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

THE PROJECT
FOR
RURAL ROAD NETWORK PLANNING
IN
NORTHERN UGANDA

MONITORING REPORT

MAY 2013

JAPAN INTERNATIONAL COOPERATIN AGENCY

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

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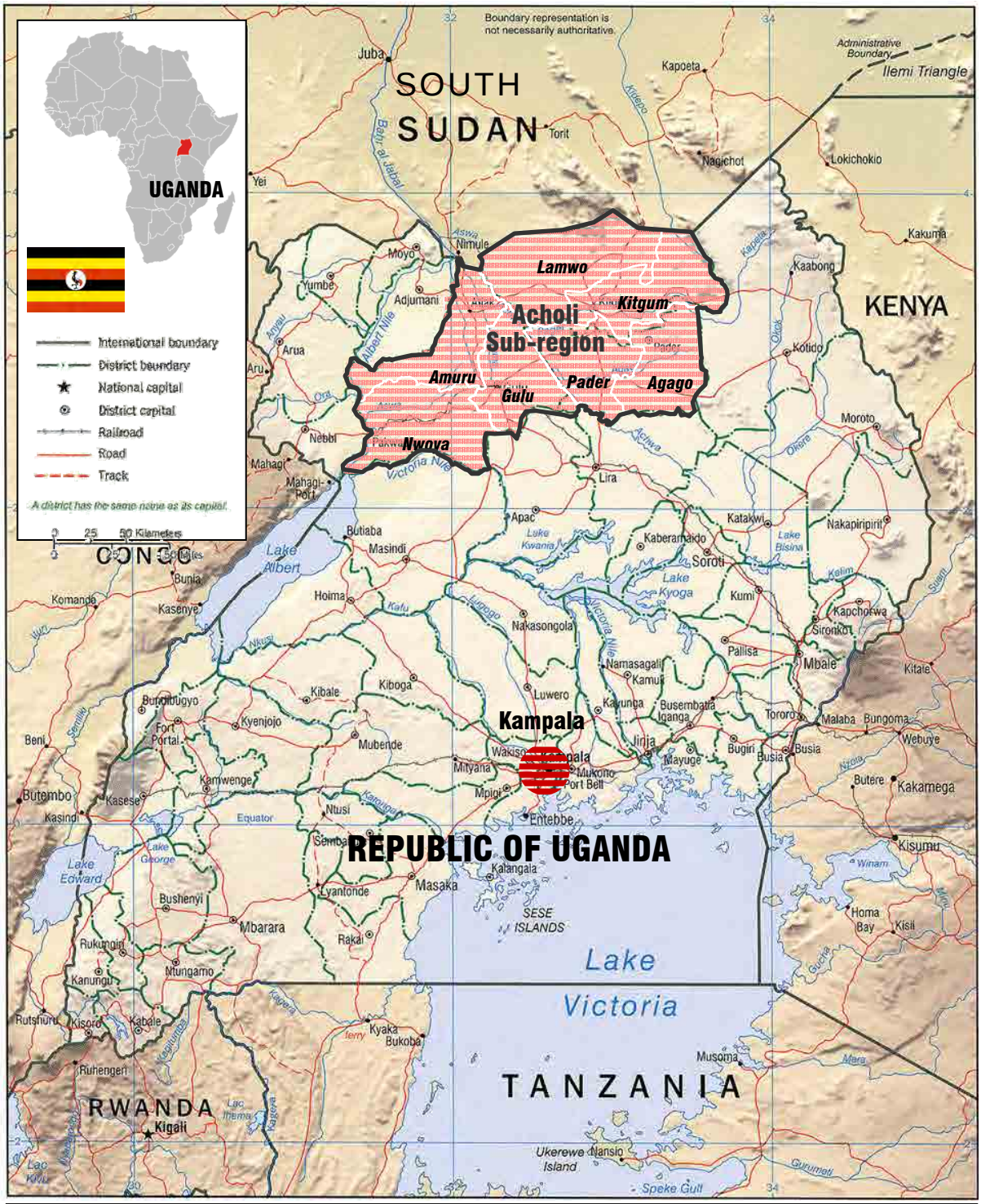
The exchange rates applied in this Study are:
USD 1.00 = Ushs* 1,947.9 = Japanese Yen 96.27
(Average exchange rate between October 2009 and March 2010)
* Ushs: Uganda Shillings

VOLUME 1: MONITORING REPORT

VOLUME 2: DEFECT INSPECTION REPORT

VOLUME 1: MONITORING REPORT



■Area	241 thousand km^2	■GNI per capita	US$ 510 (2011, WB)
■Population	34.51 million (2011,WB)	■Economic Growth	6.7% (2011, 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	Uganda Shilling (UGX)		

Location Map of Study Area

Executive Summary

Chapter 1 Outline of the Pilot Project

1-1 Background and Objectives of the Pilot Project

Before being split into 2 districts, Amuru District in Uganda was divided by the Aswa River, which runs through the centre of Amuru District, east to west. The bridges to cross the river became superannuated. This condition was considered a cause of preventing Internally Displaced Persons (IDP) who flee to IDP camps along the national road from returning to their original villages on the northern side of the river. Partial repairs to two district feeder roads and the construction of two bridges crossing Aswa River were carried out in the pilot project with the following main aims:

- To show the dividends of peace at an early stage
- To confirm the accelerating effects on the IDP return, resettlement and development due to the construction of the bridges over the river
- To implement the technical transfer for master planning and road operation and maintenance to district engineers

1-2 Outline of the Project

The pilot project was implemented and divided into two lots. The outline of these lots is as follows:

1-2-1 Lot 1: (Otwee – Anaka Road)

Road improvements for gravel road: 6.20 km in total

Bridge and structures: a reinforced concrete bridge of 35m, 3 box culverts, and 1 pipe culvert

Maintenance of gravel road: 21.31 km

1-2-2 Lot 2: (Otwee – Wii Anaka Road)

Road improvement for gravel road: 0.66 km

Bridge and structures: a reinforced concrete bridge of 35 m

Maintenance of gravel road: 44.00 km

Chapter 2 Monitoring of the Pilot Project

2-1 Baseline and Monitoring Survey

In order to evaluate the effectiveness and impact of the Pilot Project and confirm the effect of the promotion of IDP return and resettlement, an Origin-Destination (OD) survey and community interview survey were conducted in the baseline and monitoring surveys before and after the construction of the bridges.

2-1-1 OD Survey

The contents and interview items of the OD survey on Lot 1 and 2 are below:

Table 2-1 Contents of OD Survey

	Lot 1 (Otwee- Anaka)	Lot 2 (Otwee-Wii Anaka)
Location	Beside the bridge on Aswa River for Lot 1	Beside the bridge on Aswa River for Lot 2
Date (YY/MM/DD)	・Before construction: 2010/3/2 ・A month after completion: 2011/10/11 ・A year after completion: 2012/9/3 ・A year & 3 months after completion: 2012/12/12 ・A year & 6 months after completion: 2013/4/5	・Before construction: 2010/3/4 ・A month after completion: 2012/10/18 ・A year after completion: 2012/8/28 ・A year & 3 months after completion: 2012/12/4 ・A year & 6 months after completion: 2013/4/8
Time	7 a.m. – 7 p.m. (12 hours)	
Interviewee	All passers-by	
Method	Interview of passer-by by interview form	

Source: JICA Study Team

Table 2-2 Interview Items for OD Survey

Interview Items	Choices	
Direction	(1) From South to North (2) From North to South	
Age	(1) Adult (>20yrs) (2) Children (<20yrs)	
Transportation Type	(1) Vehicle (2) Motorcycle (3) Bicycle	(4) Walk (5) Others
Trip Purpose	(1) To work (including farming) (2) To school (3) Business (sales, meeting, etc.)	(4) Private (shopping, social, etc.) (5) To go home (6) To go to hospital
Trip Frequency	(1) Everyday (2) A few days a week (3) Once a week	(4) A few days a month (5) Once a month (6) A few days a year
Commodity Type	(1) Animal & Animal Products (2) Vegetable Products (3) Foodstuffs (4) Petrol and Mineral Products (5) Chemicals & Allied Industries (6) Plastics / Rubbers (7) Animal Skins, Leather & Furs (8) Wood & Wood Products (9) Textiles	(10) Footwear / Headgear (11) Metals incl. hoes (12) Machinery / Electrical (13) Vehicles and Other Transportation (14) Miscellaneous (15) Unknown (16) Grass (17) People (carry)

Source: JICA Study Team

2-1-2 Community Interview Survey

The contents and interview items of the community interview survey on Lot 1 and 2 are below:

Table 2-3 Contents of Community Interview Survey

	Lot 1 (Otwee - Anaka)		Lot 2 (Otwee - Wii Anaka)	
	Northern	Southern	Northern	Southern
Target Sub-village (Village)	Lungulu (Bwobonam B), Lacic (Lulyango)	Lulyango Center (Lulyango), Bidati (Badati)	Denga (Pamin Awure), Abongo Luduka (Latek Odong)	Lamin Olango (Pajengo), Ayero Olwangi (Pamin Olango)
Date (YY/MM/DD)				
Before construction	2010/3/18	2010/3/4 & 12	2010/3/26 & 30	2010/4/1
A month after completion	2011/10/10	2011/10/12	2011/10/19	2011/10/17
A year after completion	2012/9/4-5	2012/9/4	2012/8/29	2012/8/28-29
A year & 3 months after completion	2012/12/13	2012/12/13	2012/12/4 & 6	2012/12/6
A year & 6 months after completion	2013/4/6	2013/4/6/	2013/4/9	2013/4/9
Methodology	Interview survey by prepared questionnaire			
Interviewee	Sub-village Leader			

Source: JICA Study Team

Table 2-4 Interview Items for Community Survey

	Lot 1 (Otwee- Anaka)	Lot 2 (Otwee- Wii Anaka)
Interview Information	1. Date 2. Interviewee 3. Occupation	
Address of the Site	1. Sub-county 2. Parish 3. Village 4. Sub-village (Tee Rwot Kweri)	
Outline of the Site	1. Population 2. Number of households 3. Population by type (Returned villagers, villagers in transition, villagers outside the village)	
Transportation	1. Access from the village to Anaka 2. Access from the village to Amuru	1. Access from the village to Purongo 2. Access from the village to Packwach 3. Access from the village to Amuru
Agriculture	1. Information about agriculture (major crops, major cash crops) 2. Amount and selling prices of major cash crop 3. Information about agricultural marketing 4. Cost of goods transportation	
Education	1. Access to Primary School 2. Access to Secondary School	
Health	1. Name of health centres people go to 2. Access to the first health centre 3. Access to the second health centre	
Water	1. Number of water sources people use 2. Access to the nearest water source 3. Type of the nearest water source 4. Condition of the nearest water source	
Realised changes the bridge construction brought	Open ended	

Source: JICA Study Team

Chapter 3 Results of Monitoring and Evaluation

3-1 Effectiveness

This section will elaborate and evaluate how the output of the pilot project leads to changes and effects on the promotion of IDP returns and resettlements.

3-1-1 Lot 1 (Otwee - Anaka)

(1) Rate of IDP Return

Before construction of Bridge No.1, the number of IDP returnees in Lacic Sub-village, located in the northern area of the bridge, was around 400 and the number of IDPs that lived in transit sites was around 200 (the rate of returnees was 67%). At a year and 6 months after completion of Bridge No.1, there are no remaining IDPs in IDP camps or transit sites. The main reason for the increase in IDP return at the time of bridge completion may be that the efforts to promote voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest.

(2) Usage of the Bridge and Road

Comparing the number of passers-by each day (128 persons) prior to the commencement of the construction, to that of the passers-by each day (average more than 400 persons) one year after the completion of the bridge shows an increase of more than 300%. It is considered that the effect has appeared due to the construction of the bridge, because traffic convenience has risen. Concerning the transportation types, 4 motor bikes and 44 bicycles that passed by the bridge site of Lot 1 each day before the construction has rapidly increased to the current average of 98 motorbikes and 73 bicycles each day a year after completion of the bridge. A majority of the traffic is "motorbike taxis" which come and go with people on board. A majority of passers-by use the bridge of Lot 1 once a week, while about half of all passers-by use it every day. It is considered that the daily traffic methods of villagers around Lot 1 have diversified and the traffic volume has increased. According to the community interview survey, it appears that the effective decrease in the rate of accidents has appeared due to ensuring a safe traffic route.

Hence, the bridge has been frequently utilized due to the construction of the new bridge, which has led to the improvement of convenience for villagers' daily lives.

(3) Reduction of Access Time

According to the interview survey with Lungulu sub-village on the northern side of Lot 1, access time to Anaka by vehicles was shortened to 50 minutes or less, while it took 1 hour and a half before the road improvement and construction of the bridge. Access time to Otwee was shortened to 20 minutes

or less by vehicles, while it took 40 minutes by vehicles before the road improvement and construction of the bridge. In addition, access time to Anaka Hospital by vehicles and motorbikes was reduced to half the time, compared with the access time before the road improvement and construction of the bridge. Therefore, the access time to each destination, especially for motorbikes and vehicles, was drastically reduced.

As for the access time to Otwee from Bidati Sub-village on the southern side of Lot 1 by all transportation types (on foot, bicycles, motorbikes, and vehicles), it became possible to go there in half the time or less, compared to the access time before construction of the bridge. The access time to Anaka Hospital by all transportation types also was shortened, compared to the time before construction of the bridge and road improvement.

As a result, the access time to Anaka and Otwee from the villages in the Lot 1 area, by vehicles, has been sharply reduced. In addition, the access time to Anaka Hospital, especially by vehicles and motorbikes, was reduced, compared to the access time before the road improvement and construction of the bridge. Accordingly, it can be said that the effectiveness on time saving appeared due to the construction of the bridge.

3-1-2 Lot 2 (Otwee – Wii Anaka)

(1) Rate of IDP Return

Before construction of Bridge No.2, the number of IDP returnees of Abongo Luduku Sub-village, located in the Area north of the bridge, was around 300 and the number of IDPs that lived in transit sites was around 200 (the rate of returnees was 60%). As of a year and 6 months after completion of Bridge No.2, there are no remaining IDPs in IDP camps or transit sites. The main reason that IDP return had been promoted before the bridge completion can be that, like Lot 1, the efforts to promote voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest.

(2) Usage of the Bridge and Road

As of a year and 6 months after completion of the bridge, the number of passers-by each day (120) exceeded the number of passers-by each day before construction of the bridge (about 90). Both periods of time, before construction and a year and 6 months after completion of the bridge, include a planting season (March and April) for the main crops before the rainy season and it is a busy agriculture season. It is seen that, in comparison with this planting season, the number of passers-by has increased. Because the period of a month after the bridge completion (October), the period of a year after completion of the bridge (August-September) and the period of a year and 3 months after completion of the bridge (December) are in the rainy season, the number of passers-by is smaller than during the dry season. It can be said that seasonal variation significantly affects changes in the traffic volume, since commercial activities related to agriculture, such as transportation of agricultural products and the movements of people who work on farms, have been performed in the area of Lot 2.

In the southern section of Aswa River, there was no longer a muddy area because of gravel laid on the road surface as a "maintenance section" to ensure the passage. However, people were anxious about the maintenance condition of this section so that there were hardly any changes in the traffic volume. In addition, the traffic volume in the rainy season is less than that in the busy planting and harvest seasons. It is considered that there were hardly any changes in the number of vehicles and motorbikes.

Because farmland is spread from north to south across the Aswa River and large-scale farms are dotted along it, a majority of the commuters are farmers. Hence, the majority of trips across the bridge are, therefore, on business and commuting (traveling to the farms). The number of passers-by on business especially has sharply risen for the last 3 months so that agricultural business has been activated around Lot 2. According to the community interview survey, it appears that accidents such as drowning when crossing the river have decreased as another effect of ensuring a safe traffic route.

(3) Reduction of Access Time

According to the interview survey on the northern side of Lot 2, the access time to Packwach by vehicles has been shortened. The access time to the Amuru health centre by motorbikes and vehicles has been reduced compared to the time before construction of the bridge. Also, according to the interview survey on the southern side of the bridge of Lot 2, it is certain that the access time by motorbikes to Packwach and the time by motorbikes and vehicles to Otwee have been shortened. Accordingly, it can be said that the effect on time saving appeared due to the construction of the bridge.

The interview survey with farm owners around Lot 2 has shown that reduction of time by access improvement, reduction of fuel costs for transport vehicles, and certainty of time prediction for the movement of people and goods have appeared. On the other hand, there was an opinion that the road was still narrow and the maintenance situation on it has not improved so that it was necessary to improve the road section, which was considered to be a challenge for the future.

In addition, an interview survey concerning the traffic changes and effects brought by the construction of the bridge was conducted with Gulu Agriculture Development. Co. Ltd. (GADC), which operates the cotton factory in Gulu and frequently utilizes the bridges of Lots 1 and 2 to expedite the purchase of raw cotton. As a result of the interview survey with GADC, it is realized that the bridges and roads of Lots 1 and 2 have been used very often and 40 heavy trucks a day pass over the roads and bridges of Lots 1 and 2 in the busy season of cotton raising. In other words, the improvements, such as easy access to cotton farms, the shortening of access time, and reduction of fuel costs have appeared after construction of the bridge.

Consequently, the bridge of Lot 1 has been frequently utilized due to the construction of the bridge, which leads to the improvement of convenience for villagers' daily lives. The majority of passers-by at Lot 2 are farmers, so seasonal variation and the agricultural season significantly affect changes in the traffic volume. Both periods of time, before construction and a year and 6 months after completion of

the bridge, include a planting season (March and April) for the main crops, which is a busy season for agricultural work. This planting season, the number of passers-by has increased, which contributes to improved convenience for villagers' daily lives. It is considered that the number of passers-by on business has sharply risen for the last 3 months so that the number of passers-by for business purposes related to agriculture has increased. It is regarded that the bridge at Lot 2 especially plays an important role for agricultural business stakeholders such as farm owners and suppliers purchasing agricultural products. Therefore, the effect of the implementation of the pilot project has been substantial and it is considered highly effective. The construction of the bridge and improvement/maintenance of the road have helped to promote the resettlement of returnees and have played an important role.

