1	Kamdini-Gulu Road Section Improvement	L=58km W(9.5):1.5-3.25-3.25-1.5 Bituminous Standard	The paved surface of the road section is heavily deteriorated in the entire section and the shoulders are eroded due to drainage problems. The cross section is narrower than standard width. The program aim is to improve the section to meet same standard of the Gulu-Atiak-Nimule Rd.
IT2	Gulu-Atiak Road Section Improvement	L=67km, W(9.5):1.5-3.25-3.25-1.5 Bituminous Standard	The current road is a murrum road. Since the road section has been identified as an international corridor connecting between Kenya and South Sudan, the section needs to meet the international trunk road standard with tarmac pavement. At Gulu township, a bypass was designed. The project is financed by WB and the project is in the evaluation stage for the Contractor.

ID	Program Name	Scope	Description
IT3	Atiak-Nimule Road Section Improvement	L=35km, W(9.5):1.5-3.25-3.25-1.5 Bituminous Standard	The current road is a murrum road. Since the road section has been identified as an international corridor connecting between Kenya and South Sudan, the section needs to meet the international trunk road standard with tarmac pavement. At Gulu township, a bypass was designed. The project is financed by JICA and the project is in the evaluation stage for the Contractor.
Inter-Region Trunk Road Improvements			
IR1	Kit gum-Lira Road Section Improvement	L=120km W(8.6):1.5-2.80-2.80-1.5 (Paved III) Bituminous Standard	The road section is identified as a regional truck road in northern Uganda and the road continues to the Kenyan border. The section from Lira to the Kenyan Border has been upgraded as bituminous standard with financial assistance of WB. UNRA has completed FS and DD for the Kitugum-Lira-Apac section and awaits funds for implementation.
IR2	Gulu-Acholibur Road Section Improvement	L=85km W(8.6):1.5-2.80-2.80-1.5 (Paved III) Bituminous Standard	The section runs east-west in Acholi Sub-region and has also been identified as a regional truck road. The construction of Aswa Bridge was underway as of Oct. 2011. The section is a part of Olwiyo – Gulu- Kitgum road and its FS and DD has been completed by UNRA and it awaits funds for implementation.
Inter-District Road Improvements			
ID 1	Kitgum-Musingo (South Sudan Border) Road Section Improvement	L=70km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The section is a part of IR1 and its FS and DD has been completed. The section was designed with bituminous standard. Estimated traffic volume remains low at approx. 100 in 2018 according to the traffic forecast. Because of low traffic, this study proposes Murrum standard as an improvement.
ID 2	Kitgum-Atiak Road Section Improvement	L=96km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The section runs east-west in the northern part of Acholi Sub-region. The section provides direct access from Kitgum to Gulu-Atiak-Nimule Rd. The portion near the Atiak has been degraded due to overloading. A temporary Bailey bridge has been provided for passenger vehicles or smaller.
ID 3	Gulu-Rackoko Road Section Improvement	L=70km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The section runs east-west in the south part of Acholi Sub-region. The section is located between Gulu-Kampala Rd. and Kitgum-Lira Rd. The maintenance condition is relatively poor. The traffic sometimes needs to be diverted to other roads because of it.
ID 4	Kilak-Adilang Road Section Improvement	L=48km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The section runs east-west in the south part of Acholi Sub-region. The improvement works on two (2) bridges in underway with financial assistance from the Governments of Japan and Italy. There is an army camp along the road section.
ID 5	Pajule-Pader-Kwonkic Road Section Improvement	L=26km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The road section links the IR1 and the ID4 via Pader. The section gives the shortest access to Kiting from Pader.
ID 6	Gulu-Ajulu-Pabbo Road Section Improvement	L=40km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The urbanization is progressing along the road section and its adjacent area would be new residential area as Gulu develops. A bridge and culvert construction was underway as of Oct.11 with financial assistance from the Government of Japan.

ID	Program Name	Scope	Description
ID 7	Kitgum- Kalongo –Patongo Road Section Improvement	L=125km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	Agago district office is located on this road section and the section continues to Kitgum. High population growth is expected along the road section.
ID 8	Kitgum- Padibe-Ngomoromo Road Section Improvement	L=65km W(10.0)=2.0-3.0-3.0-2.0 Gravel A Gravel Standard	The road links between Kitgum and the South Sudan border and continues to Torrit, South Sudan, which is in the Green Belt.
City Road Improvements			
CR1	Gulu City Roads Improvement	L=14.3km W(14.0):2.5-1.5-3.0-3.0-1.5-2.5 Bituminous Standard	The pavements on the city road are heavily deteriorated due to poor maintenance and no walkways or parking lanes have been provided although there are many NMT and Boda-Boda that create chaos in city traffic. The project application as Japan's Grant Aid is under preparation by GOU as of Oct.2011.
CR 2	Kitgum City Roads Improvement	L=to be Studied W(14.0):2.5-1.5-3.0-3.0-1.5-2.5 Bituminous Standard	The pavement in the city no longer exists because of poor maintenance. No walkways or parking lanes have been provided There is a narrow bridge which may be a bottleneck for the traffic in near future. The city is expected to be an agricultural industrial centre.
CR 3	Pader City Road Improvement	L=to be Studied W(14.0):2.5-1.5-3.0-3.0-1.5-2.5 Bituminous Standard	The pavement on the city road is heavily deteriorated due to poor maintenance and no walkways or parking lanes have been provided. The existing roadway is wide, however the road is not being effectively used.
Feeder Road Improvements			
FR 1	Gulu Feeder Road Drainage System Improvements Program	Pipe Culvert D900 N=170	Approx. 170 culverts have been identified as being in poor condition by the Road Inventory Survey. These culverts will be replaced with min. 900mm dia. culverts together with additional filling.
FR 2	Kitgum Feeder Road Drainage System Improvement Program	Pipe Culvert D900 N=30	Approx. 30 culverts have been identified as being in poor condition by the Road Inventory Survey. These culverts are being replaced with min. 900mm dia. culverts together with additional filling.
FR 3	Pader Feeder Road Drainage System Improvements Program	Pipe Culvert D900 N=40	Approx. 40 culverts have been identified as being in poor condition by the Road Inventory Survey. These culverts are being replaced with 900mm min. dia. culverts together with additional filling.
FR 4	Lamwo Feeder Road Drainage System Improvements Program	Pipe Culvert D900 N=30	Approx. 30 culverts have been identified as being in poor condition by the Road Inventory Survey. These culverts are being replaced with 900mm min. dia. culverts together with additional filling.
FR 5	Agago Feeder Road Drainage System Improvements Program	Pipe Culvert D900 N=20	Approx. 20 culverts have been identified as being in poor condition by the Road Inventory Survey. These culverts are being replaced with 900mm min. dia. culverts together with additional filling.
Public Transport Improvements			
PT1	Gulu Community Bus Service Program	Provision of community buses which will also be available to cater to small scale cargos. TA for O&M should be part of the program.	There is no reliable public transport in the District and this limits people's activities. The community bus should be provided so as to establish public access to social infrastructure and trading markets by scheduled operation but not daily.

ID	Program Name	Scope	Description
PT2	Kitgum Community Bus Service Program	Provision of community buses which will also be available to cater to small scale cargos. TA for O&M should be part of the program.	There is no reliable public transport in the District and this limits people's activities. The community bus should be provided so as to establish public access to social infrastructure and trading markets by scheduled operation but not daily.
PT 3	Pader Community Bus Service Program	Provision of community buses which will also be available to cater to small scale cargos. TA for O&M should be part of the program.	There is no reliable public transport in the District and this limits people's activities. The community bus should be provided so as to establish public access to social infrastructure and trading markets by scheduled operation but not daily.
PT 4	Bus Terminal Integration Program in Gulu City	Bus Terminal and Parking Space Construction	There are 2 existing bus terminals in Gulu which are being operated by the private sector. One of the bus terminals is located in the middle of town and that disturbs city flow. To improve city traffic and increase user's convenience, an integrated bus terminal is proposed.

Source: JICA Study Team



Source: JICA Study Team

Figure 16-1 Location of Priority Projects

16.2 Selection of Prioritized Sections in CARs

As discussed in "5.3 Community Access Roads Survey", the improvement and strengthening of the CARs, which form the road network being used frequently by the community , is

considered to be very essential. The CARs to be prioritized by the districts are shown in Figure 5-4. These selections were made by the districts themselves.

The issue is how to maintain those prioritized roads so as to be passable to motorized traffic. As one countermeasure, the application of the labour based technology (LBT) is considered, which is to use available human resources for the maintenance work and it would be expected to bring an additional benefit, which is the acceleration of social and economic settlements of the IDPs in this Acholi Sub-region.

This study seeks an appropriate and applicable work method and organization approach for the maintenance of the CARs by the execution of Pilot Projects which is further explained in Chapter 17.

16.3 Selection of High Priority Project

As explained in "Chapter 9, Regional Development Plan", the study area needs to improve accessibility to Gulu and Kitgum to attain regional development. In particular the international trunk road network conveying international freight needs to be emphasized and connected to the regional network. The establishment of a strategic investment plan for the improvement network is necessary and it should be economically and socially feasible

Taking into account the above, the selection is made with the following view points

1) Improvement of Connectivity to the International Distribution Corridor
2) Accessibility to Gulu and/or Kitgum
3) Number of Beneficiaries from the Improvement
4) Average Daily Traffic
5) Contribution to Regional Industries

As a result, the following programs are selected as the high priority projects as shown in Table 16-2.

1) IT1 Kamdini-Gulu Road Section Improvement L=58km
2) IR1 Kitgum-Lira Road Section Improvement L=120km
3) IR2 Gulu-Acholibur Road Section Improvement L＝85km
4) MR1 Gulu Municipal Roads Improvement L=14.3km

Table 16-2 Program Evaluations

Project ID.	Road Section	Improvement of Connectivity to International Distribution Corridor	Accessibility to Gulu and/or Kitgum	Nos. of Beneficiaries from the Improvement	ADT (PCU2018)	Evaluation (Impacts on Regional Economy)
International Trunk Road Improvements						
IT1	Kamdini-Gulu Road Section Improvement	• The road section connects between Gulu and the branching point to Lira (Kamdini), • The road reaches Nairobi and Kampala, where are major industrial centers in EAC countries, with continuous tarmac roads, eventually, • Improvement of the road section would result in enhancing the distribution corridor of Mombasa – Juba	• The road is directly connected with Gulu	• 462,000(Direct Beneficiaries) • 800,000(Indirect Beneficiaries)	• 1,900 -2,300	• The Project is expected to bring great contributions to regional economy • Gulu would play a rely point on the distribution corridor that would make service industries be developed, • Positive economic impacts would spread to rest of Acholi Sub-region, **A**
IT2	Gulu-Atiak Road Section Improvement	• The road section connects between Gulu and Atiak where is 35km before the border of South Sudan, • The road would reaches Nairobi and Kampala, where are major industrial centers in EAC countries, with continuous tarmac roads, eventually, • Improvement of the road section would result in enhancing the distribution corridor of Mombasa – Juba	• The road is directly connected with Gulu	• 462,000(Direct Beneficiaries) • 800,000(Indirect Beneficiaries, Population of Juba City)	• 1,100	• The Project is expected to bring great contributions to regional economy • Gulu would play a rely point on the distribution corridor that would make service industries be developed, • Positive economic impacts would spread to rest of Acholi Sub-region, • Implementation of the Project is committed by WB -
IT3	Atiak-Nimule Road Section Improvement	• The road section connects between Atiak and Nimule where is the border of South Sudan, • The road would reaches Nairobi and Kampala, where are major industrial centers in EAC countries, with continuous tarmac roads, eventually, • Improvement of the road section would result in enhancing the distribution corridor of Mombasa – Juba	• The road is a part of link between Nimule and Gulu	• 462,000(Direct Beneficiaries) • 800,000(Indirect Beneficiaries, Population of Juba City)	• 1,100	• The Project is expected to bring huge great contributions to regional economy. • Implementation of the Project is committed by JICA -
IR1	Kitugum-Lira Road Section Improvement	• The road section connects between Kitgum and Lira, • The road would reach Nairobi through Lira with continuous tarmac roads, eventually. • The improvement of the road section would result in travel time saving and shorter distance between Kitgum and Kampala	• The road is directly connected with Kitgum	• 475,000	• 1,500 -1,600	• The Project will bring in the time saving to Kampala and Kenya that is expected to make Kitgum a relay point of agriculture product from North including South Sudan and to generate new industry such as food processing, • Pader and Lamwo will also be beneficiaries because of creation of shorter access to Kampala by the improvement. **A**
IR2	Gulu-Acholibur Road Section Improvement	• The road section connects between Gulu and Kitgum. • The improvement of the road section would result in creation of multi linkage such as to Juba, Kampala and DRC via Gulu.	• The road is directly connected with both Gulu and Kitgum	• 738,800	• 1,100-1,800	• The Project will bring in the time saving to Kampala and DRC that is expected to make Kitgum a relay point of agriculture product from North including South Sudan and to generate new industry such as food processing, • Lamwo will also be beneficiaries because of shorter access to Kampala by the improvement. **A**

Project ID.	Road Section	Improvement of Connectivity to International Distribution Corridor	Accessibility to Gulu and/or Kitgum	Nos. of Beneficiaries from the Improvement	ADT (PCU2018)	Evaluation (Impacts on Regional Economy)
Inter-Region Trunk Road Improvements						
ID1	Kitgum-Musingo(South Sudan Border) Road Section Improvement	• The road section connects between Kitgum and South Sudan Border (North East). • The road section is a continuation of Gulu-Kitgum and Lira- Kitgum road.	• The road is directly connected with Kitgum	• 165,900	• 110	• The Project will give positive impact on agricultural industry along the road if the IR1 and IR2 are constructed. **C**
ID2	Kitgum-Atiak Road Section Improvement	• The road section connects between Kitugum and Atiak at the Atiak – Nimule (South Sudan Border) Road.	• The road is directly connected with Kitgum	• 283,300	• 200	• The Project will give positive impact on agricultural industry along the road. • Increase of exportation of agricultural products to South Sudan is expected. **B**
ID3	Gulu-Rackoko Road Section Improvement	• The road section connects between Gulu and Rackoko at the Kitgum-Lira Road	• The road is directly connected with Gulu	• 191,800	• 1,000	• The Project will give positive impact on agricultural industry along the road if the IT1 and IR1 are constructed. **B**
ID4	Kilak-Adilang Road Section Improvement	• The road section connects between Kilak at the Kitgum- Lira Road and Adilang	• The road is not connected with neither Gulu nor Kitgum	• 260,900	• 170	• The Project will give positive impact on agricultural industry along the road if the IR2 is constructed. **C**
ID5	Pajule-Pader-Kwon kic Road Section Improvement	• The road section connects with Pajule at Kitgum-Lira Road and Pader and Kwon kic in Agago.	• The road is not connected with neither Gulu nor Kitgum	• 233,500	• 350	• The Project will give positive impact on agricultural industry along the road if the IR2 is constructed. **C**
ID6	Gulu-Ajulu-Pabbo Road Section Improvement	• The road section connects with Gulu and Ajulu and Pabbo at the Gulu-Nimule Road	• The road is directly connected with Kitgum	• 169,800	• 360	• The Project will give positive impact on agricultural industry along the road when the IT2 is constructed. **B**
ID7	Kitgum- Kalingo –Patongo Road Section Improvement	• The road section connects with Kitgum and Kalino –Patongo at Agago	• The road is directly connected with Kitgum	• 234,600	• 100	• The Project will give positive impact on agricultural industry along the road when the IR1 and the IR2 are constructed. **C**
ID8	Kitgum-Padibe-Ngomoromo Road Section Improvement	• The road section connects with Kitgum and Ngomoromo at South Sudan Border (North West)	• The road is directly connected with Kitgum	• 184,100	• 100	• The Project will give positive impact on agricultural industry along the road when the IR1 and the IR2 are constructed. • There is a national development plan on agriculture industry after the border (South Sudan side). If the road section is improved and the area at South Sudan could be a part of Kitgum agricultural zone **C**
Municipal Road Improvements						
MR1	Gulu Municipal Roads Improvement	• The improvement work contains the road sections at CBD area with 14.3km	• The roads are located within Gulu municipality	• 172,000	• 5,000	• The Project will contribute to the effectiveness of urban transport • The Project is expected to bring new industries such as on service industries (Retail Trade, Bank, Tourism) **A**
MR2	Kitgum Municipal Roads Improvement	• The improvement work is on the road sections at town centre with 7.5km	• The roads are located within Kitgum municipality	• 78,000	• 300-500	• The Project will contribute to improvement of living standards and stimulate local economy. • Infrastructure development including roads will bring new industry such as agriculture product processing B
MR3	Pader Town Council Roads	• The improvement work is on the road section at town centre with 1.5m	The road is not connected with neither Gulu nor Kitgum	• 18,000	• 300	• The Project will contribute to improvement of living standards and stimulate local economy. **C**

Source: JICA Study Team

17. PLANNING AND IMPLEMENTATION OF THE PILOT PROJECT

17.1 Objective and Scope of the Pilot Project

Since Uganda is a landlocked country, most of the distribution of goods and passenger journeys are dependent on motorization. It is said that the total length of the road network in Uganda is approx. 65,000km and out of that 10,000km are classified as national roads. Furthermore, it is also said that of the 55,000km which are classified as district and community access roads, the sections paved with tarmac in good condition total just 700km: the rest are paved with gravel or remain as earth roads.

According to the administrative jurisdictions of Uganda, sub-counties have the responsibility of maintaining CARs. However, since sub-counties do not have enough in terms of either personnel resources or equipment, maintenance of CARs is hardly conducted, with the exception of basic labour work which doesn't require equipment, for example slashing weeds.

A policy has been enacted to change the method of road maintenance from the current equipment-based methods to Labour-based techniques, especially for routine maintenance. However, the districts and sub-counties are more familiar with equipment-based methods by sub-contracting to contactors. Therefore, the Government conducted technical training for the district engineers at Mt-Elgon Labour Based Technology Training Centre (MELTC), which is the only training institute for LBT in Uganda. But since there is no practical experience in managing LBT by force account in the districts, the effect of the training is not clear.

LBT is a construction method where mainly manpower is used together with small equipment for compaction or hauling materials. Therefore, it is expected that this method will be applied in the sub-counties which do not have enough resources to manage or operate the maintenance works. Besides, the fact is that CARs are part of a district's road network and maintenance of CARs is work which will directly enhance the lives of the people in the community. From this, the necessity to implement a pilot project targeting CARs and collect and evaluate the data to find out the needs for the sub-counties to introduce LBT is very high.

The work of road maintenance can be categorized into: 1) Routine, 2) Periodic, 3) Rehabilitation, 4) Spot Maintenance and 5) Urgent Improvement and the required technology for each of these five categories is different. Therefore, in this Pilot Project, routine and periodic maintenance shall be chosen due to its being typical of the maintenance works.

The "DONOU Method" is a road maintenance method in which gunny bags (which are called "donou" in Japanese) are used. Active action has been carried out by JICA volunteers and Japanese NPO to spread the method widely in Uganda. The donou method is a method which is reasonable and uses simple technology, so it is expected that it can be managed even at sub-county level. Therefore, in this Pilot Project, accessibility of this donou method to sub-counties shall be verified.

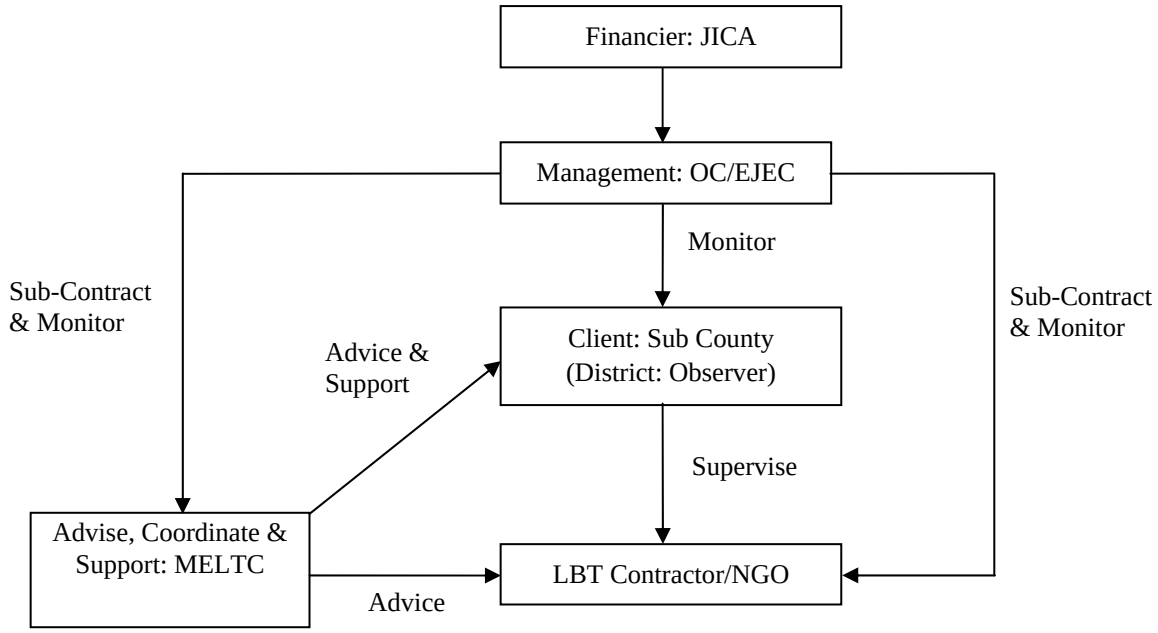
Despite the fact that sub-counties have the responsibility of managing the CARs, it should be noted that CARs form part of the road network of the district. So, in this Pilot Project, the district will be asked to become involved in the inspection of works. There will be a need for consultations between the district and sub-county to verify institutional roles.