3-2 Impacts

This section will elaborate directly or indirectly upon the impacts and factors of the implementation of the pilot project to promote the resettlement of IDP return, such as improvement of their living in terms of agricultural activation and the promotion of regional development.

3-2-1 Lot 1 (Otwee - Anaka)

(1) Agriculture Activation

Community interview surveys around Lot 1 concerning the planted area per household in acres, the volume of crop sales, and the selling price per bag were carried out before and after construction of the bridge. The planted area per household in acres before the bridge construction (average planted area of rice and cotton: 1.1 Acre) has expanded (average planted area of rice and cotton: 3.1 Acre) in every village a year and 6 months after bridge completion. The main reason for this would be that the number of households has increased as well as the number of people engaged in agriculture has increased by the promotion of the resettlement of IDP returnees, which has led to the expansion of the planted area per household.

In Lungulu Sub-village, located on the northern side of Lot 1, the sales volume of rice and groundnuts has rapidly increased one year after the bridge completion (rice: average 800 bags, groundnuts: average 750 bags), which was more than 15 times more than before construction of the bridge (rice: average 45 bags, groundnuts: average 35 bags). The sales volume of rice and groundnuts in Lacic, Lulyango Centre and Bidati Sub-village has also significantly increased compared to before the bridge construction. The main reason for this would be that the number of people engaged in agriculture has increased by the promotion of IDP return, which has led to the expansion of the planted area per household. Consequently, it seems that this resulted in the increase in the volume of crop yields and sales.

Except for the selling price of groundnuts in Lungulu Sub-village, a year after completion of the bridge selling prices of all crops in all villages have increased compared with the time before construction of the bridge or a month after completion of the bridge. The reasons for the increase in selling price around Lot 1 would be that passage of vehicles becomes possible throughout the year and

access to the markets has improved so that people around the bridges can sell their crops at a more appropriate price and their business opportunities have increased.

The income generated by crop sales in villages around Lot 1 has rapidly increased with the rapid increase in the volume of crop sales, especially since a month after completion of the bridge. It can be said that these changes have contributed to the increase in the income of IDP returnees and the promotion of their resettlement due to improvement of their lives.

As a result of interview survey with villagers on the changes brought by the construction of the bridge, it can be said that the sales markets of agricultural products have spread by access improvement, to which the increase in the volume of crop sales can be attributed. Furthermore, it was confirmed that the amount of agricultural product business along the road has increased, because traffic volume along the road has increased. It is considered that these effects lead to improvement not only in villagers' income but also their motivation for "making effort in their work".

(2) Other Impacts

As for other impacts brought by the bridge, one respondent said, "The social relationship of villagers between the northern side of the bridge and the southern side of the bridge has been improved."

Community interview surveys concerning the negative impacts brought by road improvement and the construction of the bridge were also conducted. In response, respondents said, "The number of thefts increased, because people from distant places could easily approach the villages due to the increase in movement of people," and "There is a shortage of food, since markets were opened for farmers and they are more likely to sell all the agricultural products in their possession."

3-2-2 Lot 2 (Otwee – Wii Anaka)

(1) Agriculture Activation

Community interview surveys concerning the planted area per household in acres, the volume of crop sales, and the selling price per bag around Lot 2 were carried out before and after construction of the bridge the same as Lot 1.

Apart from groundnuts in Abongo Ludugu Sub-village at the time of a year and 6 months after completion of the bridge, the planted area per household in acres has expanded to average 2.6 acres from an average of 1.4 acres before construction of the bridge in every village. The main reason for this would be that the number of households has increased and the number of people engaged in agriculture has increased by the promotion of IDP return, which has led to the expansion of the planted area per household.

On the northern side of Lot 2, the sales volume of rice and groundnuts has rapidly increased one year after the bridge completion (rice: average 1,120 bags, groundnuts: average 1,420 bags) compared with

the time before construction of the bridge (rice: average 42 bags, groundnuts: average 67 bags). Additionally, on the southern side of Lot 2, the sales volume of rice and groundnuts has also increased steadily since one year after bridge completion. Especially, the sales volume of rice in Olwangi Sub-villages increased almost 10 times (4,233 bags) compared with the time before construction of the bridge (450 bags).

The main reason for this would be that the number of people engaged in agriculture has increased by the promotion of IDP return, which led to the expansion of the planted area per household. Consequently, it seems that this resulted in the increase in the volume of crop yields and sales.

This bridge is used for business purposes, especially for transporting agricultural products and the farm workers. After the construction of the new bridge, it became possible for general vehicles, large-sized vehicles and machines for farming, such as tractors, to safely pass over the bridge. Therefore, it is considered that the transportation access of buyers from Gulu, Kampala, and Torit (South Sudan) coming to purchase agricultural products from the Lot 2 area became easy, which led to the increase in the volume of crop sales.

The income generated by crop sales in villages around Lot 2 has rapidly increased with the rapid increase in the volume of crop sales, especially since the time of a year after completion of the bridge. It can be said that these changes have contributed to the increase in the income of IDP returnees and the promotion of their resettlement due to improvement of their lives.

(2) Other Impacts

As for other impacts brought by the bridge, one respondent said, “Business with the buyers who come to villages around the bridge to purchase charcoal from Kampala was started,” “Social relationships among neighbouring villagers has improved and communication and interchange among them were promoted,” and, “The employment opportunities of peripheral inhabitants were created due to the establishment of new farms.”

On the other hand, community interview surveys concerning the negative impacts brought by the construction of the bridge were also conducted. The results of these surveys on negative impacts show that the forest destruction and environmental disruption have advanced because business with buyers coming to purchase charcoal from Kampala has thrived due to the access improvement. Another response was that thefts might have occurred in villages due to the construction of the bridge.

3-2-3 Interview with Farm Owners near the Bridge of Lot 2

Because commercial farms are dotted along the northern side of the bridge of Lot 2, interview surveys with farm owners concerning the realized and expected changes and effects brought by the construction of the bridge were conducted.

(1) Agriculture Activation

Due to the access improvement, farmers can more easily come to rent agriculture machines from a farm owner, while the farm owner can more easily come to carry employees to the farms, which has led to the activation of agriculture activities such as improvement of the productivity and expansion of production scale for farmers. This contributed to improvement of their lives in their villages. Hence, the resettlement of villagers around Lot 2 area has been promoted.

(2) Manner of Utilization of the Bridge in the Future

Thanks to construction of the bridge of Lot 2, the plans for the projects for large-scale crop production farms and the sugar factory have been pushed forward in the peripheral area so that the activation of agricultural business in the area of Lot 2 is expected in the future. Therefore, it is expected that the agricultural industry and community/regional development around Lot 2 will be promoted more than before. In this situation, the bridge plays an essential role for the transportation of crops and sugar. Without the bridge of Lot 2, the plan for regional industrial development would not come into existence.

However, the road is still narrow and the maintenance situation on it has not improved so that it is necessary to improve the section, since the traffic volume of vehicles, including heavy trucks, has not increased very much. If the road improvement of the section is implemented, it will be possible for heavy trucks to travel easily. It is expected that the activation of regional industry will be further promoted due to improvement of distribution access in the area.

3-2-4 Interview with Cotton Stockist

Interview surveys concerning the changes and effects on agricultural activation and improvement of farmers lives brought by the construction of the bridge were conducted with GADC, beyond the interviews with villagers and farm owners around the bridge during the last monitoring survey. The results of the interview surveys show that due to the access improvement, the volume of raw cotton purchased by GADC has increased. On the other hand, it is possible for farmers to ensure a stable market for sales and they are able to sell at an appropriate price. Therefore, a win-win situation was built for both GADC and the farmers. In addition, it is considered that farmers cultivating organic raw cotton can sell it at a high price, which has contributed to the income improvement and the motivation improvement of farmers.

Although there were some negative impacts, the construction of the bridges and road improvement solved many traffic problems in the area, which led to the improvement of access to markets, an increase in the volume of crop sales, the creation of employment opportunities for the inhabitants, improvement in their income, and promotion of the agricultural industry. In addition, the social

relationship of neighbouring villagers around the bridges has been improved and the communication and interchange among them have been promoted. Consequently, it can be said that the pilot project has contributed to the creation of impacts such as the activation of agriculture, the promotion of resettlement of IDP returnees, and the promotion of regional development.

3-3 Sustainability

This section will examine whether the effects brought by the pilot project will last after the end of the project. However, to confirm the sustainability of the effects to facilitate the resettlement of the IDP returnees, it is necessary to consider more than just the construction of the bridges and road improvement, which are necessary conditions to promote the resettlement of the returnees, but also other necessary conditions such as the opening of hospitals/health centres and schools and the construction of new wells in the surrounding area. It is difficult to comprehensively confirm the sustainability of the effects to facilitate their resettlement.

3-3-1 Sustainability of Promotion of IDP Resettlement

It is confirmed that the project, the road improvements, and the construction of the bridges at Lots 1 and 2, have had a substantial effect on the promotion of IDP resettlement. This effect would continue as long as the roads and bridges are adequately utilized.

On the other hand, it could be possible that the function and effect of the project could be lost in approximately 10 years unless the maintenance of the roads and bridges is properly conducted. In order to ensure the further sustainability, it is necessary to carry out the maintenance of the roads and bridges in the future. Therefore, the sustainability concerning the maintenance for the roads and bridges of the project will be examined in the sections below.

3-3-2 System of Operation and Maintenance

Planning for road development in Uganda is under the jurisdiction of the Ministry of Works and Transport (MoWT). Maintenance of national roads is under the jurisdiction of the Uganda National Road Authority (UNRA). That of district roads is under the jurisdiction of the district local governments. The development and maintenance of urban roads is under the jurisdiction of urban councils, while community access roads are under that of the sub-counties.

As the roads and bridges of Lots 1 and 2 are district roads, Nwoya district is in charge of the operation and maintenance of them. In Nwoya District there are only 2 personnel involved in the operation and maintenance, the district engineer and a road inspector. According to an interview with the district engineer, there are problems of understaffing and they need a senior engineer for operations and

maintenance. In addition, about 10 staff members for Lots 1 and 2 are required to carry out the operation and maintenance.

The maintenance of roads is classified according to 3 categories; namely, routine maintenance, periodic maintenance, and rehabilitation. Routine maintenance is an activity that consists of the clearing and de-silting of culverts, open and lined channels, and culvert outfalls throughout the year. These operations mainly require small-scale, low skill technology. Therefore, for routine maintenance, the use of Labour Based Technology (LBT) is suitable at least once a year. Periodic Maintenance is an activity carried out after a few years. The work items of periodic maintenance include reshaping, re-graveling, and replacement and repair of broken culverts.

3-3-3 Technical Level of Maintenance

The technical level required for maintenance of the project has been met. According to the interview with the engineer of Nwoya district, the engineers have received the required education for maintenance and participated in the training for the Uganda Road Transport Rehabilitation Program. Therefore, there is no problem concerning the technical level of maintenance for them.

3-3-4 Finance of Maintenance

Nwoya district, where the bridges were installed, bears the maintenance costs for the bridges of Lots 1 and 2. According to the interview with the engineer of Nwoya district, the budget for roads in the district in the last financial year was 321 million Ugandan shillings. 229 million Uganda shillings out of the above figure were allocated to district roads. Nonetheless, it is considerably difficult to implement the maintenance of the roads because of the insufficient and limited budget of 229 million Ugandan shillings. It is necessary for Lot 1 to obtain a budget of 22 million Ugandan shillings for routine maintenance and 256 million Ugandan shillings for periodic maintenance. Additionally, it is necessary for Lot 2 to obtain a budget of 36 million Ugandan shillings for routine maintenance and 416 million Ugandan shillings for periodic maintenance. In this respect, a sufficient budget for maintenance has not been ensured.

3-3-5 Condition of Operation and Maintenance

There is anxiety about the future deterioration of road conditions if they are not maintained due to the fact that mowing and cleaning may not be carried out regularly, even though in the section of the pilot project, not much time has passed since the completion, so the condition of the roads and bridges remains fair, overall.

Because an adequate budget for roads is not ensured, the dispatch to the sites of road inspectors conducting road checks/monitoring has not been done appropriately because of the lack of qualified personnel so that a system addressing the maintenance situation has not been prepared. Nwoya district

has responded to the road maintenance situation by prioritizing which roads require maintenance urgently, since the maintenance of all roads cannot be implemented at the same time due to the limited budget.

To sum up, the problem is partly in the number of staff and partly in the budget for road maintenance in the pilot project so that it is considered that the sustainability of the effects produced by the pilot project is not high. In order to continue the sustainability in the future, it is hoped that daily routine maintenance, which does not need a large budget, and in which LBT requiring low-skill technology can carry out mowing or cleaning, is regularly conducted and a system for maintenance prepared.

3-4 Conclusions of the Monitoring and Evaluation

3-4-1 Conclusions

It can be said that the effectiveness of the project is high, because the construction of bridges and road improvements ensured safe and smooth traffic and led to the reduction of access time to destinations, although there is anxiety about road maintenance because of the number of staff, and the budget for road maintenance and road conditions. It can be said that the pilot project has contributed to the production of impacts such as the activation of agriculture, the promotion of communication and interchange between neighbouring villagers, improvement of their income, the promotion of resettlement of IDP returnees, and the promotion of regional development such as agricultural industry.

3-4-2 Recommendations

The construction of the bridge of Lot 2 has solved many traffic problems. In the southern section of the Aswa River, there are no longer any muddy areas because gravel was laid on the road surface as a "maintenance section" to ensure the passage. However, the road is still narrow and the maintenance situation on it was not improved so that it is necessary to implement road improvements for the section.

On the other hand, the plans for the projects for the large-scale crop production farm and the sugar factory have been pushed forward in the peripheral area so that the activation of agricultural business in the area of Lot 2 is expected in the future. Therefore, it is expected that the agricultural industry and community/regional development around Lot 2 will be promoted more than before.

Provided that the road improvement along the southern section of the Aswa River is implemented, it will become easier for heavy trucks to travel and the distribution access around the area will be improved, which would lead to the promotion of further activation of regional industry. Hence, it is hoped that the road improvement along the southern section of the Aswa River is implemented.

The problem is partly with the number of staff for road maintenance and partly the lack of a budget for it in the pilot project. Whereas it is necessary to improve the road, it is difficult to rapidly increase the

number of staff and the budget in reality. In order to continue the sustainability in the future, it would be effective to carry out daily routine maintenance, which does not need a large budget and in which LBT requiring low skill technology can carry out mowing or cleaning, and prepare a system for maintenance. It is recommended that the below mentioned items are implemented for daily routine maintenance.

- Guardrail
- Shoe
- Filling
- Gabion
- Earth ditch
- Cut/Embankment slope
- Drainage for deck slab
- Expansion Joint
- Riprap Slope
- Stone masonry for side ditch
- Road surface

As for the daily routine maintenance, it is also recommended that discussions be carried out with Amuru District about the maintenance plan and the timing, because simultaneous maintenance conducted by Nwoya and Amuru Districts together would be much more effective and efficient.

Also, the following improvement plan will be suggested for road maintenance management of the whole district including this pilot project in the future.

Short-term actions

- Training for application of LBT
- Improvement of the ability for the plan and design of roads and incidental facilities
- Preparation of a maintenance manual such as for construction supervision, construction planning/design, and machine maintenance

Medium-term actions

- To carry out effective road maintenance with a limited budget, it is necessary to produce a high precision road inventory using RAMPS (Rehabilitation and Maintenance Planning System) with GPS and provide a GIS and related education program.

Long-term actions

- To avoid the depletion or loss of intellectual and technical personnel to private companies, it is necessary to correct the problem regarding the difference in salaries between public employees and private employment.

VOLUME 1: MONITORING REPORT

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Abbreviations

C	CPI	Consumer Price Index
D	DDP	District Development Plan
G	GADC	Gulu Agriculture Development. Co. Ltd.
I	IDP	Internally Displaced Person
J	JICA	Japan International Cooperation Agency
L	LBT	Labour Based Technology
M	MoWT	Ministry of Works and Transport
N	NGO	Non-Governmental Organizations
	NUAC	Northern Uganda Agricultural Center
O	OD	Origin and Destination
U	UBOS	Uganda Bureau of Statistics
	UNRA	Uganda National Road Authority
	Ushs.	Uganda shillings

Cahpter 1 Outline of the Pilot Project

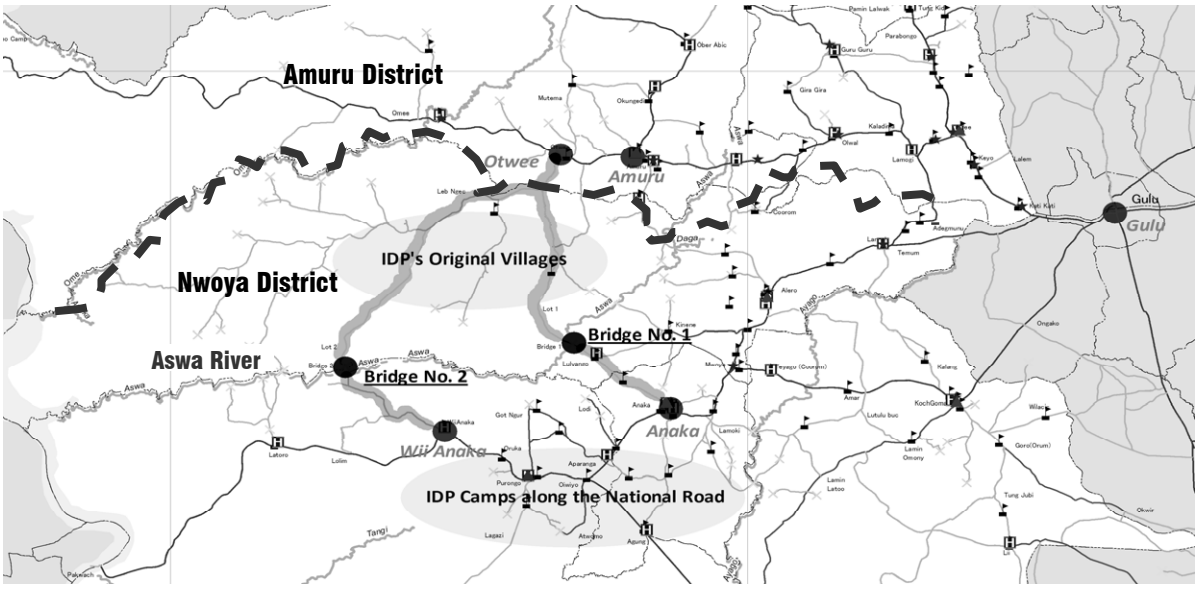
1-1 Background and Objectives of the Pilot Project

Before being split into 2 districts, Amuru District in Uganda was divided by the Aswa River, which runs through the centre of Amuru District, east to west. The bridges to cross the river became superannuated. This condition was considered a cause of preventing Internally Displaced Persons (IDP) who flee to IDP camps along the national road from returning to their original villages on the northern side of the river. Partial repairs to two district feeder roads and the construction of two bridges crossing Aswa River were carried out in the pilot project with the following main aims:

- To show the dividends of peace at an early stage
- To confirm the accelerating effects on the IDP return, resettlement and development due to the construction of the bridges over the river
- To implement the technical transfer for master planning and road operation and maintenance to district engineers

1-2 Location of the Pilot Project

The location of the pilot project is shown in Figure 1-1. Both bridges are located on the district feeder roads heading for Nwoya District from Otwee in Amuru District. While Bridge No.1 is on the Otwee-Anaka road, Bridge No.2 is on the Otwee-Wii Anaka road.



Source: JICA Study Team

Figure 1-1 Location of the Pilot Project

1-3 Outline of the Project

The pilot project was implemented and divided into two lots. The outline of these lots is as follows:

1-3-1 Lot 1: (Otwee – Anaka Road)

Road improvements for gravel road: 6.20 km in total

Bridge and structures: a reinforced concrete bridge of 35 m, 3 box culverts, and 1 pipe culvert

Maintenance of gravel road: 21.31 km

Otwee – Anaka Road, where Lot 1 is located, was upgraded to district feeder road from community access road in June 2009.

The conditions before and after the construction of the bridge are shown below (Left: before the construction, right: after the construction).

(Commencement day: 15th March, 2010)

(Completion day: 22nd August, 2011)

Source: JICA Study Team

Figure 1-2 Bridge Site Condition on Lot 1 (Commencement and Completion Day)

This bridge is used for social purposes such as commuting to the hospital, school, and their work places. Before construction, no vehicle was able to cross the river. After the bridge was constructed, vehicles could pass in all seasons.

1-3-2 Lot 2: (Otwee – Wii Anaka Road)

Road improvements for gravel road: 0.66 km

Bridge and structures: a reinforced concrete bridge of 35 m

Maintenance of gravel road: 44.00 km

Otwee – Wii Anaka Road, where Lot 2 is located, is a district feeder road. There is an arterial road that leads to the Democratic Republic of the Congo 8 kilometres south of Lot 2 (at Lolim). According to the District Development Plan (DDP), there is a plan for building a district road to connect the bridge of Lot 2 and Lolim with the shortest distance.

The conditions before and after the construction of the bridge are shown below (Left: before the construction, right: after the construction).

(Commencement day: 9th April, 2010)

(Completion day: 19th August, 2011)

Source: JICA Study Team

Figure 1-3 Bridge Site Condition on Lot 2 (Commencement and Completion Day)

This bridge is used for business purposes, especially for transporting agricultural products and the farm workers. Before construction of the new bridge, there was a bridge made of wooden boards, which became submerged during flooding. It was difficult for general vehicles to pass across it because of the peeling of some floorboards, although farm vehicles like tractors were able to do so. It was impossible even for four-wheel drive vehicles to travel the 8 kilometre interval between the bridge and Wii Anaka during the period of April to October, the rainy season, due to being muddy. As a result of the road maintenance in the project, the road is travelable over all intervals even during the rainy season.

Cahpter 2 Monitoring of the Pilot Project

2-1 Baseline and Monitoring Survey

In order to evaluate the outcome and impact of the Pilot Project, Origin-Destination (OD) surveys and community interview surveys were conducted in the baseline and monitoring surveys.

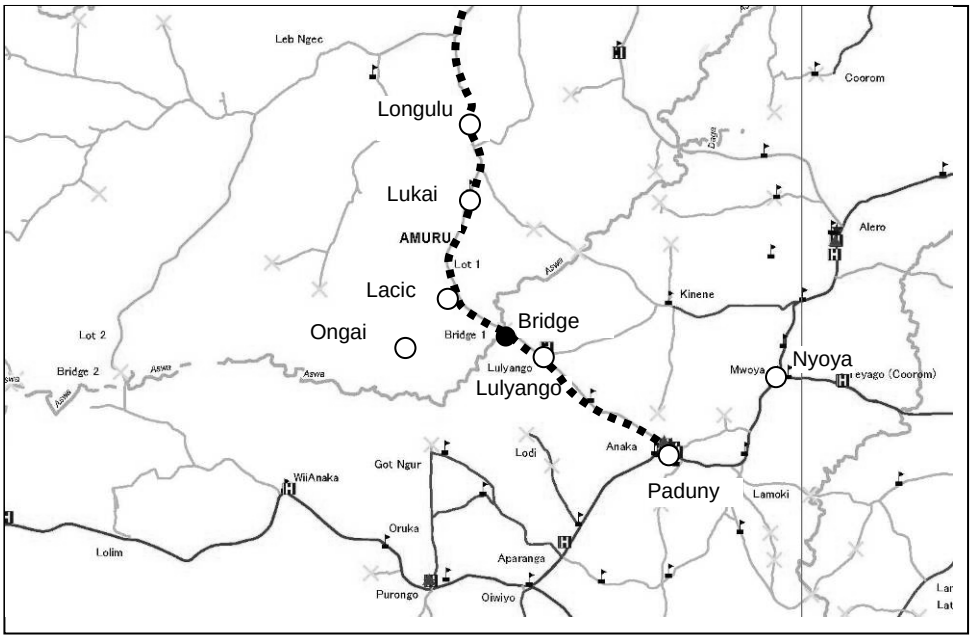
2-1-1 OD Survey

OD surveys were carried out before and after the commencement of the construction so as to confirm the effect of facilitating IDP returns and resettlement. The contents, location, condition, and interview items of the OD survey are below:

Table 2-1 Contents of OD Survey

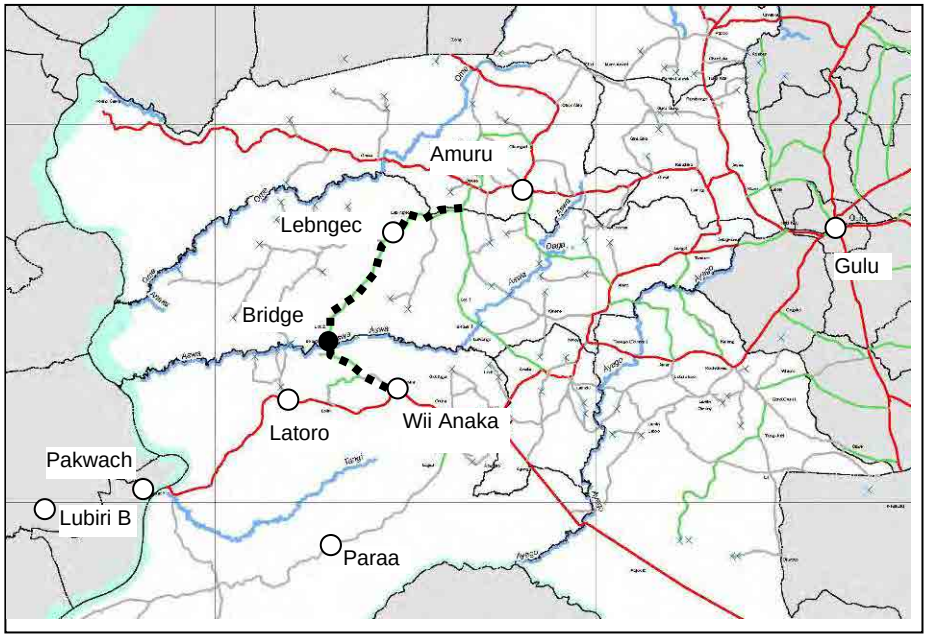
	Lot 1 (Otwee- Anaka)	Lot 2 (Otwee-Wii Anaka)
Location	Beside the bridge on Aswa River for Lot 1	Beside the bridge on Aswa River for Lot 2
Date (YY/MM/DD)	・Before construction: 2010/3/2 ・A month after completion: 2011/10/11 ・A year after completion: 2012/9/3 ・A year & 3 months after completion: 2012/12/12 ・A year & 6 months after completion: 2013/4/5	・Before construction: 2010/3/4 ・A month after completion: 2012/10/18 ・A year after completion: 2012/8/28 ・A year & 3 months after completion: 2012/12/4 ・A year & 6 months after completion: 2013/4/8
Time	7 a.m. – 7 p.m. (12 hours)	
Interviewees	All passers-by	
Method	Interview of passer-by by interview form	

Source: JICA Study Team



Source: JICA Study Team

Figure 2-1 Location Map of Survey for Lot 1



Source: JICA Study Team

Figure 2-2 Location Map of Survey for Lot 2

Source: JICA Study Team

Figure 2-3 Photos of OD Survey at the Bridge (Lot 1)

Source: JICA Study Team

Figure 2-4 Photos of OD Survey at the Bridge (Lot 2)

Table 2-2 Interview Items for OD Survey

Interview Items	Choices	
Direction	(1) From South to North (2) From North to South	
Age	(1) Adult (>20yrs) (2) Children (<20yrs)	
Transportation Type	(1) Vehicle (2) Motorcycle (3) Bicycle	(4) Walk (5) Others
Trip Purpose	(1) To work (including farming) (2) To school (3) Business (sales, meeting, etc.)	(4) Private (shopping, social, etc.) (5) To go home (6) To go to the hospital
Trip Frequency	(1) Everyday (2) A few days a week (3) Once a week	(4) A few days a month (5) Once a month (6) A few days a year
Commodity Type	(1) Animal & Animal Products (2) Vegetable Products (3) Foodstuffs (4) Petrol and Mineral Products (5) Chemicals & Allied Industries (6) Plastics / Rubber (7) Animal Skins, Leather & Furs (8) Wood & Wood Products (9) Textiles	(10) Footwear / Headgear (11) Metals incl. hoes (12) Machinery / Electrical (13) Vehicles and Other Transportation (14) Miscellaneous (15) Unknown (16) Grass (17) People (carry)

Source: JICA Study Team

2-1-2 Community Interview Survey

Community interview surveys were carried out with villagers around project sites before and after the commencement of the construction so as to confirm the effect of facilitating IDP returns and resettlement. The contents, condition, and interview items of the community interview survey are below.

Table 2-3 Contents of Community Interview Survey

	Lot 1 (Otwee - Anaka)		Lot 2 (Otwee - Wii Anaka)	
	Northern	Southern	Northern	Southern
Target Sub-village (Village)	Lungulu (Bwobonam B), Lacic (Lulyango)	Lulyango Center (Lulyango), Bidati (Badati)	Denga (Pamin Awure), Abongo Luduka (Latek Odong)	Lamin Olango (Pajengo), Ayero Olwangi (Pamin Olango)
Date (YY/MM/DD)				
Before construction	2010/3/18	2010/3/4 & 12	2010/3/26 & 30	2010/4/1
A month after completion	2011/10/10	2011/10/12	2011/10/19	2011/10/17
A year after completion	2012/9/4-5	2012/9/4	2012/8/29	2012/8/28-29
A year & 3 months after completion	2012/12/13	2012/12/13	2012/12/4 & 6	2012/12/6
A year & 6 months after completion	2013/4/6	2013/4/6/	2013/4/9	2013/4/9
Methodology	Interview survey by prepared questionnaire			
Interviewee	Sub-village Leader			

Source: JICA Study Team

Source: JICA Study Team

Figure 2-5 Photos of Community Interview Survey around Bridge

These community interview surveys were carried out at sub-villages, which are smaller than villages.

Table 2-4 Interview Items for Community Survey

	Lot 1 (Otwee- Anaka)	Lot 2 (Otwee- Wii Anaka)
Interview Information	1. Date 2. Interviewee 3. Occupation	
Address of the Site	1. Sub-county 2. Parish 3. Village 4. Sub-village (Tee Rwot Kweri)	
Outline of the Site	1. Population 2. Number of households 3. Population by type (returned villagers, villagers in transition, villagers outside the village)	
Transportation	1. Access from the village to Anaka 2. Access from the village to Amuru	1. Access from the village to Purongo 2. Access from the village to Packwach 3. Access from the village to Amuru
Agriculture	1. Information about agriculture (major crops, major cash crops) 2. Amount and selling prices of major cash crop 3. Information about agricultural marketing 4. Cost of goods transportation	
Education	1. Access to primary school 2. Access to secondary school	
Health	1. Name of health centres people go to 2. Access to the first health centre 3. Access to the second health centre	
Water	1. Number of water sources people use 2. Access to the nearest water source 3. Type of the nearest water source 4. Condition of the nearest water source	
Realised changes the bridge construction brought	Open ended	

Source: JICA Study Team

2-2 Restrictions on the Evaluation

No objective verifiable indicators had been set at the time of the baseline survey for the planning stage. Hence, a method to measure the effect quantitatively, to compare and evaluate the changes of the quantities of the baseline and monitoring surveys, rather than to measure the degree of goal attainment, is carried out in the evaluation. The objective of the project was to confirm the effect of facilitating IDP returns and resettlement yielded by constructing bridges across the river, because the rate of IDP return at the planning stage of the project was still low. Nonetheless, the IDP returns were promoted more than expected due to a substantial external factor, namely the movement to promote voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest. The purpose of the pilot project has been, therefore, changed to examine the degree of contribution to the promotion of resettlement, such as livelihood improvement and regional development, rather than that of IDP returns. The report also examines the changes and effects on the promotion of resettlement brought by the project.

Cahpter 3 Results of Monitoring and Evaluation

3-1 Effectiveness

This section will elaborate and evaluate how the output of the pilot project lead to changes and effects on the promotion of IDP return and resettlement quantitatively and qualitatively.

3-1-1 Quantitative Effects

(1) Lot 1 (Otwee - Anaka)

1) Rate of IDP Return

Before construction of Bridge No.1, the number of IDP returnees to Lacic Sub-village, located in the area north of the bridge, was around 400, and the number of IDPs that lived in transit sites was around 200 (the rate of returnees was 67%). At a year and 6 months after completion of Bridge No.1, there are no remaining IDPs in IDP camps or transit sites. There are 20 families who have resettled in other towns and villages such as Gulu in lieu of returning to their original villages. Four families out of the above families are supposed to return their original villages. The main reason that IDP returns increased at the time of the bridge completion may be that the actions taken to promote voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest. In addition to this, the reopening of a school in this area and improved access to Anaka town, with a detour during the bridge construction stage, might accelerate IDP return and resettlement in their original villages.

IDPs from the villages near the bridge of Lot 1 are no longer remaining in IDP camps or transit sites. Nonetheless, in Amuru and Nwoya districts, as of 2012, the former IDP camps have about 2,100 IDPs, while the former transit sites have about 1,200 IDPs.[1] Most of the IDPs came back to the former IDP camps and transit sites, because they were not able to resettle in their original villages. The main reason for this is a lack of land for them to settle on. Especially, this is caused by land disputes between widows and the relatives of the husband's side.

2) Usage of the Bridge

After the bridge of the pilot project started being utilized, OD surveys, which were the same as the baseline survey conducted prior to the commencement of the construction of the bridge, were carried out. The following changes in traffic concerning the constructed bridge were measured.

a) Number of Passers-by

The changes in the number of passers-by between the baseline and monitoring surveys are as follows:

[1] Referring to JICA, IDP Profiling Survey in Acholi Sub-region, Household Survey in Amuru and Nwoya Districts, March 2013

Table 3-1 Changes in the Number of Passers-by each day across the Bridge of Lot 1

Unit: Persons

Period	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
No. of Passers-by each day	128	193	357	457	410

Source: JICA Study Team

Comparing the number of passers-by prior to the commencement of construction to that of the passers-by one year after completion of the bridge shows an increase of more than 2.5 times. It is considered that this effect has appeared due to the construction of the bridge.

b) Transportation Types

The changes in the transportation types on the baseline and monitoring surveys are as follows:

Table 3-2 Changes in Transportation Types across the Bridge of Lot 1

Unit: No. of Users (Persons)

Period / Transportation Types	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Vehicles	0	15	3 (10)	12 (6)	19 (97)
Motorbikes	4	21	106 (177)	115 (17)	74 (127)
Bicycles	44	64	73 (90)	83 (100)	65 (97)
Pedestrians	(75)	(17)	(80)	(64)	(89)

Source: JICA Study Team

As for the number of vehicles, apart from that for the period a year after completion of the bridge, more than 10 vehicles crossed the bridge each day in the period beginning a month after completion. While the number of motorbikes has rapidly increased since a month after completion, that of bicycles has also risen compared to the number before construction. It is considered that the increase in the number of motorbikes was due to the increased use of motorbike taxis. Furthermore, the road improvement of Lot 1 would make it easier for bicycles to travel.

As mentioned above, it is acknowledged that the number of passers-by on motorbikes and bicycles at the bridge site of Lot 1 has rapidly increased, which leads to the improvement of the convenience for villagers' daily lives due to the construction of the bridge.

In addition, according to the traffic demand forecast, it is predicted that there will be 20-50 pcu/day in 2018 and 0-20 pcu/day in 2030. If instead of passenger car units, the actual values recorded in the traffic volume survey of April, 2013 are used, it becomes 41 pcu/12hr. From this result, more than the double the predicted value of vehicles will use the Lot-1bridge in 2018.

c) Trip Purpose

The changes in trip purpose between the baseline and monitoring surveys are as follows:

Table 3-3 Changes in Trip Purpose across the Bridge of Lot 1

Unit: Persons

Period / Trip Purpose	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
To work	13	27	58	47	126
Private	18	22	68	88	75
Business	10	20	41	78	71
Hospital	17	9	23	25	39
To school	13	6	36	12	6

Source: JICA Study Team

Trip purpose is examined as follows:

- To work: Compared to before construction, the number of commuters is increasing. Especially, about 120 commuters utilized the bridge each day at a year and 6 months after the completion of the bridge. About 80 commuters out of the above 120 utilize the bridge to commute every day. The main reason that the number of commuters drastically increased at the final monitoring survey (April) is that many of the commuters are farmers and the planting period of many agricultural crops is during April.