Through the practical activity of the Pilot Project, wide issues at the district and sub-counties, including the capability of the contractors, need for technical assistance and direction of the assistance shall be verified. And also, from the result of the verification, the way forward for JICA to tackle road maintenance shall be considered.

17.2 Organization, Schedule and Location of the Targeted Road

(1) Organization

The following figure indicates the organization of the Pilot Project.



Source: JICA Study Team

Figure 17-1 Organization of the Pilot Project

The logic behind the above mentioned organization of the pilot project is shown below:

a. Due to its purpose of verifying the series of activities of the sub-counties in road maintenance, the sub-county shall be the client. However, the district shall also be involved as an observer and assist the sub-county.
b. Since it is unreasonable to expect adequate technical skills from the sub-county as well as the district in managing LBT, MELTC, the only training centre specialized in LBT in Uganda, shall provide support to the project. Further, MELTC itself shall be included as a target of the evaluation to find a comprehensive solution in road maintenance including "training "
c. MELTC shall support the contractor, sub-county, and district as well as the study team in technical and procedural aspects.
d. The JICA study Team shall provide overall management and sub-contract MELTC and contractors. Allowances shall be paid to the sub-county and district.

(2) Schedule

The following table indicates the general schedule of the pilot project.

Table 17-1 General Schedule of the Pilot Project

	September	October	November	December	January
(1) Meeting with District & Sub-Counties					
(2) Meeting with MELTC					
(3) Internal progress of JICA					
(4) Contract with MELTC					
(5) Public Consultation & tendering preparation					
(6) Tendering procedure					
(7) Construction (Periodic)					
(8) Construction (Routine,)					

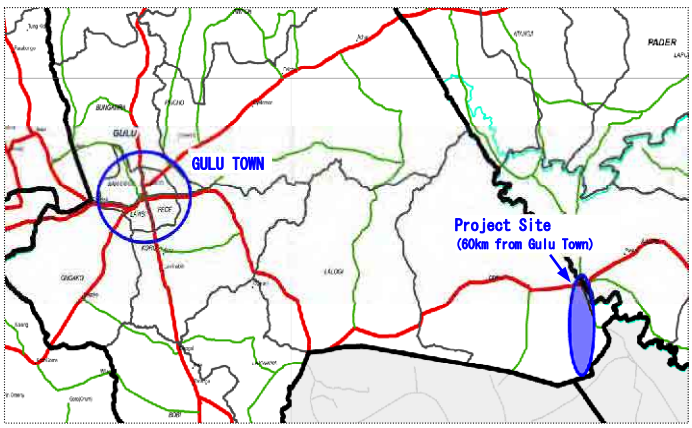
Source: JICA Study Team

(3) Location

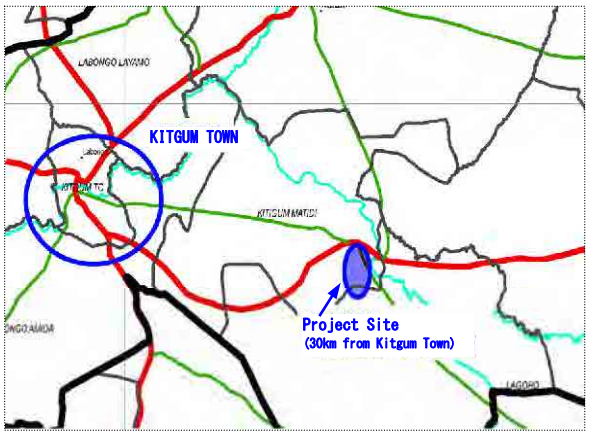
The condition of the road of the Pilot Project shall be as follows:

a. Able to work at routine or periodic level
b. Passable for all seasons
c. Nominated as an important route in the sub-county
d. Enough people settled along it to provide necessary labour for LBT
e. Easy to collect road material such as gravel and stone
f. Area where sub-counties awareness is high

Given the above selection criteria, the routes mentioned in the table below were chosen from Gulu and Kitgum district. Location maps are shown in Figure 17-2.



(a) Project Site in Gulu District (Approx. 60km from Gulu)



(b) Project Site in Kitgum District (Approx. 30km from Kitgum)

Source: JICA Study Team

Figure 17-2 Maps Showing Location of the Pilot Project

17.3 Considerable Risks and Mitigation Measures

Recently in Uganda, weather patterns have been erratic and it is becoming increasingly difficult to predict the rainy and dry seasons precisely. From experience, the duration of the Pilot Project falls in the dry season: however, there is a possibility of the occurrence of unexpected heavy rains. It is common for the contractor to prepare a work schedule making an allowance for rain-interrupted days. However, it might be difficult to expect such management skills from the contractor, and this kind of skill is also one of the targets of the evaluation.

Therefore, when delays occurred as a result of circumstances such as those mentioned above, the construction shall be suspended and at the end of the contract period, the payment shall be finalized. Furthermore, if as a result of the afore-mentioned reasons, there was a change in quantities or if a new issue had arisen, the construction shall be suspended at the maximum price of the contract. Contract amendments shall be required for these cost finalizations and suspensions.

Gravel for construction was planned to be provided from the district borrow pit free of charge or at reasonable price. However, when it was found that the capacity of the borrow pit was not adequate, it became difficult to establish an understanding with the land owner; thus, gravel for use on the project had to be procured at market price. In such a case, an amendment to the contract such as reviewing the quantity and items to fit within the contract price shall be made.

17.4 Impremention of the Pilot Projects

(1) Periodic and Routine Maintenance

Periodic Maintenance work in Gulu District

The Pilot Project in Gulu was conducted in Odec Sub-County, Gulu District. Since construction was done at the periodic level, using machinery was allowed. However, the priority of CARs is lower than the district road, and this brings inadequate funds for road maintenance. According to an interview with the sub-county, it receives approximately from 3 to 5 million Ushs annually. Therefore, there was a challenge to use labour based rather than machinery as much as possible to determine the application to use the labour based method in the CARs in several maintenance levels. By using the labour based method it was expected to complete the road maintenance at a lower cost in CARs.

The length of the target road was 13km with a 60 day construction period. MELTC joined the construction as supervisor and monitor to evaluate the performance of the contactor, authorities, and the casual labourers that where hired from the communities along the targeted road. The construction started on 19 November and ended on 17 January, 2012.

Routine Maintenance work in Kitgum District

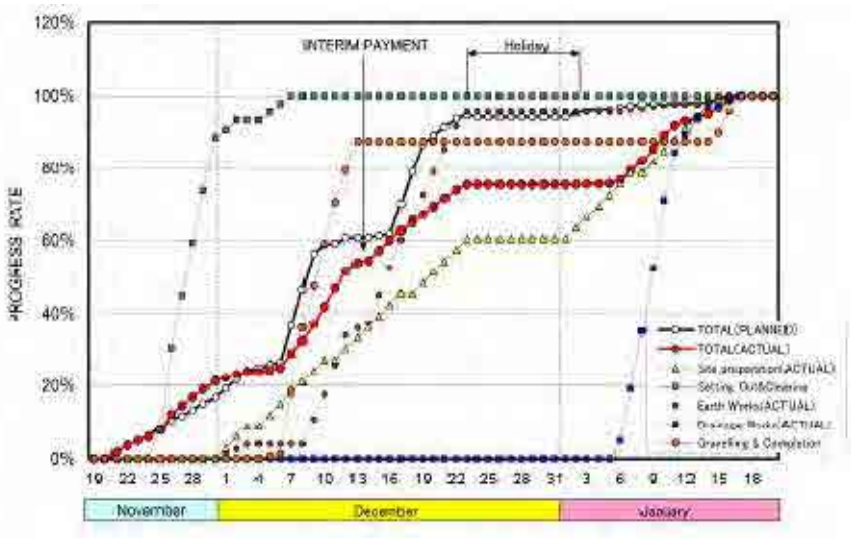
Contrary to the Pilot Project in Gulu, the Pilot Project in Kitgum was challenged to do the construction by applying purely a labour based method as much as possible. One of the objectives to apply the labour based method is to see the applicability of the labour based method to community road maintenance by hiring community people. The maintenance level was planned as routine. Also, the clearance of the bottlenecks is one of the greatest difficulties which the sub-county has, and this mostly comes from the inadequate budget. To solve this issue, the donou method was attempted where cross culverts were needed and it was used instead of concrete. “Donou” is a Japanese word which means sand bag or gunny bag.

The length of the target road was approx. 8km with 3 crossing culverts. The construction period was 30 days. MELTC joined to the construction as supervisor and monitor to evaluate

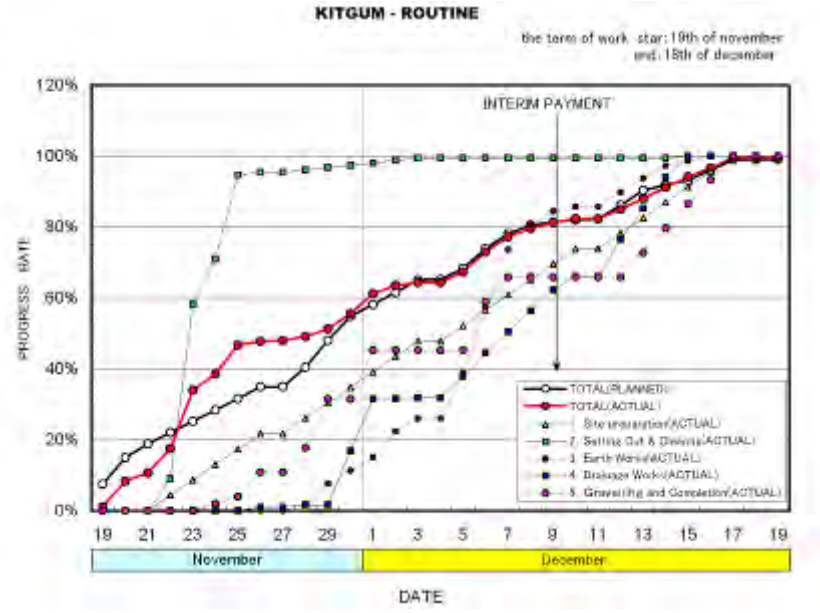
the performance of the contactor, authorities, and the casual labourers that where hired from the communities along the targeted road.