- Business: The number utilizing the bridge on business has drastically mushroomed since one year after the completion of the bridge. Almost all the people who utilized the bridge on business did so once a week as revealed in the survey executed a year and 6 months after the completion of the bridge, and 25 persons utilized the bridge every day. Many users of the bridge on business tend to head for Anaka or Alero.

- To school: A year after the completion of the bridge, there were 36 students on the southern side of the Aswa River. It seems that this is because the number of students who go to school in Anaka from the northern side of the bridge increased. Since then, there has been a decreased number of students. The main reason for this would be that a school was built on the northern side of the Aswa River and another school was reopened on the southern side of the river.

- Hospital : Compared with the number before bridge construction, the number of patients going to the hospital tends to increase. A majority of patients are going to the Anaka hospital in the south.

Except for private purposes, the percentage utilizing the bridge for commuting to work or commercial purposes is high. As compared to the time of completion of the bridge, those numbers have more than doubled since a year after the completion of the bridge.

d) Commodity Types

The changes in the commodity types on the baseline and monitoring surveys are as follows:

Table 3-4 Changes in Commodity Type across the Bridge at Lot 1

Unit: Persons

Period / Commo-dity Type	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
People	14	11	162	226	165
Foodstuff	2	34	88	89	85
Petrol & Minerals	17	1	4	24	8
Wood & wood products	16	4	11	11	7

Source: JICA Study Team

Motorbike traffic has rapidly increased by more than 3 times, to 74 motorbikes each day at a minimum from 21 motorbikes each day at the time immediately after the completion of the bridge. It is considered that most of them are "motorbike taxis" which come and go with people on board. In addition, the number of those who transport foodstuff has increased to 85 persons from 34 persons since the survey a month after the completion of the bridges.

e) Trip Frequency

The changes in trip frequency based on the baseline and monitoring surveys are as follows:

Table 3-5 Changes in Trip Frequency across the Bridge of Lot 1

Unit: Persons

Period / Trip Frequency	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Everyday	111	63	163	284	197
A few a week	16	31	109	130	163
Once a week	1	7	29	8	9
A few a month	0	6	21	16	29
Once a month	0	3	16	4	5
A few a year	0	7	19	15	7

Source: JICA Study Team

About 84% of the total passers-by used the bridge of Lot 1 at least once a week and 46% of the total used it every day as of a year after the completion of the bridge.

In the survey of a year and 6 months after completion of the bridge, about 90% of the total used the bridge at least once a week and 48% of the total did so every day. Considering the above, a majority of passers-by use the bridge of Lot 1 at least once a week, while about half of all passers-by use it every day.

In summary, for the usage of the bridge, comparing with the number of passers-by prior to commencement of construction, that of the passers-by at the point one year after the completion of the

bridge has increased more than 2.5 times. The number of passers-by on motorbikes and bicycles at the bridge site of Lot 1 has rapidly increased since the point in time a month after the completion of the bridge. Most vehicles are "motorbike taxis" which come and go with people on board. A majority of passers-by use the bridge of Lot 1 at least once a week, while about half of all passers-by use it every day. Hence, the bridge has been frequently utilized due to the construction of the bridge, which leads to an improvement in the convenience of villagers' daily lives.

3) Reduction of Access Time

After the bridge of the pilot project started being utilized, community interview surveys, which were the same as the baseline survey conducted prior to the commencement of the construction of the bridge, were carried out. Shortening the access time to the destinations by repairing the bridge has been measured.

The changes in the time required to travel to destinations from Lungulu Sub-village on the northern side of Lot 1 are as follows:

Table 3-6 Changes in Access Time from Northern Side of the Bridge of Lot 1

Unit: Hour

Period / Access to	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Anaka					
・On foot	5	5	4.5	5	5
・By bicycle	2	3	1.5	2	2.5
・By motorbike	0.5	0.75	0.66	0.8	0.7
・By vehicle	1.5	0.33	0.30	0.8	0.8
Otwee					
・On foot	3	3	1.5	1.5	2
・By bicycle	1.5	1	1	1	1
・By motorbike	0.5	0.33	0.33	0.3	0.7
・By vehicle	0.7	0.25	0.25	0.3	0.8
Primary school	* In a village	*Lungulu P/S	*Lungulu P/S	*Lungulu P/S	*Lungulu P/S
・On foot	—	0.5	1	0.8	0.5
・By bicycle	—	0.17	0.42	0.3	0.25
・By motorbike	—	0.08	0.13	0.2	—
・By vehicle	—	0.12	0.08	0.2	—
Health unit: Anaka Hospital					
・On foot	5	5	4.5	5	5
・By bicycle	3	2.5	2	2	2
・By motorbike	1.5	1.5	0.66	0.8	1.5
・By vehicle	2	2	0.5	0.8	1.5
Water Source					
・On foot	—	—	0.5	0.5	0.5
・By bicycle	—	—	0.25	0.25	—

Source: JICA Study Team

Access time to Anaka by vehicles was shortened to 50 minutes or less, while it took an hour and a half before the road improvement and construction of the bridge. Access time to Otwee was shortened to 2 hours or less on foot and 20 minutes or less by vehicle, while it took 3 hours on foot and 40 minutes by vehicle before the road improvement and construction of the bridge. In addition, access time to Anaka Hospital by vehicle or motorbike was reduced to half of what it was before the road improvement and construction of the bridge. Therefore, the access time to each destination, especially by motorbikes and vehicles, was drastically reduced.

The changes in the time required to reach destinations from Bidati Sub-village on the southern side of Lot 1 are as follows:

Table 3-7 Changes in Access Time from Southern Side of the Bridge of Lot 1

Unit: Hour

Period / Access to	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Anaka					
・On foot	1.33	1.5	0.5	1	0.5
・By bicycle	0.5	0.66	0.5	0.4	0.33
・By motorbike	0.13	0.33	0.13	0.12	0.08
・By vehicle	0.18	0.25	0.18	0.1	0.08
Otwee					
・On foot	10	6	4	3	4
・By bicycle	5-6	3	2	2	2.5
・By motorbike	1.5	1.5	1	0.8	1
・By vehicle	2.5	1	0.25	0.5	1
Primary school	*In a village	*In a village	* In a village	* In a village	* In a village
・On foot	—	—	0.08	0.1	0.15
・By bicycle	—	—	0.03	0.1	0.66
・By motorbike	—	—	—	—	—
・By vehicle	—	—	—	—	—
Health unit	*Anaka hospital	*Anaka hospital	*Lulyango H/C	*Anaka hospital	*Anaka hospital
・On foot	1.5	1.5	0.42	1	0.66
・By bicycle	0.66	0.5	0.3	0.3	0.33
・By motorbike	0.33	0.33	0.08	0.1	0.16
・By vehicle	0.42	0.25	0.07	0.1	0.16
Water Source					
・On foot	—	—	0.25	0.25	0.16
・By bicycle	—	—	0.08	0.1	—

Source: JICA Study Team

As for the access time to Otwee by all the transportation types (on foot, bicycles, motorbikes and vehicles), it became possible to go there in half the time or less, comparing with the access time before construction of the bridge. The access time to Anaka Hospital by all transportation types also was shortened, comparing with the time before construction of the bridge and road improvement.

As a result, the access time to Anaka and Otwee from villages in the Lot 1 area by vehicles has been sharply reduced. In addition, the access time to Anaka Hospital, especially by vehicles and motorbikes, was reduced, comparing with the access time before the road improvement and construction of the bridge. Accordingly, it can be said that the time saving appeared to be due to the construction of the bridge.

(2) Lot 2 (Otwee – Wii Anaka)

1) Rate of IDP Return

Before construction of Bridge No. 2, the number of IDP returnees to Abongo Luduku Sub-village, located in the area north of the bridge, was around 300 and the number of IDP that lived in transit sites was around 200 (the rate of returnees was 60%). As of a year and 6 months after completion of Bridge No. 2, there were no remaining IDPs in IDP camps or transit sites. There are 120 families who have resettled in other towns and villages, such as Gulu, in lieu of returning to their original villages. Almost all the families out of the above families are supposed to return their original villages. The main reason that IDP return had been promoted before the bridge completion, like Lot 1, may be that the actions taken to promote voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest.

2) Usage of the Bridge

After the bridge of the pilot project started being utilized, OD surveys, which were the same as the baseline survey conducted prior to the commencement of the construction of the bridge, were carried out. The following changes in traffic concerning the constructed bridge were measured.

a) Number of Passers-by

The changes in the number of passers-by on the baseline and monitoring surveys are as follows:

Table 3-8 Changes in the Number of Passers-by at the Bridge of Lot 2

Unit: Persons

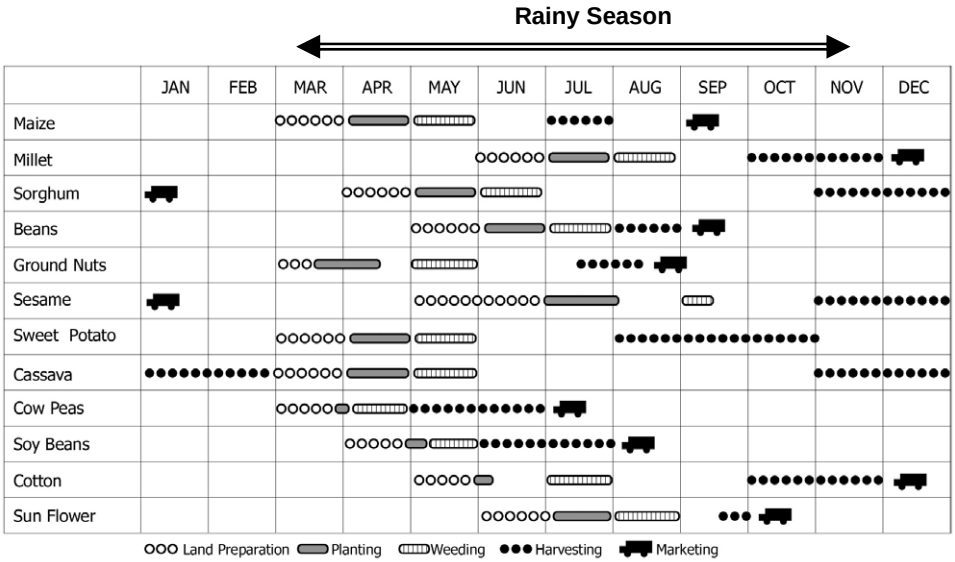
Period	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
No. of Passers-by each day	91	46	79	89	124

Source: JICA Study Team

The number (about 120) of passers-by each day as of a year and 6 months after completion of the bridge exceeded the number (about 90) of passers-by before construction of the bridge. Dozens out of the 120 are regarded as workers passing by for regular road maintenance. Not considering the number of such workers, it is assumed that the number of passers-by each day would be 110 as of a year and 6 months after completion of the bridge. Both periods of time, before construction and a year and 6 months after completion of the bridge, include a planting season (March and April) for the main crops, such as maize, groundnuts, sweet potatoes, and cassavas, before the rainy season comes and it is a busy season for agricultural works. It is acknowledged that the number of passers-by has increased partially due to this planting season.

A month after the bridge completion was during the rainy season and the agricultural off-season when shipping of the main agricultural products is finished, so the number of passers-by was limited.

A year after completion of the bridge (August-September) and a year and 3 months after completion (December) are the shipping season and harvesting season, respectively, as well as the rainy season. It is considered that in the area of poor access during the rainy season, crops are sometimes waiting for the dry season to be shipped so that the number of passers-by in the rainy season is smaller than that of the dry season. It can be said that seasonal variation significantly affects changes in the traffic volume, since commercial activities related to agriculture, such as transportation of agricultural products and the movements of people who work on farms, have been performed in the area of Lot 2.



Source: Prepared by JICA Study Team based on sources in Pader District

Figure 3-1 Period of Planting, Harvesting, and Marketing of Typical Crops in Acholi Area

b) Transportation Types

The changes in the transportation types between the baseline and monitoring surveys are as follows:

Table 3-9 Changes in Transportation Types at the Bridge of Lot 2

Unit: No. of Passengers (Persons)

Period / Transportation Types	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Vehicles	19	4	4 (25)	4 (18)	4 (29)
Motorbikes	14	6	8 (15)	20 (39)	14 (26)
Bicycles	20	1	12 (14)	10 (12)	6 (8)
Pedestrians	(11)	(6)	(25)	(20)	(61)

Source: JICA Study Team

Nineteen vehicles crossed the bridge in the month before construction of the bridge (in the beginning of March) because it is the planting season for the main crops. In contrast, the number of vehicles a month after completion of the bridge (in the middle of October, the end of the rainy season) was 4 vehicles, since the movements for the agricultural work and harvest were few. Another reason for this would be that people tended to avoid travelling the southern section of the Aswa River, considering the condition of the road surface of that section.

The number of vehicles in each of the months immediately after completion of the bridge, a year and 3 months after completion of the bridge, and a year and 6 months after completion of the bridge was 4 vehicles for each month, which is the same as the month after completion of the bridges in the rainy season.

On the southern section of the Aswa River, there were no longer muddy areas because gravel had been laid on the road surface as a "maintenance section" to ensure the passage. However, people were anxious about the maintenance condition of this section so that there were hardly any changes in the traffic volume. In addition, the traffic volume in the rainy season is less than that in the busy planting and harvest seasons.

It is considered that there were hardly any changes in the number of motorbikes due to the above reason. The number of passers-by on foot increased at the time of a year and 6 months after completion of the bridge. It seems that this is because of the increase in the number of farmers using the road and the workers passing by for regular maintenance of this road section.

In addition, according to the traffic demand forecast, it is predicted that 0-20 pcu/day in neither 2018 nor 2030, therefore, the number of vehicle passing in Lot-2 will not increase. If instead of passenger car units, the actual value determined in the traffic volume survey of April, 2013is used, it becomes 8 pcu/12hr, but this is 12 hours volume. Hence, this value is almost the same as 2018’s predicted traffic volume considering the ratio of daily traffic to daytime traffic.

c) Trip Purpose

The changes in trip purpose between the baseline and monitoring surveys are as follows:

Table 3-10 Changes in Trip Purpose at the Bridge of Lot 2

Unit: Persons per month

Period / Trip Purpose	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
To work	38	10	39	8	49
Private	6	2	17	5	4
Business	0	3	3	8	33
Hospital	0	0	5	9	0
To school	0	0	0	5	0

Source: JICA Study Team

Trip purpose is examined as follows:

- To work: Because farmland is spread from north to south across the Aswa River and large-scale farms are dotted along it, the majority of commuters are farmers. Both periods of time, before construction (March) and a year and 6 months after completion of the bridge (April), include a planting season for the main crops and the dry season. The number of commuters before construction of the bridge was 38 per month, while the number at a year and 6 months after completion of the bridge increased to 49 per month. Passage of workers for routine maintenance of the road section and increase in employment opportunities in the surrounding farms can be considered as the reason for the increase. The number of commuters in the month one year after bridge completion (August and September) was not small at 39. Because this period is a shipping or harvest period of many agricultural crops, it is considered that the number of commuters was relatively large.
- Business: There is a growing likelihood of passers-by on business and the number of passers-by on business has increased to 33 in the month a year and 6 months after completion of the bridge. Most of them tend to head for Packwach and Alero. One of the causes of this increase could be that agricultural business has been activated around Lot 2.
- Hospital: There have been a few who go to the hospital through the monitoring period. Those who go to the hospital head for Wii Anaka Health Centre, on the southern side of bridge.
- To school: There are no students who utilize the bridge to go to school, since there are few houses around the bridge of Lot 2.

d) Commodity Type

The changes in the commodity type between the baseline and monitoring surveys are as follows:

Table 3-11 Changes in Commodity Type across the Bridge at Lot 2

Unit: Persons

Commo-dity Type \ Period	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
People	0	0	17	30	46
Foodstuff	63	3	8	34	10
Metal & hoes	2	1	10	3	53
Wood & wood products	12	1	0	0	3

Source: JICA Study Team

The number of people transported has increased in each survey and the movements for commercial or commuting purposes account for a majority of the increase.

There were 34 persons carrying foodstuff. This traffic volume was confirmed, to some extent, a year and 3 months after bridge completion (December), during the harvest season. Yet, no figures for the monitoring period have exceeded the 63 persons recorded in the month before bridge construction. It is considered that the reason that not many passers-by transported food at a year and 6 months after bridge completion (April) is that it is not the harvest and shipping season. On the other hand, the number people transporting hoes dramatically increased a year and 6 months after bridge completion (April).

The main reasons for this would be that farmers were carrying hoes due to the planting season for crops and that the workers for regular maintenance of the road section were carrying hoes.

e) Trip Frequency

The changes in the trip frequency between the baseline and monitoring surveys are as follows:

Table 3-12 Changes in Trip Frequency across the Bridge of Lot 2

Unit: Persons per month

Trip Frequency \ Period	Before construction (March 2010)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Everyday	91	20	23	4
A few a week	0	27	53	34
Once a week	0	10	4	5
A few a month	0	8	0	69
Once a month	0	6	5	0
A few a year	0	8	4	12

Source: JICA Study Team

In all of the monitoring periods except for the period a year and 6 months after completion of the bridge, the percentage of people who use the bridge a few days a week is the highest, followed by the percentage of people who do so every day. The number of people who use the bridge a few days a month drastically increased to 69 per month, while the number of people who do so every day considerably decreased in the survey period a year and 6 months after completion of the bridge, which is harvest season (April). January and February, before starting the planting season, are in the agricultural off-season and the frequency of bridge use is low during such period so that it is more likely that the result of the frequency of use was low in response to the impact of the agricultural off-season.

To sum up, both periods of time, before construction and a year and 6 months after completion of the bridge, include a planting season (March and April) for the main crops, such as maize, groundnuts, sweet potatoes, and cassavas before the rainy season comes and it is a busy season for agricultural work. It is observed that in comparison to this planting season, the current number of passers-by has increased.

A month after the bridge completion (October), a year after bridge completion (August-September), and a year and 3 months after bridge completion (December) are during the rainy season so that the number of passers-by in this season was smaller than during the dry season. It can be said that seasonal variation significantly affects changes in the traffic volume, since commercial activities related to agriculture, such as transportation of agricultural products and the movements of people who work on farms, have been performed in the area of Lot 2.

In the area around the southern section of the Aswa River, there were no longer muddy areas because gravel had been laid on the road surface as a "maintenance section" to ensure the passage. However, people were anxious about the maintenance condition of this section so that there were hardly any changes in the traffic volume. In addition, the traffic volume in the rainy season less than that in the busy planting and harvest seasons. It is considered that there were hardly any changes in the number of motorbikes due to the above reason.

As mentioned in the section on qualitative effectiveness later, according to the findings of an interview with a farm owner, the construction of the bridge of Lot 2 led to the improvement of many traffic problems, however, the road is still narrow and the maintenance situation on it has not improved so that it is necessary to implement road improvement of the section. Because farmland is spread from north to south across the Aswa River and large-scale farms are dotted along it, a majority of commuters are farmers. The majority of trip purposes on the bridge are, therefore, on business and commuting (traveling to the farms). Especially, the number of passers-by on business has sharply risen for the last 3 months, which indicates that agricultural business has been activated around Lot 2. The number of people transported has increased in each survey and the movements of commercial or commuting purposes make up a majority of the trips. It can be said that the frequency of usage of the bridge of Lot 2 is lower than that that of Lot 1. Nevertheless, it is considered that the number of passers-by on business has sharply risen for the last 3 months, which indicates that the number of

passers-by for business purposes related to agriculture has increased, whereas there had been few passers-by on business prior to a year after the completion of the bridge.

3) Reduction of Access Time

After the bridge of the pilot project started being utilized, community interview surveys, which were the same as the baseline survey conducted prior to the commencement of the construction of the bridge, were carried out. The degree of shortening of the access time to destinations by repairing the bridge has been measured.

The changes in the time required to reach destinations from Abongo Luduku Sub-village on the northern side of Lot 2 are as follows:

Table 3-13 Changes in Access Time from Northern Side of the Bridge of Lot 2

Unit: Hour

Period / Access to	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Pakwach					
・On foot	24	24	24	—	24
・By bicycle	12	12	6	—	9
・By motorbike	2	6	2	—	5
・By vehicle	4	4	3	—	2
Otwee					
・On foot	2.5	3	5	2.5	4
・By bicycle	1	2.5	2	1	2
・By motorbike	0.5	1.5	0.5	0.5	1
・By vehicle	0.67	1	1	0.7	0.75
Primary school	*Leb Ngec P/S	*Leb Ngec P/S	*Leb Ngec P/S	*Leb Ngec P/S	*Leb Ngec P/S
・On foot	1	2.5	1	1.5	1.5
・By bicycle	0.33	1	0.5	0.5	0.5
・By motorbike	0.17	0.33	0.25	—	0.33
・By vehicle	0.23	0.33	—	—	0.25
Health unit	*Amuru HC II	*Amuru HC II	*Amuru HC II	*Amuru HC II	*Amuru HC II
・On foot	2.5	4	3	2.5	2
・By bicycle	1	2	1.5	1	1
・By motorbike	0.67	0.67	0.5	0.5	0.25
・By vehicle	0.83	0.5	0.33	0.7	0.33
Water resource					
・On foot	—	—	0.08	0.1	0.33
・By bicycle	—	—	0.08	0.1	—

Source: JICA Study Team

It could not be generally confirmed that there was a reduction of access time to destinations by most transportation types. However, it is acknowledged that the access time to Packwach by vehicles has been shortened.

The changes in the time required to reach destinations from Ayero Olwangi Sub-village on the southern side of Lot 2 are as follows:

Table 3-14 Changes in Access Time from Southern Side of the Bridge of Lot 2

Unit: Hour

Period / Access to	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Pakwach					
・On foot	12	12	12	10	12
・By bicycle	7	6	7.33	4	6
・By motorbike	3	1.67	2.67	1.5	1.5
・By vehicle	1	3	2.17	1	1
Otwee					
・On foot	8	14	8.33	7.8	8
・By bicycle	6	7	5	5	4
・By motorbike	4	3.5	1.67	2.8	1.5
・By vehicle	3	2.5	1	2	1.5
Primary school	*Wii Anaka P/S	*Wii Anaka P/S	*Wii Anaka P/S	*Wii Anaka P/S	*Wii Anaka P/S
・On foot	1.5	2	1.5	1	1.5
・By bicycle	0.75	0.75	0.5	0.8	0.67
・By motorbike	0.5	0.25	—	0.1	0.25
・By vehicle	0.25	0.17	—	0.1	0.25
Health unit	Purongo HC III	Wii Anaka HCII	Wii Anaka HCII	Wii Anaka HCII	Wii Anaka HCII
・On foot	3	2	1.5	1.5	1.5
・By bicycle	2	0.75	0.5	0.8	0.66
・By motorbike	0.67	0.25	0.25	0.1	0.25
・By vehicle	0.5	0.17	0.33	0.1	0.25
Water resource					
・On foot	—	—	0.17	0.1	0.13
・By bicycle	—	—	0.08	0.1	—

Source: JICA Study Team

The access time by motorbike to Packwach has been shortened to an hour and a half from 3 hours. In addition, with regard to the access time by motorbikes and vehicles to Otwee, the project made it possible to travel there in about half the time or less, compared with the time before construction of the bridge.

Hence, according to the interview survey on the northern side of the bridge of Lot 2, it could not be generally confirmed that access time to destinations by most transportation types has been reduced. However, it is seen that the access time to Packwach by vehicles has been shortened. The access time to the Amuru health centre by motorbikes and vehicles has been reduced compared with the time before construction of the bridge. On the other hand, according to the interview survey on the southern side of the bridge of Lot 2, it is certain that the access time by motorbikes to Packwach and the time by motorbikes and vehicles to Otwee have been shortened. Accordingly, it can be said that effectiveness in time saving appeared due to the construction of the bridge.

3-1-2 Qualitative Effects

(1) Lot 1 (Otwee - Anaka)

Community interview surveys concerning the traffic changes and effects brought by the construction of the bridge were conducted in Lungulu Sub-village and Lacic Sub-village located on the northern side of Lot 1 and Bidati Sub-village and Lulyango Centre Sub-village located on the southern side of Lot 1. The qualitative effects are as follows:

- The access to Anaka hospital by vehicles was especially improved and the access when conveying patients by vehicle in an emergency is improved.
- The access to schools is improved.
- It became easier to transport agricultural products to markets.
- There used to be a suspension bridge for pedestrians to cross the river before completion of the new bridge and it was necessary for passers-by other than pedestrians to get off the river, which led to accidents. It has been possible for vehicles, motorcycles and bicycles to cross the bridge after completion of the new bridge, which contributed to the elimination of accidents and better safety.

As a result of the community interview survey in villages near Lot 1, the effectiveness of access improvement to destinations such as markets, schools, the hospital, and being able to convey patients in an emergency to a hospital, was confirmed. In addition, a significant decrease in the rate of accidents has occurred due to ensuring a safe traffic route.

(2) Lot 2 (Otwee – Wii Anaka)

Community interview surveys concerning the traffic changes and effects brought by the construction of the bridge were conducted in Abongo Luduka Sub-village located on the northern side of Lot 2 and Lamin Olango Sub-village and Ayero Olwangi Sub-village located on the southern side of Lot 2. The qualitative effects are as follows:

- The transportation of agricultural products to the markets of South Sudan, Pakwach and Panyimur became easier.

- The access to administrative organizations, Anaka, Otwee and other villages became easier.
- The access to farms for farmers became easier.
- The access to school became easier.
- The access to the hospital/health centre became easier. Emergency transport to a hospital became possible, which has led to a decrease in mortality in the village.
- There is no anxiety about drowning when crossing the river. Such risk has been reduced and safe traffic has been ensured, which has a substantial effect on the decrease in mortality and accident rate.

As a result of the community interview survey in the villages near Lot 2, the effectiveness of access improvement to destinations such as markets, administrative organizations, farms, schools, and the hospital has appeared. Emergency transport to a hospital became possible, which has led to the decrease in mortality in the village. In addition, a decrease in the rate of accidents has appeared due to ensuring a safe traffic route.

(3) Farm Owners around the Bridge of Lot 2

Because commercial farms are dotted along the northern side of the bridge of Lot 2, interview surveys with farm owners concerning the traffic changes and effects brought by the construction of the bridge were conducted. The qualitative effects are as follows:

- When transporting equipment and local workers to the farms, it used to be necessary to travel a long-distance. The travel time has been reduced due to the improvement of access.
- Villagers and farmers around the bridge did not previously have easy access to the farms, markets or public facilities when flooding occurred in the Aswa River. However, traveling distance and access time to the destination have been shortened and fuel costs have been reduced after construction of the bridge.
- The reliability of transport time of agricultural equipment and the arrival time of the farmers at the farms has increased so that time prediction is easier than before.
- Whereas it took more than 2 hours to reach Kampala to sell harvested crops via Gulu before construction of the bridge, transporters are now, after construction, able to arrive at Kampala in 2 hours. Transport costs and travel time have been reduced significantly owing to construction of the bridge.
- The construction of the bridge of Lot 2 led to the improvement of many traffic problems. However, the road is still narrow and the maintenance situation on it has not improved so that it is necessary to implement road improvement on the section.

As a result of the interview survey with farm owners around Lot 2, improvements such as the reduction of travel time due to access improvement, reduction of fuel costs for transport vehicles, and certainty of time predictions regarding the movement of people and goods, are evident. On the other hand, there was an opinion that the road was still narrow and the maintenance situation on it has not improved so that it is necessary to implement road improvement on the section, which was considered as a challenge for the future.

(4) Cotton Stockist

Other than the interviews with villagers and farm owners around the bridge, during the last monitoring survey, interview surveys concerning the traffic changes and effects brought by the construction of the bridge were conducted with Gulu Agriculture Development. Co. Ltd. (GADC), which operates the cotton factory in Gulu and frequently utilizes the bridges of Lot 1 and 2 to purchase cotton and sesame. The results of this interview survey are as follows:

Table 3-15 Bridge Usage and Traffic Changes and Effects due to Construction

Items of Question	Answers by GADC
Roads and Bridges for Use	• GADC uses both roads and bridges of Lot 1 and 2.
Transportation Type	• In general, sesame and cotton are transported by heavy trucks of 8 ton load capacity.
Usage Season of Roads and Bridges	• The bridges and roads of Lot 1 and 2 have been used between September and March, the shipping season of mainly sesame and cotton.
Frequency of usage of Roads and Bridges	• The bridges and roads of Lot 1 and 2 have been used very often in order to purchase agricultural products from farmers. • GADC has about 80 heavy trucks. 40 heavy trucks pass over the roads and bridges of both Lot 1 and 2 every day in the busy cotton season.
Area of Cotton Production	• The cotton farms are located in many places including Nwoya, Amuru, Lamwo, Gulu, kitgum and other places. • In Nwoya District, the cotton farms dealing with GADC are located on the northern side of Lots 1 and 2. Eighty per cent of all cotton products GADC deals with come from these cotton farm areas.
Changes Before and After Construction of the Bridge	• Before the construction of the bridges GADC had been traveling longer roads and detouring to cotton farms, which would make the operation costs very high since more diesel was required. After the construction of the bridges, it is possible for GADC to access cotton farms easily and fuel costs have been reduced. • Access time to purchase cotton has shortened, compared with the time before construction of the bridge due to the access improvement of Lots 1 and 2.

Source: JICA Study Team

As a result of the interview survey with GADC, it is realized that the bridges and roads of Lots 1 and 2 have been used very often and 40 heavy trucks pass over the roads and bridges of Lots 1 and 2 each day in the busy cotton season. In other words, improvements, such as easy access to cotton farms, the shortening of access time, and reduction of fuel costs have appeared after construction of the bridges.

Consequently, the bridge of Lot 1 has been frequently utilized due to the construction of the bridge, which leads to improved convenience for villagers' daily lives. The majority of passers-by at Lot 2 are farmers so seasonal variation and the agricultural season significantly affect changes in the traffic volume. Both periods, before construction and a year and 6 months after completion of the bridge, include a planting season (March and April) for the main crops and it is a busy season for agricultural work. It is observed that in comparison with this planting season, the number of passers-by has increased, which contributes to improvement of n the convenience for villagers' daily lives. It is considered that the number of passers-by on business has sharply risen for the last 3 months so that the number of passers-by for business purposes related to agriculture has increased. It is regarded that the bridge at Lot 2 especially plays an important role for agricultural business stakeholders such as farm owners and suppliers purchasing agricultural products. Therefore, the pilot project has been highly effective. The construction of the bridge and improvement/maintenance of the road have helped to promote the resettlement of returnees and have played an important role.

However, as the pilot project is only one of the necessary conditions to promote the resettlement of returnees, the resettlement of returnees would also be promoted through other necessary conditions such as the opening of hospitals/health centres and schools and the construction of new wells in the surrounding areas.

3-2 Impacts

This section will elaborate the direct and indirect impacts and factors of the implementation of the pilot project to promote the resettlement of IDP returnees, such as improvement of their living standards in terms of agricultural activation and to promote regional development quantitatively and qualitatively. Further, the unintended direct or indirect negative impacts caused by carrying out the pilot project will also be examined.

3-2-1 Quantitative Impacts

(1) Lot 1 (Otwee - Anaka)

1) Planted Area per Household in Acre

In Lungulu and Lacic Sub-villages located on the northern side of Lot 1 and Bidati and Lulyango Centre Sub-villages on the southern side of Lot 1, community interview surveys concerning the planted area in acres per household were carried out before and after construction of the bridge. The results of the changes are shown below. The planted area in the period when agricultural crops are not cultivated was also confirmed.

Table 3-16 Changes in Planted Area per Household in Acres in Villages around Lot 1

Unit: Acre

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 1	Lungulu	Rice	0.5	1.0	2.0	2.0	2.0
		Groundnuts	1.0	1.5	2.0	2.0	2.0
	Lacic	Rice	2.0	―	3.0	4.0	5.0
		Groundnuts	1.0	―	3.0	3.5	3.5
Southern Side of Lot 1	Lulyango Center	Rice	2.0	―	3.0		3.0
		Groundnuts	1.0	―	3.0		3.0
	Bidati	Rice	0.5	1.0	2.0	2.0	2.0
		Groundnuts	0.5	1.0	2.0	2.0	2.0

Source: JICA Study Team

Compared with the time before the bridge construction, the planted area per household in acres has expanded in every village. The main reason for this would be that the number of households has increased as well as the number of people engaged in agriculture due to IDPs returning, and improvement of the access to markets due to the road improvement and construction of the bridge, which would have a positive impact on the farmers' willingness to cultivate crops, which has led to the expansion of the planted area per household.

2) Volume of Crop Sales (Village Total)

In Lungulu and Lacic Sub-villages located on the northern side of Lot 1 and Bidati and Lulyango Centre Sub-villages on the southern side of Lot 1, community interview surveys concerning the volume of crop sales in the last harvest were carried out before and after construction of the bridge. The results of the changes are shown below.

Table 3-17 Changes in the Volume of Crop Sales in Last Harvest in Villages around Lot 1

Unit: Bag

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 1	Lungulu	Rice	46	32	700	750	950
		Groundnuts	35	30	800	750	700
	Lacic	Rice	1,000	―	2,400	3,000	3,000
		Groundnuts	400	―	1,800	2,600	2,700
Southern Side of Lot 1	Lulyango Center	Rice	1,000	―	2,400		1,200
		Groundnuts	400	―	1,800		800
	Bidati	Rice	308	250	450	800	700
		Groundnuts	250	260	600	650	600

Source: JICA Study Team

In Lungulu Sub-village located on the northern side of Lot 1, in the period since one year after the bridge completion, sales volumes of rice and groundnuts has rapidly increased to more than 15 times the amount before construction of the bridge. Sales volumes of rice and groundnuts in Lacic, Lulyango Centre and Bidati Sub-villages have also significantly increased compared with the time before construction of the bridge. The main reason for this would be that the number of people engaged in agriculture has increased because of the promotion of the voluntary return of IDPs by the government of Uganda and international aid agencies were in earnest. This led to the expansion of the planted area per household. Consequently, it seems that this resulted in the increase in the volume of crops grown and sold.

Compared with the period before construction of the bridge, the volume of crop sales at the period of 1 month after the bridge completion reduced temporarily. This is because the self-consumption of crops increased due to the fact that IDPs had returned to each village and that reduced the volume of crops that could be taken to market.

3) Selling Price per Bag

In Lungulu and Lacic Sub-villages, located on the northern side of Lot 1 and Bidati and Lulyango Centre Sub-villages on the southern side of Lot 1, community interview surveys concerning the selling price per bag were carried out before and after construction of the bridge. The results of the changes are shown below.

Table 3-18 Changes in Selling Price per Bag in Villages around Lot 1

Unit: Ushs/bag

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 1	Lungulu	Rice	54,000	50,000	70,000	75,000	75,000
		Groundnuts	60,000	60,000	45,000	60,000	80,000
	Lacic	Rice	40,000	–	90,000	75,000	85,000
		Groundnuts	40,000	–	45,000	65,000	70,000
Southern Side of Lot 1	Lulyango Center	Rice	40,000	–	90,000		70,000
		Groundnuts	40,000	–	45,000		75,000
	Bidati	Rice	60,000	50,000	60,000	80,000	75,000
		Groundnuts	45,000	50,000	55,000	70,000	70,000

Source: JICA Study Team

Except for the selling price of groundnuts in Lungulu Sub-village a year after completion of the bridge, the selling price of all crops in all villages has increased compared with the time before construction of the bridge or a month after the completion of the bridge.

With respect to changes in the average retail price[2] in consideration of the Consumer Price Index of rice and groundnuts in Lot 1 and 2 area during the monitoring surveys (2011-2013), the average retail price of rice tended to decrease as mentioned below. On the other hand, the average retail price of groundnuts has shown a relatively constant price with some fluctuation.