(2) Progress of the Construction

Progress of the Pilot Projects is shown in Figure 17-3.



(Periodic Maintenance Work in Gulu District)



(Routine Maintenance Work in Kitgum District)

Source: JICA Study Team

Figure 17-3 Construction Progresses of the Pilot Projects

(3) Construction Photos

Periodic Maintenance work in Gulu District

The following photos indicate the construction procedure from commencement to the end.

Photo 17-1 Construction Procedure (Pilot Project in Gulu)

		
1-1 Setting out of Stakes	2-1 Site Clearing Work	2-2 After Site Clearing Work
		
3-1 Reshaping & Side drain Work	4-1 Compaction Work	4-2 After Compaction Work
		
5-1Setting out for Earth Work	5-2 Earth work (Fill material)	5-3 After Earth work
		
6-1 Setting out for Gravelling Work	6-2 Spreading Gravel	6-3 After Gravelling Work

		
7-1 Setting out for Setting Culvert	7-2 Excavation & Casting concrete	7-3 Completion of Pipe Culvert
		
8. Site Training	9. Final Inspection	10. Project Board

<u>Routine Maintenance work in Kitgum District</u>.

The following photos indicate the construction procedure from commencement to the end.

Photo 17-2 Construction Procedure (Pilot Project in Kitgum)

		
1-1 Bush clearing	2-1 Setting out of road works	3-1 Grubbing Work
		
4-1 Excavation of side drain	5-1 Cutting side trees	6-1 Excavation of Mitre drain

		
7-1 Before Culvert work (1+830)	7-2 Installation of Pipe culvert	7-3 After Culvert work
		
8-1 Before Culvert work(7+800)	8-2 Installation of Pipe culvert	8-3 After Culvert work
		
9. Training	10. Inspection of Pipe Culvert	11. Project boards

17.5 Evaluation of the Pilot Project

(1) Beneficiaries of the project

Six villages and 2 primary schools are located along Awari–Anget Road in Oden Sub-county (Gulu District). Population of the 6 villages is around 8,800 persons, and the number of student is around 1,500 persons.

In regard to the other pilot project in Matisi Sub-county of Kitgum District, 4 villages are located along the project section (6 km) of Jangyat Road. Total population is around 2,000 persons.

(2) Benefits from the Pilot Project

The following benefits were observed during and after improvement works.

- Income generation for residents by introduction of labor based technology, and
- Increased convenience for pedestrians and bicycle users

In addition to that, the following benefits are expected from the project.

- Improvement in transport and walking during the rainy season.
- Supporting economic activities along the roads.

(3) Income generation for residents

In the case of the improvement work at Jangyat Road, 60 workers were engaged for 4 weeks. A worker received 5,000 Ushs per half day or 8,000 Ushs per day. The entire income per worker is around 120,000 Ushs to 180,000 Ushs. Normal monthly revenue for a worker is around 60,000 Ushs to 90,000 Ushs. Therefore, improvement of community access road by use of labour-based technology provides a significant impact to the residents.

According to the residents, half-day work for the road improvement does not have a negative impact on their agricultural activity.

(4) Increased convenience for pedestrians and bicycle users

After the improvement work, pedestrians and bicycle users can pass the roads more easily. This comes from installation and improvement of the culverts and mowing.

Before the improvement work, there were some puddles at the broken culverts and around the small streams. Those were obstacles for pedestrians and bicycle users. Bicycle users had to walk the bicycle. These puddles have disappeared, and the pedestrians and bicycle users can pass these points smoothly after the improvement work.

At Jangyat Road, it is difficult to walk and go though by bicycle in some sections due to overgrown weeds. After mowing, the width of the road was widened from 2.5 meters to 5 meters, and pedestrians and bicycle users go over the road more smoothly and safely.

(5) Improvement in transport and walking during rainy season

The improvement work was implemented in November 2011, and this impact assessment is being conducted in January 2012. Since the period is in the dry season, improvement of the road transport in the rainy season could not be observed. However, smoother transport and walking is expected owing to the roadside ditches, drainage and improvement and installation of the culverts. There are 2 primary schools located along the road section and 1,500 pupils go to school along Awari–Anget Road. Such improvement would support their daily commuting.

(6) Supporting economic activities along the roads

Most of the land along the pilot project roads is used for agriculture. Major products are cotton, sunflower, sorghum, millet, cassava, beans, maize, peanuts, etc. As of January 2012 when this impact assessment was conducted, cotton balls ready for harvest were observed along the road. After improvement work, it is expected that material and harvested products can be transported more easily.

Photo 17-3 Economic Activities along the Pilot Project Site

Transport with bicycle (after project)

Cotton field along community access road (after project)

January 2012 is also a season of open burning for plantation in the next rainy season. The open burning was conducted not only on existing farm land but also on uncultivated land. Because of improvement of the community access road, the farmers have decided to expand their agricultural production along the road.

(7) Negative impacts from the Project

In general, improvement of road condition brings about an increase in traffic accidents, however, such accidents will not occur at the pilot project sections because almost all the traffic is only pedestrians and bicycles.

The other point is the flow of water from the roadside ditches. Since drainage from the roadside ditches to land along the road flows for a considerable distance, the flow of water to the farm land would increase in the rainy season.

(8) Findings

The following positive impacts that were observed and are expected during and after the pilot project.

- Income generation for residents by introduction of labor based technology, and
- Increased convenience for pedestrians and bicycle users
- Improvement in transport and walking during the rainy season.
- Supporting economic activities along the roads.

No negative impacts caused by the pilot project have been observed.

18. PRELIMINARY DESIGN FOR THE HIGH PRIORITY PROJECTS

18.1 Road Design in Uganda

(1) Design Class

Uganda has a road design manual, which is composed of four volumes; the Geometric design manual, Hydrology and hydraulics design manual, Pavement design manual and Bridge design manual. The Geometric Design Manual prepares the Design Class which is divided into 7 classes, as follows.

Table 18-1 Design Class

Design Class	Capacity [PCU x 1,000/day]	Road-way width[m]	Maximum Design speed Km/h			Functional Classification				
			Level	Rolling	Mountainous	A	B	C	D	E
Ia Paved	12 – 20	20.80-24.60	120	100	80	√				
Ib Paved	6 – 10	11.0	110	100	80	√	√			
II Paved	4 – 8	10.0	90	70	60	√	√	√		
III Paved	2 – 6	8.6	80	70	50	√	√	√		
A Gravel	4 – 8	10.0	90	80	70		√	√	√	
B Gravel	2 – 6	8.6	80	60	50				√	√
C Gravel		6.4	60	50	40					√

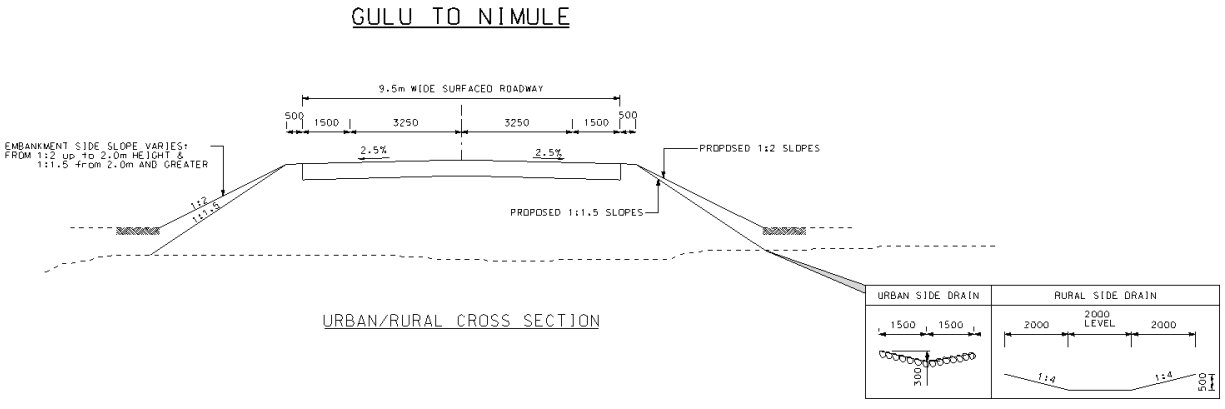
Source: Geometric Design Manual in Uganda

As shown above, the design class is decided by road capacity (i.e. traffic volume).

18.2 Preliminary Road Design

(1) Typical Cross Sections for National Roads

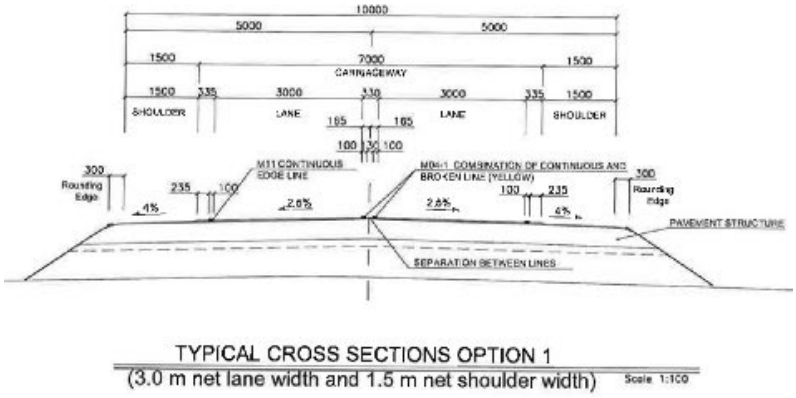
a. IT1 Kamdini-Gulu Road Section Improvement L=58km



Source: Gulu –Atiak –Nimule Road Detailed Engineering Design Report

Figure 18-1 Typical Cross Section (IT 1: Kamdini-Gulu Road)

b. IR 1 Kitgum-Lira Road Section Improvement L=119.6km, IR 2 Gulu-Acholibur Road Section Improvement L=81.2km



Source:Lot A, Rwenkuuye-Apac-Lira-Kitgum-Musingo Detailed Engineering Design Report

Figure 18-2 Typical Cross Section (IR 1: Kitgum-Lira Road, IR2: Gulu-Acholibur Road)

For IR 1, Kitgum-Lira Road, there are two bridges and for IR 2, Gulu-Acholibur Road, there is one bridge to be re-constructed as shown in the following tables.