Table 3-19 Changes in Average Retail Crops Prices for CPI Commodities in Gulu

Type of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (September 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Rice (Shs/kg)	-	2,904	2,773	2,000	2,287
Groundnuts (Shs/kg)	-	3,603	3,751	3,244	3,658

Source : Uganda Bureau of Statistics

In contrast to the average retail price, the reasons for the increase in selling price around Lot 1 would be that the passage of vehicles becomes possible throughout the year and the access to the markets has improved so that people around bridges can sell their crops at a more appropriate price and their business opportunities have increased. One of the illustrations of this is that those in the region wanting to sell agricultural products had no choice but to wait for middlemen from Anaka and Gulu to come to their villages from afar. Because access was improved, trucks traveling together have come into the area. The situation has been changing so that farmers can now sell their crops at more appropriate prices since they are now able to travel to Anaka or Gulu to sell their products at any time. It can be said that these changes have contributed to the promotion of returns from IDP camps and the promotion of their resettlement.

4) Income Generated by Crop Sales in Villages

Income generated by crop sales in villages is calculated by multiplying the volume of crop sales in the whole village and the selling price. The volume of crop sales in the whole village has increased remarkably compared to the time before construction of the bridge. Furthermore, the selling price of all crops in all villages has risen compared to the period before construction of the bridge or a month after completion of the bridge. Accordingly, in Lungulu and Lacic Sub-villages, located on the northern side of Lot 1 and Bidati and Lulyango Centre Sub-villages on the southern side of Lot 1, the income generated by crop sales has rapidly increased along with the rapid increase in the volume of crop sales, especially since the period one month after completion of the bridge. It can be said that these changes have contributed to the increase of the income of IDP returnees and the promotion of their resettlement due to improvement of their lives.

[2] Regarding the average retail price of rice and groundnuts in the area of Lot 1 and 2, the "Average Retail Market Price (UG.Shs) for CPI Commodities" in the Gulu area, which Uganda Bureau of Statistics (UBOS) issues monthly was used.

(2) Lot 2 (Otwee – Wii Anaka)

1) Planted Area per Household in Acres

In Abongo Ludugu and Denga Sub-villages located on the northern side of Lot 2 and Lamin Olango and Olwangi Sub-villages, on the southern side of Lot 2, community interview surveys concerning the planted area per household in acres were carried out before and after construction of the bridge. The changes are shown below. The planted area in the period when agricultural crops are not cultivated was also confirmed.

Table 3-20 Changes in Planted Area per Household in Acres in Villages around Lot 2

Unit: Acre

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 2	Abongo Ludugu	Rice	1.5	―	2.0	―	2.0
		Groundnuts	2.0	―	2.5	4.0	2.0
	Denga	Rice	1.0	―	3.0	3.0	3.5
		Groundnuts	1.0	―	3.0	3.0	3.0
Southern Side of Lot 2	Lamin Olango	Rice	3.0	3.0	3.0	3.0	3.0
		Groundnuts	1.0	1.0	2.0	2.0	―
	Olwangi	Rice	3.0	3.0	3.0	2.0	3.0
		Groundnuts	―	1.5	2.0	2.0	2.0

Source: JICA Study Team

Apart from groundnuts in Ludugu Sub-village at a year and 6 months after completion of the bridge, the planted area per household in acres has expanded in every village. The main reason for this would be that the number of households has increased, the number of people engaged in agriculture has increased by the promotion of IDP returns, and improvement of the access to markets due to the road improvement and construction of the bridge would have a positive impact on the willingness of farmers to cultivate crops, which led to the expansion of the planted area per household.

2) Volume of Crop Sales (Village Total)

In Abongo Ludugu and Denga Sub-villages located on the northern side of Lot 2 and Lamin Olango and Olwangi Sub-villages on the southern side of Lot 2, community interview surveys concerning the volume of crop sales were carried out before and after construction of the bridge. The results of the changes are shown below.

Table 3-21 Changes in the Volume of Crop Sales in Villages around Lot 2

Unit: Bag

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 2	Abongo Ludugu	Rice	60	―	2,700	―	1,500
		Groundnuts	100	―	2,500	2,000	1,000
	Denga	Rice	25	―	400	500	500
		Groundnuts	35	―	1,800	600	620
Southern Side of Lot 2	Lamin Olango	Rice	1,700	2,000	3,800	3,700	3,900
		Groundnuts	700	2,000	3,000	3,200	―
	Olwangi	Rice	450	1,500	4,500	4,200	4,000
		Groundnuts	―	1,100	3,000	2,500	3,000

Source: JICA Study Team

In Abonogo Ludugu and Denga Sub-villages located on the northern side of Lot 2, the sales volume of rice and groundnuts has rapidly increased since the survey one year after the bridge completion compared with the survey before construction of the bridge. Additionally, in Lamin Olango and Olwangi Sub-villages located on the southern side of Lot 2, the sales volume of rice and groundnuts has also increased steadily since the survey one year after the bridge completion. Especially, the sales volume of rice in Olwangi Sub-villages was about 10 times that compared with the sales volume before construction of the bridge.

The main reason for this would be that the number of people engaged in agriculture has increased due to the promotion of IDP return, which has led to the expansion of the planted area per household. Consequently, it seems that this resulted in the increase in the volume of crops produced and sales.

This bridge is used for business purposes, especially for transporting agricultural products and workers to farms. Before construction of the new bridge, there was a bridge made of wooden boards, which was submerged during flooding. It was difficult for general vehicles to cross it because of the peeling of some floorboards. It became possible for general vehicles, large-sized vehicles and machines for farming, such as tractors, to safely cross the bridge. Therefore, it is considered that the transportation access of buyers from Gulu, Kampala, and Torit (South Sudan) coming to purchase agricultural products in the Lot 2 area became easier, which led to the increase in the volume of crop sales.

3) Selling Price per Bag

In Abongo Ludugu and Denga Sub-villages located on the northern side of Lot 2 and Lamin Olango and Olwangi Sub-villages in the southern side of Lot 2, community interview surveys concerning the

selling price per bag were carried out before and after construction of the bridge. The results of the changes are shown below.

Table 3-22 Changes in Selling Price per Bag in Villages around Lot 2

Unit: Ushs/bag

Name of Village		Types of Crops	Before construction (March 2010)	A month after completion (October 2011)	A year after completion (August 2012)	A year & 3 months after completion (December 2012)	A year & 6 months after completion (April 2013)
Northern Side of Lot 2	Abongo Ludugu	Rice	30,000	―	90,000	―	50,000
		Groundnuts	40,000	―	38,000	60,000	60,000
	Denga	Rice	50,00	―	90,000	70,000	80,000
		Groundnuts	48,000	―	45,000	50,000	80,000
Southern Side of Lot 2	Lamin Olango	Rice	50,000	90,000	120,000	90,000	70,000
		Groundnuts	55,000	60,000	60,000	65,000	―
	Olwangi	Rice	50,000	55,000	130,000	70,000	70,000
		Groundnuts	―	50,000	60,000	75,000	75,000

Source: JICA Study Team

Selling price of rice in all villages peaked a year after completion of the bridge, since then it has tended to decrease. Since the average retail price of rice in Gulu area, as indicated in the Consumer Price Index (See Table 3-19), is likely to decrease, it is assumed that the decrease in the selling price of rice around Lot 2 is caused by this expected drop in retail prices. Therefore, it is assumed that rice has not been unfairly bought at a cheap price by the middlemen. The selling price of groundnuts has been stable or increasing with some fluctuation.

Because general vehicles were able to cross the bridge, the access to the markets of Wii Anaka, Anaka, and Gulu was improved after the completion of the bridge. The farmers can sell their crops at a more appropriate price since their business opportunities have increased because of their increased ability to travel to markets. As mentioned before, it is considered that the transportation access of buyers from Gulu, Kampala, and Torit (South Sudan) coming to purchase agricultural products in the Lot 2 area has become easier, which has meant that farmers can sell their crops at more appropriate prices.

4) Income Generated by Crop Sales

Income generated by crop sales in villages is calculated by multiplying the volume of crop sales in the whole village and the selling price. The volume of crop sales in the whole village has increased remarkably compared to the time before construction of the bridge. Furthermore, the selling price of almost all the crops in each village have risen compared to the time before construction of the bridge or a month after completion of the bridge.

Accordingly, in Abongo Ludugu and Denga Sub-villages, located on the northern side of Lot 2 and Lamin Olango and lwangi Sub-villages, on the southern side of Lot 2, the income generated by crop sales has rapidly increased along with the rapid increases in the volume of crop sales, especially since a year after completion of the bridge. It can be said that these changes have contributed to the increase of the income of IDP returnees and the promotion of their resettlement due to improvement of their lives.

Considering the above, the volume of crop sales in villages around Lot 1 and 2 has significantly increased compared to before the construction of the bridge. The income generated by crop sales in villages has rapidly increased with the rapid increase in the volume of crop sales especially since a year after completion of the bridge. It can be said that these changes have contributed to the increase in the income of IDP returnees and the promotion of their resettlement due to improvement of their lives.

3-2-2 Quantitative Impact

(1) Lot 1 (Otwee - Anaka)

1) Agriculture Activation

Community interview surveys concerning the changes and effects on agricultural activation and income improvement brought by the construction of the bridge were conducted in Lungulu Sub-village and Lacic Sub-village, located on the northern side of Lot 1 and Bidati Sub-village and Lulyango Centre Sub-village, located on the southern side of Lot 1. The qualitative effects are as follows:

- Access to areas around the bridge for business persons who come from Amuru and Pabbo was improved.
- While before construction of the bridge all vehicles were forced to follow a detour more than 40 km long for more than one hour to get to the opposite bank owing to the impassability of the old bridge for vehicles. After construction of the new bridge it became possible to transport agricultural products more rapidly and the transportation costs have been reduced, as the bridge became passable for vehicles.
- The markets for agricultural products have enlarged and the business environment has improved because villagers can easily go to the markets of Packwach and Nebbi via Anaka.
- Because villagers were able to access new markets in which they sell their products, the volume of crop sales has increased.
- The increase in the volume of agricultural productions led to the improvement of agricultural productivity.

- Because traffic volume along the road increased, the number of businesses dealing with agricultural products along the road has increased.
- The construction of the bridge creates income for villagers. In particular, this contributes to the income improvement of people living along the road.
- The motivation for "making effort in their work" of villagers was improved because traffic was improved.

Hence, it can be said that sales markets for agricultural products have expanded because of access improvement, which caused the increase in the volume of crop sales. Furthermore, it was confirmed that the number of businesses dealing with agricultural products along the road has increased, because traffic volume along the road increased. It is considered that these effects led to improvement not only of the villagers' income but also their motivation for "making effort in their work."

2) Contribution to the Regional Society

Community interview surveys concerning the changes and effects on the regional society brought by the construction of the bridge were also conducted in the villages around the bridge of Lot 1. The qualitative effects are as follows:

- The social relationship of villagers between the northern side of the bridge and the southern side of the bridge has been improved. In particular, communication and interchange between the villagers who used to be divided by the river has been promoted.
- The standard of living has improved since the transportation of daily necessities has become easier.
- The education level was raised, as students could go to school more easily.

(2) Lot 2 (Otwee – Wii Anaka)

1) Agriculture Activation

Community interview surveys concerning the changes and effects on agricultural activation and the improvement of income brought by the construction of the bridge were conducted in Abongo Luduka Sub-village, located on the northern side of Lot 2 and Lamin Olango and Ayero Olwangi Sub-villages, located on the southern side of Lot 2. The qualitative effects are as follows:

- Time efficiency rose because the transportation of agricultural products to markets became easier.
- Transportation costs for agricultural products were reduced.
- The markets to sell agricultural products have expanded, since access from areas other than the periphery of the bridge to villages around the bridge became easier.

- New markets for agricultural products were found. For example, business with the buyers who come from Kampala to villages around the bridge to purchase charcoal was started.
- The employment opportunities of peripheral inhabitants were created due to the establishment of farms.
- The income for farmers was improved.

2) Contribution to the Regional Society

Community interview surveys concerning the changes and effects on the regional society brought by the construction of the bridge were also conducted in the villages around the bridge of Lot 2. The qualitative effects are as follows:

- Social relationships among neighbouring villagers have improved and communication and interchange among them has been promoted.
- Aid from Non-Governmental Organizations (NGO) can arrive at villages more easily.

(3) Interview with Farm Owners near the Bridge of Lot 2

Because commercial farms are dotted on the northern side of the bridge of Lot 2, interview surveys with farm owners concerning the realized and expected changes and effects brought by the construction of the bridge were conducted. The qualitative effects are as follows:

1) Northern Uganda Agricultural Center[3] (NUAC)

a) Agriculture Activation

- The construction of the bridge has greatly revitalized agricultural activities so that small- and medium-scale farmers can easily access services such as tractors and combine harvesters for hire from NUAC.
- Farm owners are now able to transport workers to their farms across the bridge.
- As a result, many farmers, including small-scale farmers, have started farming and are steadily increasing their operation scale.
- As other changes, the farmers of Lot 2 have also offered to support the funding for the construction of a police post along Lot 2.

[3] NUAC is a private company which wrestles with agriculture productions and provides agriculture service and provides and sells agriculture machine in the northern region of Uganda.

b) Manner of Utilization of the Bridge in the Future

- In the near future, NUAC is entering into partnership with AFGRISERB, a large South African based corporation dealing in grain purchase, to provide farm equipment and technical services to local people (land owners) on the condition that all their grains (crops) are sold to NUAC and AFGRISERB.
- This NUAC/AFGRISEB project intends to use 75,000 hectares of otherwise fallow land stretching from Lot 2 bridges to the north and generate income for the landowners as well as improving their standard of living. Without the bridge of Lot 2, the plan for this project could not have come into existence. Therefore, the bridge will play a vital role for the success of the project.
- Another future use of the Lot 2 bridge will be by the Madvani Sugar Corporation, which is planning to begin the construction and operation of a sugar factory on the northern side of Lot 2. The sugar corporation is supposed to offer employment opportunities to locals. The bridge will, therefore, play an essential role for the shipment and transportation of the sugar from the sugar factory.
- The farming community is in a good mood because the government has promised to connect power (electricity) to the area.

Due to the access improvement, farmers can easily come to rent agriculture machines from NUAC, while NUAC can easily carry employees to the farms, which leads to the activation of agriculture activities, such as expansion of production for farmers. Because the farmers of Lot 2 have partly offered to support the funding for the construction of a police post along Lot 2, it is considered that villagers around the Lot 2 area will settle down in the future regardless of any problems with peace and order. Hence, the resettlement of villagers around Lot 2 area has been promoted.

Thanks to construction of the bridge of Lot 2, the plans for the projects for the large-scale crop production farm and the sugar factory have been pushed forward in the peripheral area so that the activation of agricultural business in the area of Lot 2 is expected in the future. Therefore, it is expected that the agricultural industry and community/regional development around Lot 2 are being promoted better than before. In this situation, the bridge plays an essential role for the transportation of crops and sugar. Without the bridge of Lot 2, the plan for the regional industrial development would not come into existence.

However, the road is still narrow and the maintenance situation on it has not improved so that it is necessary to implement the road improvement of the section, since the traffic volume of vehicles, including heavy trucks, has not increased very much. If the road improvement of the section is implemented, it will be possible for heavy trucks to travel easily. It is expected that the activation of regional industry will be further promoted due to the improvement of distribution access in the area.

2) Farm Owner in Nyamokina Village

a) Agriculture Activation

- To transport many workers from Pakwach and Pokwero has become easier, especially during harvest season.
- Drivers can save transportation time and it is possible to efficiently devote themselves to the work so that productivity has increased.

b) Contribution to the Regional Society

- Before the construction of the bridge, 6 people were employed permanently and about 20 employed temporarily. On the other hand, the farm presently employs 22 permanent workers who earn consistent income and 80 or more seasonal workers from Pakwach and Pokwero between September and December during harvest season, thereby providing income that they use to meet their daily needs.

Considering the above, it is confirmed that the movement of employees to the farm has become easier and productivity is improved by saving of the transportation time of persons and products. It can be said that the farm contributes to the provision of employment opportunities and improvement of the living of villagers around Lot 2, since the number of workers has largely increased at the farm. Therefore, the farm could promote the resettlement of villagers around Lot 2.

(4) Interview with Cotton Stockist

Other than the interviews with villagers and farm owners around the bridge during the last monitoring survey, interview surveys concerning the changes and effects on agricultural activation and improvement of farmers lives brought by the construction of the bridge were conducted with GADC. The results of the interview survey are as follows: In Nwoya District, the cotton farms dealing with GADC are located on the northern side of Lots 1 and 2. Eighty per cent of all the cotton products GADC deal with come from these cotton farm areas.

- The volume of cotton purchased has increased due to the easier access to Lots 1 and 2.
- It is possible for farmers to ensure a stable market for sales, since GADC has bought cotton from farmers directly.
- Farmers are able to sell raw cotton at an appropriate price because GADC is buying it directly, whereas they used to have no choice but to sell it to middlemen at a low price.
- Cotton produced at the GADC-operated cotton factory has been exported to America, Europe, and Japan. Cotton exported to Japan is organic cotton and GADC has purchased organic raw cotton at a high price from farmers cultivating it, which has contributed to the income improvement and the motivation improvement of farmers.

Due to the access improvements, the volume of raw cotton purchased by GADC has increased. On the other hand, it is possible for farmers to ensure a stable market for sales and they are able to sell at an appropriate price. Therefore, a win-win relationship was built for both GADC and farmers. In addition, it is considered that farmers cultivating organic raw cotton can sell it at a high price, which has contributed to the income improvement and the motivation improvement of farmers.

To sum up, with regard to the qualitative impacts brought by the construction of the bridge and road improvements of Lot 1, sales markets for agricultural products have expanded because of the access improvement, and this caused an increase in the volume of crop sales. Furthermore, it was confirmed that the number of businesses dealing with agricultural products along the road has increased, because traffic volume along the road has increased. It is considered that these effects will lead to improvement not only of villagers' income but also of motivation. As for the impact on regional society, the social relationships of villagers between the northern side of the bridge and the southern side of the bridge have improved.

With regard to the qualitative impacts brought by the construction of the bridge and road improvements of Lot 2, according to NUAC wrestling agricultural products, farmers can easily come to NUAC to rent agriculture machines due to the access improvement, while NUAC can easily carry employees to the farms, which has led to the activation of agriculture activities such as expansion of production for farmers.