Table 18-2 Bridges for IR 1: Kitgum-Lira Road

Ch	Name	Bridge Type	Span
190+600	Achwa	Reinforced Concrete	3x17.5
218+800	Agago	Reinforced Concrete	2x17.5

Source: JICA Study Team

Table 18-3 Bridge for IR2: Gulu-Acholibur Road

Ch	Name	Bridge Type	Span
128+710	Ajan	Reinforced Concrete	2x17.5

Source: JICA Study Team

(2) MR1 Gulu Municipal Roads Improvement

As discussed in "Chapter 9, Regional Development Plan", Gulu is expected to be a development centre and Gulu, certainly, appears to be developing so far and its speed is very high. One of the indications of the developments is that there are many ongoing building constructions in the town centre and they are more than four stories tall. The growth in the number of multi storied buildings can produce a remarkable concentration of humans and goods in the town centre.

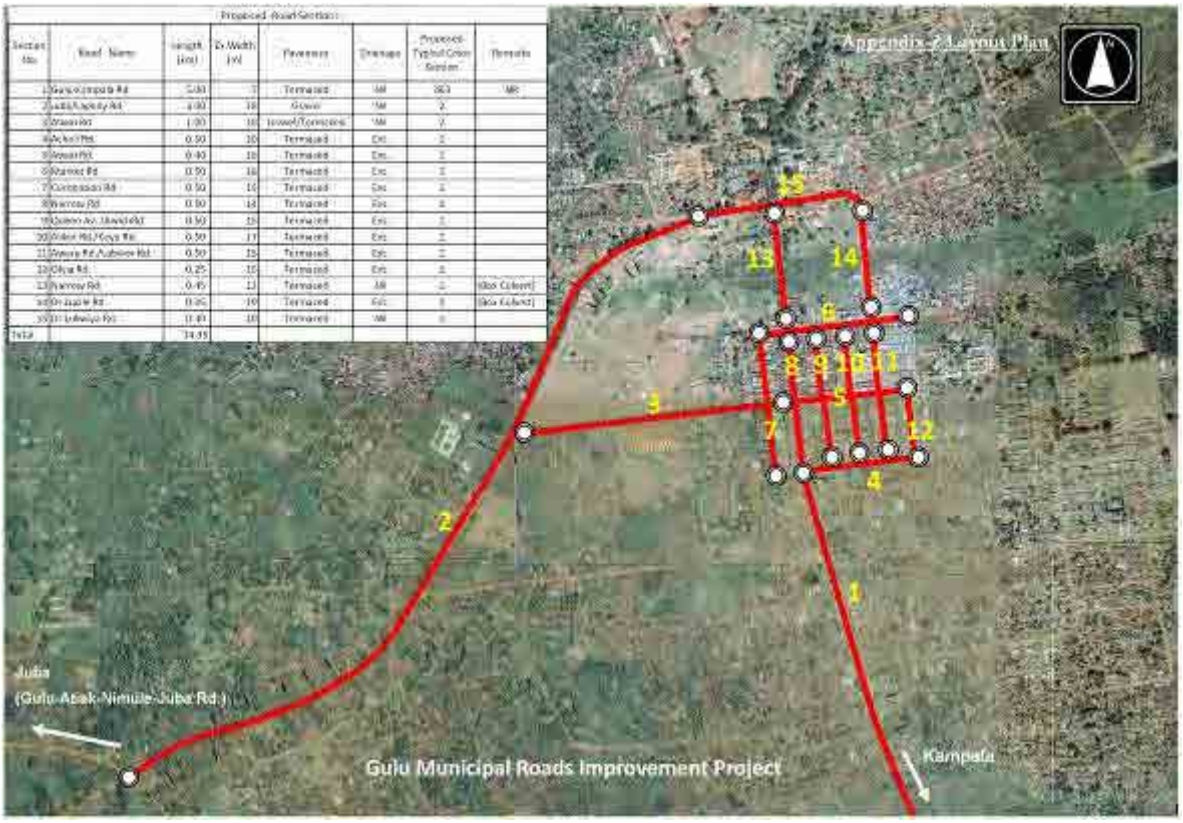
In order to accommodate the development trend and speed, the construction and upgrading of basic infrastructure such as electricity and water are very essential. The improvement of road conditions is one of the biggest critical issues to attain further development in Gulu. However the existing road condition in the town remains poor and deterioration of its pavement is progressing day by day and no effective maintenance work has been implemented due to insufficient budget of Gulu Municipality.

The objective of the municipal road improvement is to improve the roads in the town centre so as to solve the current vicious problems and to increase the effectiveness of the urban transport movement.

Existing roads in the urbanized area form a grid pattern and their width varies from 10-17m and the pavement is asphalt. There are no walkways aside of the roads. The road side drainage systems have been provided, however they seem to be too small to drain storm water during peak runoff and that makes the roads impassable.

In determination of the scope of the project consideration shall be given to the fact that the approach roads to the town from international trunk roads shall be included in addition to roads in the urbanized area (i.e. red zone in figure above) since Gulu is benefiting from the international logistic industry (e.g. Cargo traffic between Kenya and South Sudan). The town approach roads, namely Juba Road, Atwal Road and Gulu- Kampala road, are, therefore, included in the project scope reflecting the above consideration.

The scope of the project is concluded as shown in the following figure.



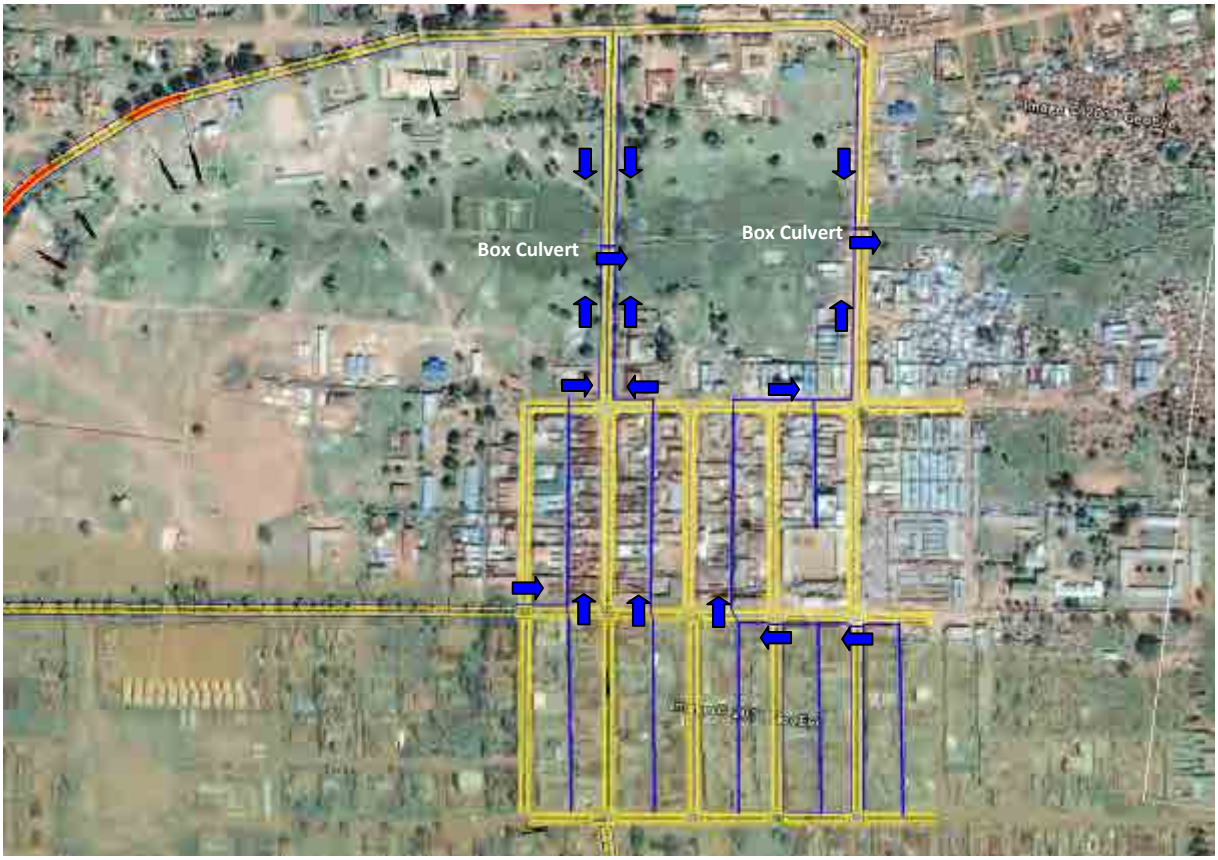
Source: JICA Study Team

Figure 18-3 Project Road Sections for MR1

As discussed, the objective of the road improvement is to attain efficiency of road transport, on the other hand available land for the road improvement is within the existing road area, therefore, no widening is needed for the design.

The major element that results in the low efficiency of the road transport in town is that there is no clear demarcation between motorized and non-motorized traffic. Hence, shoulders and walkways shall be provided

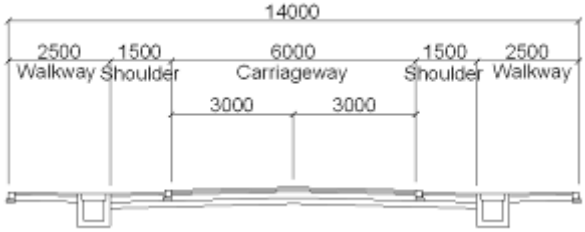
Moreover, insufficient capacity and lack of maintenance of the drainage system in town make the road network impassable; therefore road drainage and town drainage which has been provided in the middle of the residential blocks shall be improved as shown in Figure 18-4.



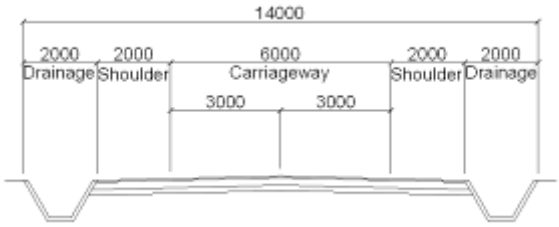
Source: JICA Study Team

Figure 18-4 Proposed Drainage Network in Town Area

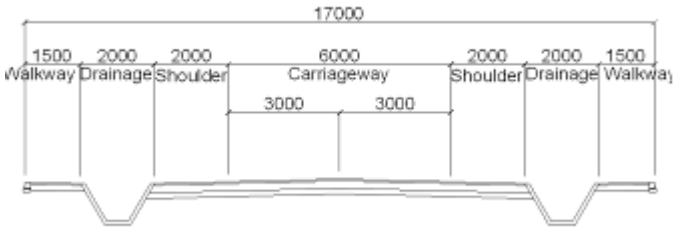
Basic policy in cross sectional designing is to make the road cross section within available road areas. In other words, no land acquisition is expected.



(Typical Cross Section for City Centre)



(Typical Cross Section for the International Trunk Road Connection)



(Typical Cross Section for National Road)

Source: JICA Study Team

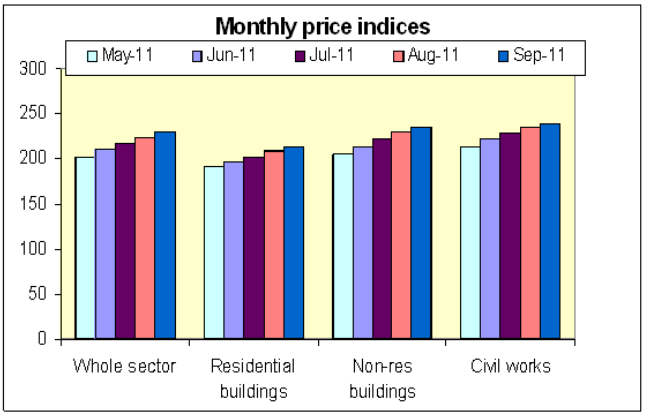
Figure 18-5 Project Road Typical Cross Sections for MR1

19. COST ESTIMATION FOR THE HIGH PRIORITY PROJECTS

19.1 Construction Cost Trend

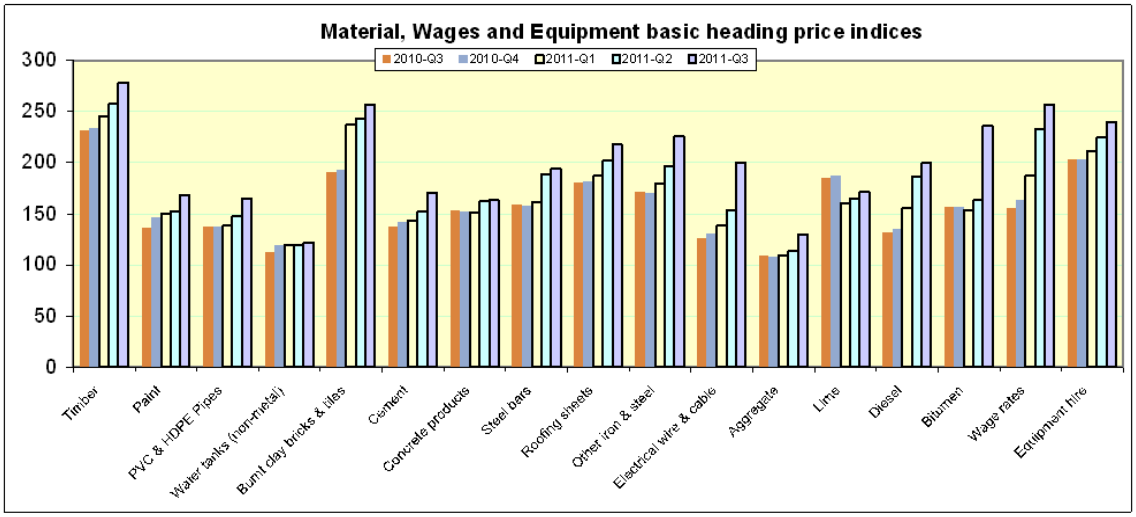
UBOS is providing the construction sector indices every quarter of the year and the latest information is that of the 4th quarter of 2011. UBOS highlighted the annual change of construction cost that the price for the whole construction sector covering material prices, wage rates and equipment hire rates rose by 35.3% in September 2011 compared to September 2010. This followed an increase of 31.4% in August 2011 compared to August 2010. This increase in price in September 2011 was due to:

- 37.5% increase in input for Non-Residential buildings
- 33.6% increase in inputs for Residential buildings and
- 32.4% increase in input for Civil Works.



Source: UBOS

Figure 19-1 Change of Construction Cost in 2011



Source: UBOS

Figure 19-2 Change of Construction Material Prices in 2011

19.2 Preliminary Project Cost Estimation for High Priority Projects

(1) International Trunk Road Improvement

The JICA Study Team carried out the preliminary design for the section and the section is designed to the Asphalt Pavement Standard.

In order to estimate construction, compensation and project administration cost, price investigations were also conducted. Construction cost data is referred from past projects, namely the Pilot Projects for Amuru Bridges and the Project for Social Infrastructure Development for Promoting Return and Resettlement of Internally Displaced Persons (IDP). The following table shows the project cost summary.

Table 19-1 Project Cost Summary for IT1 (USD)

Project ID	Project Name	Civil Work Cost	Other Cost	Total Cost
IT1	Kamdini- Gulu Road Section Improvement	27,459,000	6,597,900	34,056,900

Source: JICA Study Team

(2) Inter-Region Trunk Roads Improvement

This program contains two national roads namely Kitgum-Lira Road and Gulu-Acholibur Road and these road sections have been studied and designed by UNRA as explained in Chapter 18.

The cost estimations have also been made in the UNRA study. They, however, were estimated based on market prices in 2010. As discussed there is a trend of escalation of construction cost such that the cost in 2011 is approximately 30% more than the cost in 2010. In consideration of the cost escalation, the project costs are re-estimated as shown in the following table.

Table 19-2 Project Cost Summary for IR1 and IR2 (USD)

Project ID	Project Name	Cost in 2010	Re-Estimation in 2011
IR1	Kitgum-Lira Road Section Improvement	82,783,160	96,856,200
IR2	Gulu-Acholibur Road Section Improvement	80,171,455	93,800,700
Total		162,954,615	190,656,900

Source: JICA Study Team

(3) Municipal Road Improvement

Project cost is estimated with the same approach as the IT1 and the result is shown in the following table.

Table 19-3 Project Cost Summary for MR1 (USD)

Project ID	Project Name	Civil Work Cost	Other Cost	Total Cost
MR1	Gulu Municipal Roads Improvement	23,600,000	2,785,000	26,385,000

Source: JICA Study Team

20. INITIAL ENVIRONMENTAL EXAMINATION

20.1 Priority Projects for Social Environmental Consideration Study

(1) National Roads

Table 20-1 shows the scope for the priority projects of the national roads to be studied.

Table 20-1 Priority Projects to be Studied (National Roads)

	Width Carriageway with shoulders (m)	Width of ROW and land clearance (m)	Pavement type	Expected number of vehicles per day in 2018 (PCU)	Expected number of vehicles per day in 2030 (PCU)
IT (international)	9.5m	30	Bituminous	2,260	2,540
IR (inter-regional)	8.6m	30	Bituminous	1,780	3,720
ID (inter-districts)	10.0m	30	Gravel	110	400

Source: JICA Study Team

(2) Municipal Roads

Table 20-2 shows the scope for the priority projects of municipal roads to be studied.

Table 20-2 Priority Projects to be Studied (Municipal Roads)

Project road sections		Length (km)	Present width (m)	Target width of carriageway with shoulders (m)	Walkways or drainage (W/D)	Total target width with walkways or drainage (m)	Pavement type
Approach city roads	1	5	17	10	W/D	14 / 17	B
	2	3	18	10	D	14	G
	3	1	10	10	D	14	G / B
	13	0.45	12	9	W	14	B
	14	0.45	19	9	W	14	B
	15	0.30	10	9	W	14	B
Total		10.2	-	-	-	-	-
Inner city roads	4	0.50	10	9	W	14	B
	5	0.40	16	9	W	14	B
	6	0.50	16	9	W	14	B
	7	0.50	15	9	W	14	B
	8	0.50	14	9	W	14	B
	9	0.50	15	9	W	14	B
	10	0.50	17	9	W	14	B
	11	0.50	15	9	W	14	B
	12	0.25	15	9	W	14	B
Total		4.15	-	-	-	-	-

B: Bituminous standard / G: gravel A standard

Source: JICA Study Team

20.2 Scoping

(1) Scoping Priority Projects for the Physical and Natural Environment

Table 20-3 shows the result of scoping of priority projects for the physical and natural environment.

Table 20-3 Result of Scoping Priority Projects for the Physical and Natural Environment

Impact Criteria	Ranking	
	Constr.	Oper.
Air pollution, dust	B-	A+
Water pollution	B-	D
Soil contamination and top soil	B-	D
Solid waste	B-	D
Noise	B-	B-
Odors	-	-
Land subsidence	-	-
Water resources, water supply, water use	C	D
Morphology, Soil stability, erosion	B-	D
Protected natural areas	B-	D
Natural habitats	C	B-
Biological diversity and protected species (wildlife)	D	D
Biological diversity and protected species (plants)	C	D
Runoff, changes in drainage patterns, floods	B-	A+

Source: JICA Study Team

(2) Scoping Priority Projects for the Human and Social Environment

Table 20-4 shows the result of scoping of priority projects on human and social environment.

Table 20-4 Result of Scoping Priority Projects for the Human and Social Environment

Impact Criteria	Ranking	
	Constr.	Oper.
Involuntary resettlement of population	C	D
Loss of standing crops and plantations	B-	D
Livelihood, poverty, vulnerability	C	A+
Ethnic minorities	C	C
Local economy, employment	B+	A+
Land use and use of the local resources	D	B-
Public infrastructure and social services	B-	A+
Risk of traffic accidents	B-	B-
Distribution of benefits, social equity	C	C
Local conflicts of interest	C	C
Historical and cultural assets, landscape	C	D
Gender equity, children	C	B+
Occupational health	C	D

Source: JICA Study Team

20.3 Review of Existing ESIA (Environmental Social Impact Assessment) Report

Table 20-5 shows the result of a review of the ESIA (Environmental Social Impact Assessment) implemented by UNRA.

Table 20-5 Result of Review of EISA Implemented by UNRA

Project road according to UNRA	Priority roads of concern	Availability of the ESIA final report	Reference of the ESIA report	Has the ESIA report been submitted to NEMA	Has NEMA approved the project, when ?
Gulu Atiak	IT2 Gulu Atiak	YES	Environment social impact assessment report (ESIA) UNRA - July 2009	YES	YES July 2009
Atiak Nimule	IT3 Atiak Nimule	YES	Environment social impact assessment report (ESIA) UNRA - July 2009	YES	YES July 2009
Olwiyo - Gulu - Kitgum	IR2 Gulu Acholibur	YES	Environment social impact assessment report (ESIA) UNRA - March 2011	NO	-
Rwenkunye - Apac - Lira - Kitgum - Musingo	ID1 Kitgum - Mucwini IR1 Kitgum Lira	YES	Environment social impact assessment report (ESIA) UNRA - October 2011	NO	-

20.4 Ranking of Sensitivity of the Natural Environment

The ranking of sensitivity of the priority roads can be done, by aggregating the different results and affecting weighting factors. Table 20-6 shows the results, indicating that the roads ID2, ID6 and ID7, in grey, are the most sensitive to the project from the point of view of the natural environment conditions.