Furthermore, the plans for the large-scale crop production farm and the sugar factory, as well as the plan for power supply have been pushed forward in the peripheral area so that the activation of agricultural business in the area of Lot 2 is expected in the future. Therefore, it is expected that the agricultural industry and community/regional development around Lot 2 are now promoted better than before. In this situation, the bridge plays an essential role for the transportation of crops and sugar. Without the bridge of Lot 2, the plan for the regional industrial development could not have come into existence.

3-2-3 Negative Impacts

(1) Lot 1 (Otwee - Anaka)

Community interview surveys concerning the negative impacts brought by the construction of the bridge were conducted in Lungulu Sub-village and Lacic Sub-village, located on the northern side of Lot 1, and Bidati Sub-village and Lulyango Centre Sub-village, located on the southern side of Lot 1. The results of the survey on negative impacts are as follows:

- The number of thefts has increased because people from distant places can easily approach villages due to the increase in movement of people.

- There is a shortage of foods, since new markets were opened for farmers and they are more likely to sell all the agricultural products in their possession in distant markets.

(2) Lot 2 (Otwee – Wii Anaka)

Community interview surveys concerning the negative impacts brought by the construction of the bridge were conducted in Abongo Luduka Sub-village, located on the northern side of Lot 2, and Lamin Olango and Ayero Olwangi Sub-villages, located on the southern side of Lot 2. The results of the survey on negative impacts are as follows:

- The forest destruction and environmental disruption have advanced, because business with buyers coming to purchase charcoal from Kampala has thrived due to the access improvement.
- Thefts may have come to villages due to the construction of the bridge.
- Because the bridge was built and the traffic volume increased, the road situation can easily deteriorate.

The number of thefts have increased, because the movement of people has increased was the common negative impact at Lots 1 and 2. Measures against the deterioration of peace and order of Lot 2 have been taken, because the farmers of Lot 2 have offered to partly support the funding for the construction of a police post along lot 2. It is considered that villagers around Lot 2 area will settle down in the future regardless of any problems in the peace and order. It is considered that the resettlement of villagers around the Lot 2 area has further been promoted, given that the peace and order in the area will be improved by the construction of the police post.

Although there were some drawbacks or negative impacts, the construction of the bridges and road improvements solved many traffic problems in the area, which led to the improvement of access to markets, increase in the volume of crop sales, the creation of employment opportunities for inhabitants, improvement of their income, and the promotion of agricultural industry. In addition, the social relationships between the neighbouring villagers around the bridges have been improved and communication and interchange among them have been promoted.

Consequently, it can be said that the pilot project has contributed to the appearance of impacts, such as the activation of agriculture, the promotion of resettlement of IDP returnees, and the promotion of regional development.

3-3 Sustainability

This section will examine whether effects brought by the pilot project will last after the end of the project. However, to confirm the sustainability of effects to facilitate the resettlement of the IDPs returnees, it is necessary to consider not only the construction of the bridges and road improvement, which are part of the necessary conditions to promote the resettlement of returnees, but also other

necessary conditions such as the opening of hospitals/health centres and schools and the construction of new wells in the surrounding area. It is difficult to comprehensively confirm the sustainability of effects to facilitate their resettlement.

3-3-1 Sustainability of Promotion of IDP Resettlement

It is confirmed that the project, the road improvements and the construction of the bridges at Lots 1 and 2, have had a substantial effect on the promotion of IDP resettlement. This effect would continue as long as the roads and bridges are adequately utilized.

On the other hand, it could be possible that the function and effect of the project could be lost in approximately 10 years, unless the maintenance for the roads and bridges is properly conducted. In order to ensure further sustainability, it is necessary to carry out the maintenance of the roads and bridges in the future. Therefore, the sustainability of the maintenance for the roads and bridges of the project will be examined in the sections below.

3-3-2 System of Operation and Maintenance

Planning for road development in Uganda is under the jurisdiction of the Ministry of Works and Transport (MoWT). Maintenance of national roads is under the jurisdiction of the Uganda National Road Authority (UNRA). That of district roads is under the jurisdiction of the district local governments. The development and maintenance of urban roads is under the jurisdiction of urban councils while community access roads are under that of the sub-counties.

As the roads and bridges of Lots 1 and 2 are district roads, Nwoya district is in charge of the operation and maintenance of them. In Nwoya District there are only 2 personnel, the district engineer and a road inspector that are involved in the operation and maintenance. According to an interview with the district engineer, there are problems of understaffing and they need a senior engineer for operations and maintenance. In addition, about 10 staff members for Lots 1 and 2 are required to carry out the operation and maintenance.

The maintenance of roads is classified according to 3 categories; namely, routine maintenance, periodic maintenance, and rehabilitation. Routine maintenance is an activity that consists of the clearing and de-silting of culverts, open and lined channels, and culvert outfalls throughout the year. These operations mainly require small-scale, low skill technology. Therefore, for routine maintenance, the use of Labour Based Technology (LBT) is suitable at least once a year. Periodic Maintenance is an activity carried out after a few years. The work items of periodic maintenance include reshaping, re-graveling and replacement and repair of broken culverts.

3-3-3 Technical Level of Maintenance

The technical level required for maintenance of the project has been met. According to the interview with the engineer of Nwoya district, the engineers have received the required education for

maintenance and participated in the training for the Uganda Road Transport Rehabilitation Program. Therefore, there is no problem concerning the technical level of maintenance for them.

3-3-4 Finance of Maintenance

Nwoya district, where the bridges were installed, bears the maintenance costs for the bridges of Lots 1 and 2. According to the interview with the engineer of Nwoya district, the budget for roads in the district in the last financial year was 321 million Ugandan shillings. 229 million Ugandan shillings out of the above figure were allocated to district roads. Nonetheless, it is considerably difficult to implement the maintenance of the roads because of the insufficient and limited budget of 229 million Ugandan shillings. It is necessary for Lot 1 to obtain a budget of 22 million Ugandan shillings for routine maintenance and the budget of 256 million Ugandan shillings for periodic maintenance. Also, it is necessary for Lot 2 to obtain the budget of 36 million Ugandan shillings for routine maintenance and the budget of 416 million Ugandan shillings for periodic maintenance. In this respect, sufficient budget for future maintenance has not been ensured and the current budget is inadequate.

3-3-5 Condition of Operation and Maintenance

There is anxiety about the future deterioration of road conditions if they are not maintained due to the fact that mowing and cleaning may not be carried out regularly, although in the section of the pilot project, not much time has passed since the completion, so the condition of roads and bridges is still fair, overall.

Because an adequate budget for roads is not ensured, the dispatch to the sites of road inspectors conducting road checks/monitoring has not been done appropriately because of the lack of qualified personnel, so that no system to monitor the maintenance situation has been prepared. Nwoya district has responded to the road maintenance situation by prioritizing which roads require maintenance urgently since the maintenance of all roads cannot be implemented at the same time due to the limited budget.

To sum up, the problem is partly in the lack of staff and partly in the lack of budget for road maintenance in the pilot project so that it is considered that the sustainability of the effects produced by the pilot project is not high. In order to continue the sustainability in the future, it is hoped that daily routine maintenance, which does not need a large budget, and in which LBT requiring low skill technology can carry out mowing or cleaning, is regularly conducted and a system for maintenance prepared.

3-4 Conclusions of the Monitoring and Evaluation

3-4-1 Conclusions

It can be said that the effectiveness of the project is high, because the construction of bridges and road improvements ensured safe and smooth traffic and led to the reduction of access time to destinations,

although there is some anxiety about road maintenance because of the insufficient number of staff and budget for road maintenance. It can be said that the pilot project has contributed to the production of impacts such as the activation of agriculture, the promotion of communication and interchange between neighbouring villagers, improvement of their income, the promotion of resettlement of IDP returnees, and the promotion of regional development such as the agricultural industry.

3-4-2 Recommendations

The construction of the bridge of Lot 2 has solved many traffic problems. In the southern section of the Aswa River, there are no longer any muddy areas because gravel was laid on the road surface as a "maintenance section" to ensure the passage. However, the road is still narrow and the maintenance situation on it was not improved so that it was necessary to implement the road improvements for the section.

On the other hand, the plans for the projects for the large-scale crop production farm and the sugar factory have been pushed forward in the peripheral area so that the activation of agricultural business in the area of Lot 2 is expected in the future. Therefore, it is expected that the agricultural industry and community/regional development around Lot 2 will be promoted more than before.

Provided that the road improvements along the southern section of the Aswa River are implemented, it will become easier for heavy trucks to travel and the distribution access around the area will be improved, which would lead to the promotion of further activation of regional industry. Hence, it is hoped that road improvements along the southern section of the Aswa River will be implemented.

The problem is partly in the lack of staff for road maintenance and partly in the lack of budget for maintenance in the pilot project. Whereas it is necessary to improve this situation, it is difficult to rapidly increase the number of staff or the budget in reality. In order to continue the sustainability in the future, it would be effective to have daily routine maintenance, which does not need a large amount of budget and in which LBT requiring low skill technology can carry out mowing or cleaning, regularly conducted and a system for maintenance prepared. It is recommended that the following items be implemented as regular routine maintenance measures.

- Check the handrail condition for bolt slack and rust
- Check the slab deck drainage system for things such as blockage
- Check the shoe condition
- Check the expansion joint condition
- Check the embankment slope condition
- Check the stone pitching slope condition around abutments
- Check the gabion net condition for damage
- Check the stone masonry side ditch condition for damage
- Check the earth drainage condition for blockage
- Check the road surface condition for pot holes
- Check the cut slope condition for erosion

As for the daily routine maintenance, it is also recommended that discussions be carried out with Amuru District about the maintenance plan and the timing, because simultaneous maintenance conducted by Nwoya and Amuru Districts together would be much more effective and efficient.

The maintenance budget for district road level is distributed to each district through the Uganda Road Fund from the central government, but it is not adequate.

The Pilot Project has not been maintained by the district office to date because only one and a half years have passed since construction completion and the condition is still good.

The total length of district roads in Nwoya was 170.1km and in Amuru was 97.3km in 2012.

There are only two engineers in the Nwoya District Office, and there are no personnel to supervise the road maintenance and repair. It is not only a budget problem, it also is a human resources problem. Therefore, the following improvement plan will be suggested for road maintenance management of the whole district including this pilot project in the future.

Short-term actions

- Training for LBT implementation
- Improvement of the ability of the personnel to plan and design roads and incidental facilities
- Preparation of maintenance manuals such as for construction supervision, construction planning/design, and machine maintenance

Medium-term actions

- To carry out effective road maintenance with a limited budget, it is necessary to create a high precision road inventory using RAMPS (Rehabilitation and Maintenance Planning System with GPS and GIS and provide the related education.

Long-term actions

- To avoid the depletion or loss of intellectual and technical personnel to private companies, it is necessary to correct the salary problem regarding the difference between public employees and private employment.

VOLUME 2: DEFECT INSPECTION REPORT

VOLUME 2: DEFECT INSPECTION REPORT

Table of Contents

2-2 Lot-2

2-1　Lot-1

1. Outline of Project

(1) Project Name

- PILOT PROJECT FOR DEVELOPMENT STUDY ON RURAL ROAD NETWORK PLANNING IN AMURU DISTRICT IN NORTHERN UGANDA (Lot-1)

(2) Engineering Estimate

- Engineering Estimate Ushs.6,163,672,174-

(3) Contractor

- Contractor Name Spencon Services Limited
- Address P.O.Box 926, Kampala, UGANDA
- Contact Number +245-41-4560100
- Contract Date 1st March, 2010
- Contract Amount Ushs.5,880,097,578-

(4) Client

- Japan International Cooperation Agency (JICA), Uganda Office

2. Outline of Facilities

(1) Outline of Facilities

- Structure Work
  - Bridge Work

    L=35m (3 Spans Simple RC-I beam: 10m + 15m + 10m)

    W＝6.0m
  - Box Culvert (3 numbers)

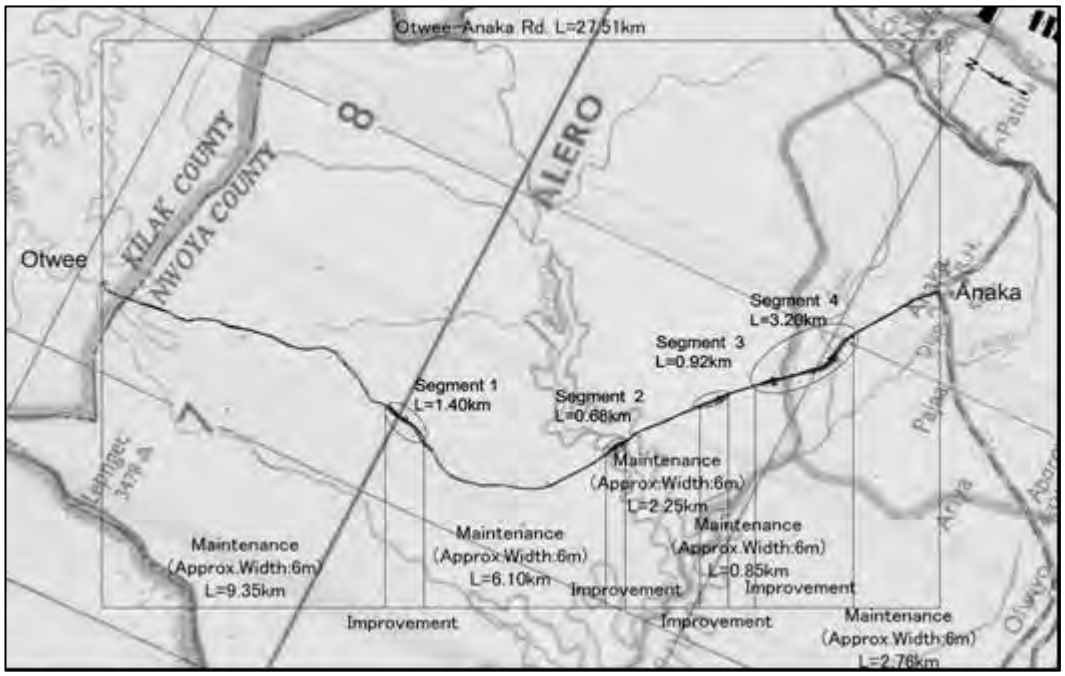
    H x B x L＝1.5mx x 4,0mx x 2 segment x 18.05m

    H x B x L＝1.5m x4,0m x 2 segment x 13.82m

    H x B x L＝1.2m x 2.5m x 29.64m
- Road Work
  - Improvement by laying gravel: 6.2km
  - Maintenance: 21.31km of the gravel road

(2) Project Site

- Nwoya District (former Amuru District) (Anaka~Otwee Road)



3. Implementation Process

(1) Study Period

- August, 2009~November, 2009

(2) Tendering and Contract Stage

1) Tender

①	Public announcement	26th November, 2009
②	Tender document distribution	30th November, 2009
③	Site pre-bid meeting	09th December, 2009
④	Closing date of inquiry	23rd December, 2009
⑤	Tender date	13th January, 2010
⑥	Bidder	Eastern Builder & Engineers Limited Mulowooza & Brothers Limited Omega Construction Limited Spencon Services Limited
⑦	Successful bidder	Spencon Services Limited

2) Contract date 01st March, 2010

(3) Construction and Procurement Stage

①	Date of commencement of work	15th March, 2010
②	Date of completion	23rd August, 2011
③	Date of completion ceremony	30th September, 2011

(4) Material Procurement

Most of the materials were procured from outside of Amuru District. The procurement of the main materials is as follows:

■ Cement	Procured most from Kenya
■ Aggregate	Procured from existing plant in Kampala, because there is no plant in Amuru District
■ Sand	At the beginning procured from Kampala but afterwards, procured from Packwach which is located south of the site
■ Malamu (Gravel)	Procured from roadside close to the site
■ Reinforcement bar	Procured all from South Africa
■ Asphalt	Procured all from Kenya

4. List of Engineers

(1) Consultant

- Oriental Consultants Co., Ltd., Eight-Japan Engineering Inc., International Development Center of Japan

  ・Mr. MINAMI Teruaki ・・・・Eight-Japan Engineering Inc.
  ・Mr. KURAISHI Isato ・・・・Eight-Japan Engineering Inc.
  ・Mr. HASHIMOTO Fumio ・・・・Eight-Japan Engineering Inc.
  ・Mr. OGAWA Motoki ・・・・Eight-Japan Engineering Inc.
  ・Mr. OKITA Hitoshi ・・・・Oriental Consultants Co., Ltd.

(2) Contractor

- Spencon Services Limited

  ・B.B. MORE

5. Present Condition

(1) Present Condition of the Facility

- Good.

(2) Maintenance System of the Executing Agency Uganda Side

- According to the result of the interview with the Nwoya District Engineer, the budget and the required staff for the maintenance of this project are allocated.

(3) Situation of the Facilities

- The results of traffic volume by monitoring survey conducted on 5th September, 2012 are shown below:

Vehicle Type	North Direction (to Otwee)	South Direction (to Anaka)
Car	3 cars	7 cars
Motorbike	82 cars	95 cars
Bicycle	39 cars	51 cars
Walking	24 persons	56 personas
Total	148	209

(4) Uganda Side Burden Matter

- Implemented

6. Defect Inspection

(1) Inspection Date

- 30th August, 2012

(2) Inspector

- Nwoya District Office Ms. A'jok Pamela Pamey

(3) Observers

- JICA Gulu Office Mr. NAKAMURA Yoshiharu
- Spencon Services Limited Mr. B. B. More
- Oriental Consultants Co., Ltd. Mr. OKITA Hitoshi
  Mr. Richard

(4) List of Inspected Items

- Bridge and accessories
- Box Culvert

(5) Result of Inspection

Defect inspection result is as follows:

- No defect found in bridge or box culvert.
- Repaired stone pitching slope protection around abutments at both sides by mortar filling due to crack occurrence.
- Repaired stone pitched side ditch due to cave-in by wash out of back filling material.
- Re-filled settled area where the river diversion was implemented during construction.

(6) Instructions on Repairing Technology

Instructions to Nwoya District to continually maintain facilities in a good condition are as follows:

- To avoid the backfill wash out of stone pitching slope protection around abutments, the rainwater should not be allowed to flow under the stone pitch protection.
- To avoid collapse of the stone pitching side ditch due to the outflow of backfill material under the ditch, frequent patrols are recommended.
- To avoid collapse of the shoulder, cut slope, embankment slope and etc. by overflow of the side ditch due to sedimentation of garbage, earth and sand, routine maintenance is very strongly recommended.
- To avoid the outflow of rainwater to outside of the bridge due to blockage of the bridge drainage pipe located along the bridge curb-stone stack, routine cleaning is very important.