Table 20-6 Ranking of Sensitivity of the Natural Environment at Road Level

	IT1	ID1	ID2	ID3	ID4	ID5	ID6	ID7	ID8
Protected area	2		2	2				2	2
Woodland / dense growth		2	2				2		2
Hilly / steep slopes			1				1	1	
Wetlands				2	2	2		2	
Reserved trees HIGH			2				2	2	
Important trees HIGH			1				1	1	
Plantation HIGH	1						1	1	
Charcoal HIGH		2	2	2	2	2	2		
Score	3	4	10	6	4	4	9	9	4

20.5 Environmental Monitoring Plan

The environmental monitoring activity is evaluated according to the potential impacts likely to occur from the project and to the issues raised by the analysis of similar cases. The responsibility of execution is on the contractor based on a detailed monitoring plan in the environmental management plan.

The most important monitoring issues for the physical and natural environment are:

- Solid waste management
- Restoration of borrow pits
- Restoration of river banks or wetlands
- Re-vegetation of slopes and restored sites
- Ecological compensation for lost reserved trees

- Employment conditions
- Financial compensation for land and improvements
- Communication with the local communities and reporting activities
- Control of application of the NEMA approval conditions, of the recommendations of the assessment document submitted to NEMA, and of the environmental management plan presented by the contractor

Most of these issues have been addressed in the District administrative and operational guidelines manuals of Volume 5 (Ministry of Works, Housing, and Communications – Oct. 2003). The financial compensation for land and improvements is fully addressed by the Land Acquisition and Compensation procedure of UNRA. The analysis of similar cases has, however, shown that the environmental issues need to be addressed with greater transparency and more effective results.

Table 20-7 shows the summary of the environmental monitoring plan for priority projects.

Table 20-7 Summary of Environmental Monitoring Plan for Priority Projects

Impact Criteria		Monitoring Site	Frequency
1	Air pollution, dust	➢ The most exposed inhabited sites like the trading centres, along the road	➢ 1 / month for visual observation ➢ 1 / month for interviews of roadside inhabitants and LC1
2	Water Pollution, Soil contamination	➢ Streams and wetlands concerned near bridge or box culvert construction works ➢ For water quality sampling sites, one upstream site and one downstream site ➢ For the management of oil substances, the work site	➢ 1 / month except the visual observation of oil product storage is to be done daily
3	Top soil	➢ Camp work site ➢ Bridge and box culvert construction sites Road work sites	➢ Daily records
4	Solid waste	➢ Camp work site ➢ Bridge and box culvert construction sites Road work sites	➢ Daily records
5	Noise	➢ The most exposed inhabited sites like the trading centres, along the road or residents near the camp work site or construction site	➢ 1 / week for visual observation ➢ 1 / month for interviews of roadside inhabitants and LC1
6	Water resources, water supply, water use	➢ Streams and wetlands concerned near bridge or box culvert construction works ➢ River water use sites	➢ Daily records ➢ 1 / month for interviews of concerned people and LC1
7	Morphology, Soil stability, erosion	➢ Borrow pits ➢ River banks at bridge construction sites ➢ Roadside slopes	➢ Records 1 / week ➢ Reports 1 / month ➢ Final report at end of the works
8	Natural habitats, Protected natural areas	➢ River banks at bridge or box culvert construction sites ➢ Wetlands at bridge or box culvert construction sites	➢ Records 1 / week ➢ Reports 1 / month ➢ Final report at end of the works
9	Biological diversity and protected species (plants)	➢ Road reserve	➢ Daily records during the clearance works ➢ Weekly records during the planting works ➢ Final report at end of the works

Source: JICA Study Team

21. PROJECT EVALUATION

21.1 Prerequisites for Economic Analysis

This chapter will reveal the benefits generated from the high priority projects that were proposed in the previous chapter, to determine if those road improvement projects are economically and socially feasible. In general, a road improvement project generates a wide range of direct benefits; including travel cost/time saving, decrease in traffic accidents, saving in energy consumption, and so forth. Indirect benefits from road projects include income generation, and stimulation of the regional economy.

The primary objective of the economic analysis is to examine the effects of the project investment. The following discussion will reveal the economic validity of necessary projects and high priority projects proposed in Chapter 16, by conventional economic analysis – Net Present Value (NPV) and Economic Internal Rate of Return (EIRR).

"With Project" implies the situation where the proposed projects are implemented, and "Without Project" implies where no investment takes place. The quantified economic benefits generated from the implementation of the projects are defined as savings in Vehicle Operating Costs (VOC: vehicle operating cost and vehicle time cost) and the Travel Time Cost (TTC) derived from the difference between "With Project" and "Without Project".

Other basic assumptions are as follows.

(1) Implementation Schedule

The implementation schedule incorporates the following assumptions: projects will commence in 2013 and be completed by 2016 for IR1 and IR2 and in 2017 for IT1 and MR1. The roads and bridges are gradually opened to traffic from 2016.

(2) Project Lifecycle

The period of the economic evaluation for road projects is set at 30 years after the completion of the projects.

(3) Prices

A base year price is prepared based on the average exchange rates in 2011 which is announced by Bank of Uganda, and exchange rates applied to this analysis are set as follows:

1.0 USD = 2,522.7 Ushs.

(4) Vehicle Operation Cost (VOC) and Passenger's Travel Time Cost (TTC)

Vehicle operating costs estimated in the previous JICA study (the Feasibility Study on the Construction of a New Bridge across River Nile at Jinja, and the Project for Rural Road Network Planning in Northern Uganda) are applied to this analysis. Passenger's travel time costs were also estimated in the previous JICA study (the Feasibility Study on the Construction of a New Bridge across River Nile at Jinja) and applied to this economic analysis.

(5) Economic Cost

The project costs in terms of financial prices are estimated in Chapter 19. For the economic analysis, financial costs are converted to economic costs by deducting the tax portion and applying a standard conversion factor to the portion of non-trade goods.

All the costs of the projects, excluding tax, are classified as non-trade goods as all the construction materials are available in Uganda. In this Study, the following conversion factors are applied;

- For tax, conversion factor of zero is applied and
- For the local currency portion of construction and administration costs (e.g., land acquisition and compensation), a standard conversion factor is applied.

The standard conversion factor (SCF) is an index which converts domestic prices to border prices by adjusting the distortion of prices in the domestic market. In this analysis, 0.90, which is estimated in "the Project for Rural Road Network Planning in Northern Uganda" is used.

(6) Investment cost

Table 21-1 shows the investment cost of the 3 trunk road improvement projects. The cost is converted to the economic cost by using the conversion method mentioned above. Total investment costs measured by the economic cost are 23.7 million USD for IT1, 69.7 million USD for IR1 and 67.5 million USD for IR2, respectively.

Table 21-1 Investment Cost for Trunk Road Improvement Projects (IT1, IR1 and IR2, economic cost)

Unit: USD

Cost items		IT1: Kamdini-Gulu Road Improvement	IR1: Kitgum-Lira Road Improvement	IR2: Gulu-Acholibur Road Improvement
Construction cost	Foreign currency	2,282,500	7,636,830	7,396,130
	Local currency	18,457,623	61,858,323	59,908,653
Sub-total of construction cost		20,740,123	69,495,153	67,304,783
Consulting service cost		2,739,000	3,818,000	3,701,800
Land acquisition		2,968,110	221,580	207,630
Total cost		23,708,233	69,716,733	67,512,413

Source: JICA Study Team

(7) Maintenance cost

Table 21-2 indicates the maintenance cost for 3 trunk road improvement projects. The cost is converted to the economic cost by using the conversion method mentioned above.

Table 21-2 Maintenance Cost for Trunk Road Improvement Projects (IT1, IR1 and IR2, economic cost)

Unit: USD

Project Name	IT1: Kamdini – Gulu Road Improvement	IR1: Kitgum Lira Road Improvement	IR2: Gulu Acholibur Road Improvement
Annual maintenance	103,701	347,476	336,524
Periodic maintenance (every 5 years)	311,102	1,042,427	1,009,572
Periodic maintenance (every 20 years)	2,074,012	6,949,515	6,730,478

Source: JICA Study Team

21.2 Economic Analysis of the High Priority Projects

Table 21-3 shows NPV and EIRR of the High Priority Projects. The discount rate to calculate Net Present Value (NPV) is set at 12%, which is the opportunity cost of capital and a criterion

whether a project is feasible or not, from the point of national economic development. NPV records plus and EIRR exceeds 12% in regard to IT1: Kamdini – Gulu Road Improvement project, however, NPV is minus and EIRR is lower than 12% regarding the other two projects.

Table 21-3 NPV and EIRR of Trunk Road Improvement Projects

Name of Project	NPV (million USD)	EIRR (%)
IT1: Kamdini – Gulu Road Improvement	2.5	12.6
IR1: Kitgum – Lira Road Improvement	-40.7	4.5
IR2: Gulu – Acholibur Road Improvement	-28.1	6.0

Source: JICA Study Team

21.3 Other Benefits from the Priority Projects

(1) Benefits from Trunk Road Improvement Projects

Improvement of these trunk roads enables efficient transport of material (fertilizer and seeds) and products of agriculture. In particular, improvement of transport in the rainy season and transporting agricultural products without damage (which is mostly caused by bad road condition) are the expected impacts from the project implementation.

Smooth transportation of agricultural products to Gulu and Kitgum will also expand agricultural business. Since these towns are centres for transhipment and distributive processing, farmers along the roads have a chance to start or expand commercial businesses not only for commercial products such as cotton but also regionally consumed products such as sorghum, millet, cassava, etc.

When the Study Team visited the pilot project sites in Oden Sub-county and Matisi Sub-county for impact assessment, it found that open burning was conducted not only on existing farm land but also on uncultivated land. This means that farmers have decided to expand their farm lands because of the improvement in the community access road. The same kind of activities is expected after completion of the trunk road improvement projects.

The other expected impacts to regional economic development are caused by accessibility. A typical example is the increased employment opportunity for people in the suburban areas of Gulu, Kitgum and Lira because of expansion of the commuting area. Such improvement of accessibility also brings about increased consumption in the towns, commercial activity (selling food and vegetables, for example), etc.

(2) Effects on Social Aspects

Improvement of community access roads is emphasized by the GOU and donors, and the projects are included in on-going programs such as NUDEIL, NUSAF and RALNUC. Actually, improvement of access roads will have a significant impact on rural people; however, improvement of trunk roads also has an effect in the following aspects as aid programs are continued.