- To maintain road safety, mowing at certain intervals is very important (road width becomes narrow due to grass growing up and worsening visibility).
- To avoid the slope collapse, instruct farmers not to graze animals on the road slope.
- To increase the value of land along the project road, certain maintenance should be implemented.

(7) Recommendations

Recommendations to maintain the project road including bridge and culverts in good condition were submitted to Nwoya District as shown in Appendix-5.

Appendix-1 Photographs for the Inspection Items

Inspection	Study Stage Time	Completion Time	Defect Time (1 year after completion)
Bridge			
Box Culvert -1			

		
		
		
Box Culvert -2	Box Culvert -3	Improvement of Gravel Road -1

		
		
		
Improvement of Gravel Road -2	Improvement of Gravel Road -3	Improvement of Gravel Road -4

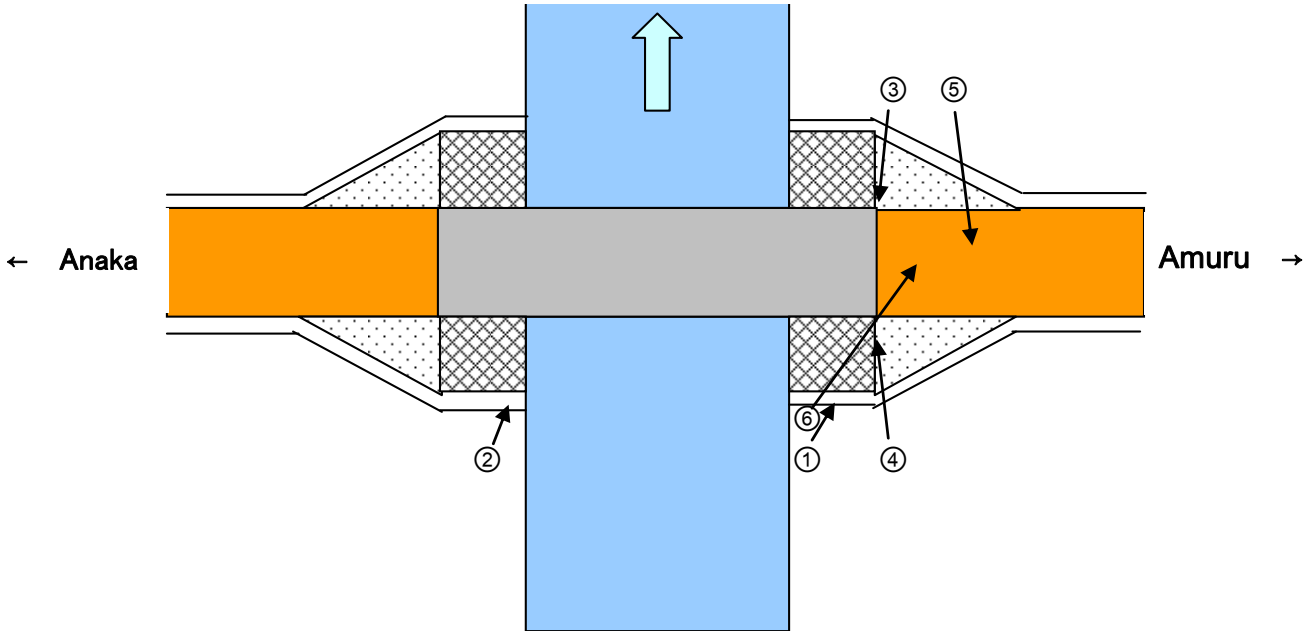
		
		
		
Maintenance of Gravel Road -1	Maintenance of Gravel Road -2	Installation of Pipe Culvert

Appendix-2 Photographs of the Repaired Items

Photo No.	Before Repairing	After Repairing
	STONE PITCHED DRAIN	
①		
②		
	A1 SIDE - Stone pitching defect	
③		

Photo No.	Before Repairing	After Repairing
	A1 SIDE	
④		
	APPROACH ROAD (Amuru Side)	
⑤		
⑥		

【Photograph position】



2-2 Lot-2

1. Outline of Project

(1) Project Name

- PILOT PROJECT FOR DEVELOPMENT STUDY ON RURAL ROAD NETWORK PLANNING IN AMURU DISTRICT IN NORTHERN UGANDA (Lot-2)

(2) Engineering Estimate

- Engineering Estimate Ushs.3,089,912,320-

(3) Contractor

- Contractor Name Spencon Services Limited
- Address P.O.Box 926, Kampala, UGANDA
- Contact Number +245-41-4560100
- Contract Date 26th March, 2010
- Contract Amount Ushs.2,633,321,486-

(4) Client

- Japan International Cooperation Agency (JICA), Uganda Office

2. Outline of Facilities

(1) Outline of Facilities

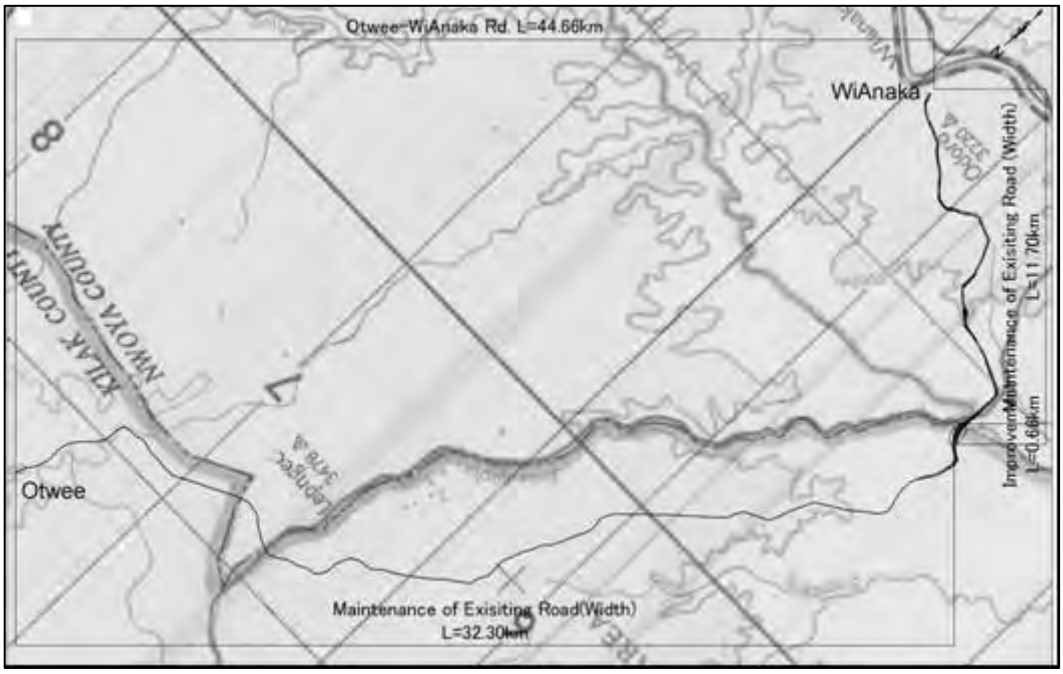
- Structure Work
  - Bridge Work

    L=45m (4 Spans Simple RC-I beam: 10m + 10m + 15m + 10m)

    W＝6.0m
- Road Work
  - Improvement by laying gravel: 0.66km
  - Maintenance: 44.0km of the gravel road

(2) Project Site

- Nwoya District (former Amuru District) (Wii Anaka~Otwee Road)



3. Implementation Process

(1) Study Period

- August, 2009~November, 2009

(2) Tendering and Contract Stage

1) Tender

①	Public announcement	26th November, 2009
②	Tender document distribution	30th November, 2009
③	Site pre-bid meeting	09th December, 2009
④	Closing date of inquiry	23rd December, 2009
⑤	Tender date	13th January, 2010
⑥	Bidder	Eastern Builder & Engineers Limited Mulowooza & Brothers Limited Nile Perch General Agency Limited Spencon Services Limited Top Care Consultants & Engineering Works Limited
⑦	Lowest price bidder	Spencon Services Limited. But, according to the conditions of tender, 2 lots cannot be acceptable from one company.
⑧	Tender condition change	Enable both orders for Lot 1 and Lot 2
⑨	Re-tender date	10th March, 2012
⑩	Re-bidder	Eastern Builder & Engineers Limited Spencon Services Limited
⑪	Successful bidder	Spencon Services Limited

2) Contract date 01st March, 2010

(3) Construction and Procurement Stage

①	Date of commencement of work	19th April, 2010
②	Date of completion	19rd August, 2011
③	Date of completion ceremony	30th September, 2011

(4) Material Procurement

Most of the materials were procured from outside of Amuru District. The procurement of main materials is as follows:

■ Cement	Procured most from Kenya.
■ Aggregate	Procured from existing plant in Kampala, because there is no plant in Amuru District.
■ Sand	At the beginning procured from Kampala but afterwards, procured from Packwach which is located south of the site.

- Malamu (Gravel) Procured from roadside close to the site
- Reinforcement bar Procured all from South Africa
- Asphalt Procured all from Kenya

4. List of Engineers

(1) Consultant

- Oriental Consultants Co., Ltd., Eight-Japan Engineering Inc., International Development Center of Japan

  - Mr. MINAMI Teruaki ····Eight-Japan Engineering Inc.
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  - Mr. HASHIMOTO Fumio ····Eight-Japan Engineering Inc.
  - Mr. OGAWA Motoki ····Eight-Japan Engineering Inc.
  - Mr. OKITA Hitoshi ····Oriental Consultants Co., Ltd.

(2) Contractor

- Spencon Services Limited

  - B.B. MORE

5. Present Condition

(1) Present Condition of Facility

- Good.

(2) Maintenance System of the Executing Agency Uganda Side.

- According to the result of the interview with the Nwoya District Engineer, the budget and the required staff for the maintenance of this project are reserved.

(3) Situation of the Facilities

- The results of traffic volume by a monitoring survey conducted 30th August, 2012 are shown below:

Vehicle Type	North Direction (to Otwee)	South Direction (to Wii Anaka)
Car	3 cars	7 cars
Motorbike	82 cars	95 cars
Bicycle	39 cars	51 cars
Walking	24 persons	56 personas
Total	148	209

(4) Uganda Side Burden Matter

- Implemented.

6. Defect Inspection

(1) Inspection Date

- 30th August, 2012

(2) Inspector

- Nwoya District Office Ms. A,jok Pamela Pamey

(3) Observers

- JICA Gulu Office Mr. NAKAMURA Yoshiharu
- Spencon Services Limited Mr. B. B. More
- Oriental Consultants Co., Ltd. Mr. OKITA Hitoshi
  Mr. Richard

(4) List of Inspected Items

- Bridge and accessories.

(5) Result of Inspection

Defect inspection result is as follows:

- No defect found in bridge.
- Repaired stone pitching slope protection around abutments on both sides by mortar filling due to crack occurrence.
- Repaired stone pitched side ditch due to cave-in by wash out of back filling material.
- Re-filled settled area located on both sides of bridge.

(6) Instructions on Repairing Technology

Instructions to Nwoya District to continually maintain the facilities in a good condition are as follows:

- To avoid the backfill wash out of the stone pitching slope protection around abutments on both sides, the rainwater should not be allowed to flow under the stone pitch protection.
- To avoid collapse of the stone pitching side ditch due to the outflow of backfill material under the ditch, frequent patrols are recommended.
- To avoid collapse of the shoulder, cut slope, embankment slope etc. by overflow of the side ditch due to sedimentation of garbage, earth and sand, routine maintenance is strongly recommended.
- To avoid the outflow of rainwater to outside of the bridge due to blockage of the bridge drainage pipe located along the bridge curb-stone stack, routine cleaning is very important.

- To maintain road safety, mowing at certain intervals is very important (road width becomes narrow due to grass grassing growing up and worsening the visibility.
- To avoid slope collapse, instruct the farmers not to graze animals on the road slope.
- To increase the value of the land along project road, certain maintenance should be implemented.

(7) Recommendations

Recommendations to maintain the project road, including bridge and culverts, in good condition were submitted to Nwoya District as shown in Appendix-5.

Appendix-3 Photographs for the Inspection Items

Inspection	Study Stage Time	Completion Time	Defect Time (1 year after completion)
Bridge			
improvement of Gravel Road			

		
		
Maintenance of Gravel Road		

Appendix-4 Photographs of the Repaired Items

Photo No.	Before Repairing	After Repairing
	A1 SIDE - Stone pitching defect	
①		
②		
③		

Photo No.	Before Repairing	After Repairing
	A1 SIDE – Stone pitching defect	
④		
	APPROACH ROAD – Defective Approach Road 10cm deflection – Fill with murrum	
⑤		
	(Amuru side)	
⑥		
	(Wii-anaka side)	

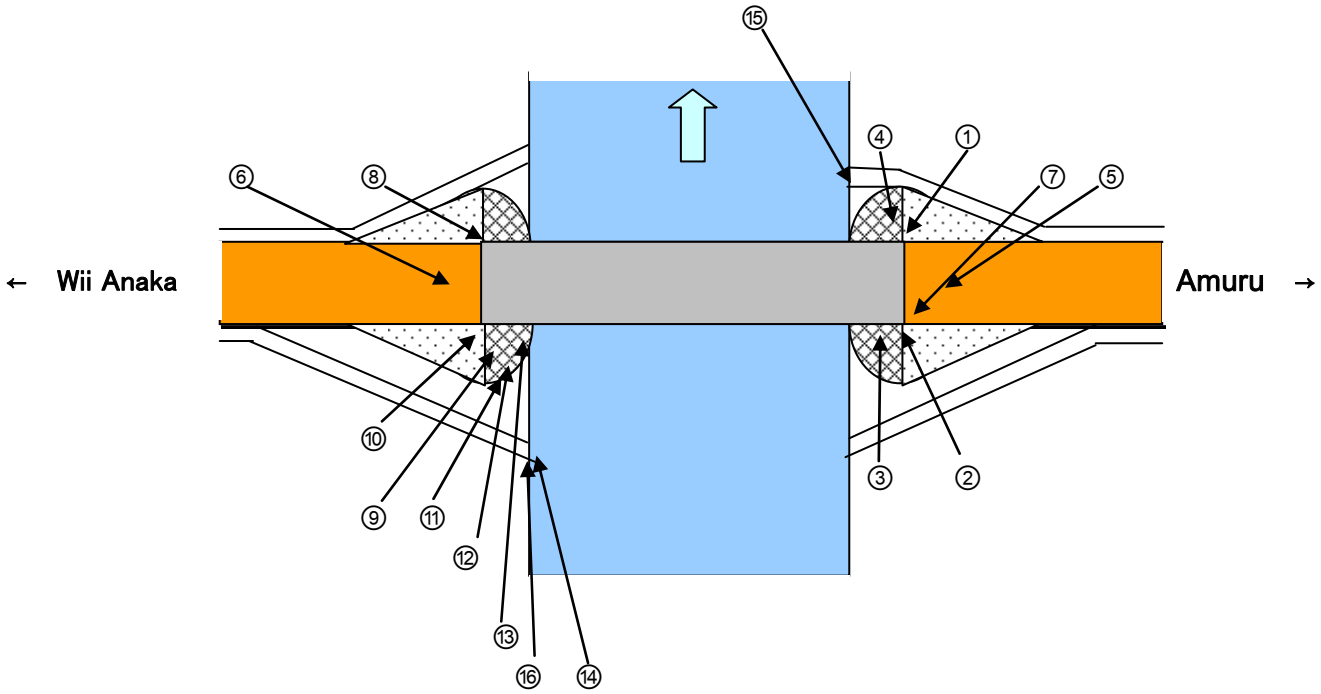
Photo No.	Before Repairing	After Repairing
	APPROACH ROAD - Defective Approach Road 10cm deflection - Fill with murrum	
⑦		
	A2 SIDE - Stone pitching defect	
⑧		
⑨		

Photo No.	Before Repairing	After Repairing
	A2 SIDE - Stone pitching defect	
⑩		
⑪		
⑫		

Photo No.	Before Repairing	After Repairing
	A2 Side - Stone pitching defect	
⑬		
	STONE PITCHED DRAIN	
⑭		
	(Wii-anaka side)	
⑮		
	(Amuru side)	

Photo No.	Before Repairing	After Repairing
	STONE PITCHED DRAIN	
		
	(Wii-anaka side)	

【Photograph position】



Appendix-5 Recommendation Letter to Nwoya District

JICA STUDY TEAM
PROJECT FOR RURAL ROAD NETWORK PLANNING IN NORTHERN UGANDA
The Consortium of Oriental Consultants, EJEC and IDCJ
4th Floor of Standard Chartered Bank Building, Plot 3 Andrea Olal Road, Gulu
TEL: 047-143-2206

5th September 2012

Attention: District Engineer
Nwoya District, Acholi Region
Republic of UGANDA

Dear Sir,

Subject: MAINTENANCE PILOT PROJECT (Lot 1 & Lot 2) FOR DEVELOPMENT STUDY ON RURAL ROAD NETWORK PLANNING IN AMURU DISTRICT IN NORTHERN UGANDA

According to the Defects Liability Certificate signed on 30th August 2012 between Japan International Cooperation Agency (hereinafter referred to as "JICA") and Spencon Services Limited (hereinafter referred to as "Contractor") regarding the above captioned project, the Contractor has been completed to everyone's satisfaction the maintenance for the maturity of the guarantee period. Therefore, I would like to request that your office discuss some aspects of the routine maintenance for the said structure that would include:

- Guardrail
- Shoe
- Filling
- Gabion
- Earth ditch
- Cut/Embankment slope
- Drainage for deck slab
- Expansion Joint
- Riprap Slope
- Stone masonry .side ditch
- Road surface

In addition, I would like to recommend that discussions be carried out with Amur District for maintenance plan and time, because same time maintenance conduct Nwoya and Amur Districts together is much better.

Your attention to the above would be highly appreciated.

Sincerely yours,

沖田 泰

Resident Engineer
Joint Venture of Oriental Consultants Co., Ltd.
and Eight-Japan Engineering Consultants Inc.