Hospital and primary health care centre: In the initial stage of a recovery and reconstruction program, construction of primary health care facilities in the rural areas is a priority. A typical target is to increase the number of the primary health care centres per village or 1000 population, etc. As time goes on, the target changes to development of a referral system at the regional level. Currently, two top-level hospitals are located at Gulu in Acholi Sub-region. Improvement of the trunk road will contribute to transport of patients to the top-level hospital, and contribute to improvement of medical service. Improvement of the trunk road will also strengthen the network of the primary healthcare facilities. In general, the human resources of

these healthcare centres are lacking. Improvement of the trunk road will enable the healthcare centres to dispatch human resources for support of each other.

Education: As well as hospital/ primary healthcare centres, construction of school facilities is the first priority of the initial stage of recovery and reconstruction. After that, one of the issues of this area is recruiting of teachers. Teachers receive their training in urban areas, and they want to stay in the urban areas. In the case of Acholi Sub-region, it is supposed that teachers want to stay in towns such as Gulu, Kitgum and Lira, and commute to their schools. Improvement of the trunk road enables such situation. The same issue would be available in the health sector (doctors working in the primary health centres).

Water supply: Boreholes are constructed in the recovery and reconstruction programs. Carrying water from the borehole to their houses is a work for women and children in Acholi Sub-region. After improvement of the road network, carrying water would be easier, in particular, in the rainy season. It would be possible to introduce water trucks if road conditions were improved.

(3) Benefits from Municipal Road Improvement Projects

Since the demand forecast for the Municipal Road Improvement Project has not been conducted, the quantitative benefit of the project is not clear. However, the following benefits could be realized when the projects were completed.

The direct benefits could be divided into two types. The first one is improving inter-city transport until bypass roads are constructed in the future (year 2030). Improvement of Section 1, 2 and 3 brings about such benefit. The second one is improving transport within the business district of Gulu city. Improving of other sections brings about such benefit.

In addition to that, the following indirect benefits could be pointed out. The first one is a basis of urban infrastructure improvement. Improving roads which form city blocks is a basis for improving drainage, water supply and sewerage in the future. Formation of city blocks is also a basis of urban development of Gulu which will have the role of being the economic centre of Acholi Sub-Region. The other benefit is decrease of dust. Towns in Acholi Sub-Region are very dusty, in particular, in the dry season. One of the reasons comes from the unpaved roads. The dust damages products being sold in these towns. If the project were conducted, the problem would be reduced.

(4) Conclusions

Out of the three trunk road projects, IT1: Kamdini – Gulu Road Improvement project, is feasible from the point of national economic development. The project shows robust performance in the sensitivity analysis, too.

The other trunk road projects (IR1: Kitgum – Lira Road Improvement Project and IR2: Gulu – Acholibur Road Improvement Project) are not feasible due to limited traffic; however, it is necessary to consider not only the direct effects but also the indirect effects on regional economic development and social aspects. Currently, the main target of the road improvement in the Acholi Sub-region is community access roads; however, improvement of the trunk road network would also be important considering the regional economic development in the middle and long term perspective.

Quantitative benefits of the Municipal Road Improvement Project (MR1) were not analyzed in this report. However, the project provides benefits to both inter-city traffic and traffic within the downtown area of Gulu Municipality. The project is also a basis of urban infrastructure improvement such as drainage, water supply and sewerage, and urban development.

22. NECESSARY ACTIONS FOR PROJECT IMPLEMENTATION

22.1 Actions for High Priority Projects

(1) IT 1: Kamdini-Gulu Road Section Improvement L=58km

To be undertaken using a foreign Assistance (Loan) because it is an economically feasible project.

(2) IR 1 Kitgum-Lira Road Section Improvement L=119.6km, IR 2 Gulu-Acholibur Road Section Improvement L=81.2km

To be selected as the priority project in the next Road Sector Development Program (RSDP) for applying donor funding.

(3) MR1 Gulu Municipal Roads Improvement

To be undertaken using a Japanese Grant Aid Program by the Ugandan side.

22.2 Actions for Other Priority Projects

Other Priority roads must maintain the required service level of each road. The traffic volumes of other priority projects are quite small and it is expected that it will not increase sharply until the target year. The best way to maintain the service level will be to apply proper routine and periodic maintenance for the roads. Although the local governments can expect support from the Uganda Road Fund (URF) for those maintenance works, the assistance from foreign donors, as shown in table 22-1, will be necessary to improve bottlenecks on the roads.

Table 22-1 On-going Programs and Selection Criteria of Road Projects

Name of Program	NUDEIL	CAIIP2	NUSAF2	RALNUC2
Financer/Donor	USAID	ADB	World Bank	DANIDA
Budget	30 million USD	82.5 million USD	100 million USD	20 million USD （Sum of RALNUC2 and DAR2）
Target District	Gulu, Kitgum, Lamwo, Amuru, Oyam, Nwoya districts	Amuru, Nwoya Gulu Kitgum Pader Lamwo Agago districts from Acholi Sub-region; Total 40 districts	Amuru, Gulu Kitgum Pader districts from Acholi Sub-region; Total 40 districts	Amuru and Nwoya districts
Program period	3 years from 2009 in the initial stage; expanding one year due to delay of road projects	From 2009 to 2014	From 2009 to 2014	From 2009 to 2013
Target road	Community access road	District road and community access road	Community access road	Community access road
Criteria for selection of projects	12 criteria such as no land dispute, and not new construction but improvement, etc.	Decided by district engineer based on district plan	Decided from district plan and local needs; limited budget allocation for road projects	Decided from district plan and local needs; Distribution of Ushs2.4 million per kilometre for road project

Source: JICA Study Team

23. CONCLUSIONS AND RECOMMENDATIONS

23.1 Conclusions

(1) Rural Road Network for contributing to Regional Development

The development plan for the rural road network was established so as to be conducive to comprehensive regional development in Acholi sub-region. The development direction of Acholi sub-region was identified based upon reviews of a series of development plans in Uganda such as the "Five-year National Development Plan for Uganda (NDP)" and the "Peace, Recovery Development Plan for Northern Uganda (PRDP)" and the "Five-year District Development Plans (DDPs)". The future vision of the study area for regional development was defined mainly in consideration of DDPs in relevant districts.

Additionally, mutual relationships between Acholi sub-region and other neighbouring regions and countries were also taken account in the plan. Notably, South Sudan, which became independent in July 2011 was considered as one of the most important countries for Acholi sub-region. A field survey in South Sudan and literature review were conducted in order to grasp the social, economic and environmental condition. Furthermore, future development plans and road conditions in the southern part of South Sudan, which is beyond the border of Acholi sub-region were investigated through the survey.

In order to promote comprehensive regional development in the study area, the double corridor structure is proposed as the most favourable spatial structure, which consists of two main routes: one connects between Kampala and Juba via Gulu, the other is between Lira and Torit via Kitgum. Based upon this structure, a road network and development scenario were established to enhance the regional economy and improve the living environment.

(2) Benefit to IDPs

The study proposes the improvement of accessibility to social infrastructure as a development goal for the short and mid terms and improvement of CARs by LBT as a practical approach to the goal.

The Study carried out the Pilot Projects to demonstrate the LBT approach for the maintenance of CARs. The Study confirmed the applicability of the approach and some benefits given to IDPs by the Pilot Project.

As for the physical aspect of the maintenance work, the study applied sand bags (DONOU) for earthwork as well as for protection of the drainage structures. As a result the sand bag method was confirmed as applicable for the works.

(3) Study Roads

The district roads that were studied and the CARs are all murrum roads except for a few sections which have moderate traffic volumes and would also be adequate to carry the future traffic load in both the mid and long terms based on the traffic demand forecast.

If those roads are improved to tarmac standard it will lower their economic feasibility, therefore, the roads are not selected as high priority project roads.

Since the progress of damage to the unpaved roads is governed largely by natural conditions, which are not predictable, the Study proposed work methodology and institutional set up rather

than proposing that they be designated as high priority roads in the planned District and CARs networks.

The study raised the issue of how to maintain the road networks so that they would be passable throughout the year. In this regard, the study pointed out issues to overcome in the Districts, Sub counties, governmental institutions and for the local contractors and proposed solutions to those issues.

(4) Coordination/ Harmonization of the Existing Road Network Development Plans

The selected high priority roads are generally related to ongoing projects such as the Gulu – Atiak- Nimule road. The early implementation of the high priority road projects is expected to bring synergy effects to the regional economy.

It is therefore that coordination and harmonization of the existing road projects and policies are greatly considered in the planning.

As for the community road level planning, since there are many development programs by donors such as the CAIIP of the AfDB and NUDEIL of USAID, the study held close and frequent discussions with such implementing agencies.

(5) Realization of the Study Results

To realize the study results, economical justification (i.e. feasibility) is required for the execution of a project. In this regard, the study estimated EIRR, which is one of the criteria for project appraisal by major donors, on each high priority project. In the result, IT1 Kamdini-Gulu road section improvement obtained an EIRR of 12.5%

In addition, the study team supported preparation of the application for Japan's Grant Aid on MR1 Gulu Municipal Road Improvement since the project contents meet the implementation policy of Japan's Grant, which is the satisfaction of basic human needs and the improvement of the international freight corridor.

(6) Utilization of Existing Study Outputs

This study developed the lessons learned in the previous JICA Amuru/Nwoya Study. This study approach was the same as the JICA Amuru/Nwoya Study and those results were effectively used in planning in this study.

(7) Technical Transfer

In developing the regional development policy, the study team worked together with the C/Ps. In addition, the study team collected opinions from the C/P regarding the road development scenarios as part of the work for the IEE. Those approaches were also transferred to the C/P for the DDP preparations

GIS training also has been given to the C/P. In particular, the road inventory survey training was included as part of the training. The effective utilization of GPS was transferred and this can be applied to C/P's regular maintenance activities.

23.2 Recommendations

1) In order to expand economic activities in Acholi Sub-region, It is recommended to start the High Priority Projects as soon as possible, expecting the synergic effects with the loan projects currently in progress between Gulu and Nimule.

2) In the rural area of Acholi Sub-region where almost all IDP had already resettled, it is expected to activate the regional economy through exploiting the close market of South Sudan and providing technical assistance which will lead the current dominant subsistence agriculture into commercial agriculture.

3) For two major service centres, Gulu city and Kitgum city, it is recommended to promote small and medium scale industries such as food and processing, through providing software measures such as the "borderless framework" and "deregulation of taxation" as well as hardware measures such as developing infrastructure and future land use plans.

4) It is viewed that "capacity development" for each district will be required considering the new government policy of using a "force account" to maintain district roads. Regarding maintenance of CARs, improvement of management ability of contractors and awareness-rising for residents regarding LBT will also be required. To respond to these requirements, it is recommended to request "technical assistance programs" provided by donor countries including Japan.

5) It is recommended to utilize GIS maps for appealing the priority of specific projects among the road sector development plan, with cooperation of MoWT in the field of graphic processing.