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**Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)  
Ministry of Water and Environment (MWE), UGANDA**



**THE PROJECT ON  
IRRIGATION SCHEME DEVELOPMENT  
IN CENTRAL AND EASTERN UGANDA**

**ATARI IRRIGATION SCHEME  
DEVELOPMENT PROJECT (F/S)**

**ANNEX III-8**

**ENVIRONMENTAL IMPACT ASSESSMENT  
AND  
DRAFT ABBREVIATED RESETTLEMENT ACTION  
PLAN**

**FEBRUARY 2017**

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
NTC INTERNATIONAL CO., LTD.  
PASCO CORPORATION**

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## ANNEX III-8

### Atari Irrigation Scheme Development Project (F/S) Environmental Impact Assessment and Draft Abbreviated Resettlement Action Plan

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#### Units

#### Glossary of Acronyms

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### ***Attachment***

- Attachment-1 : Environmental Checklist
- Attachment-2 : RAP Monitoring Form and TOR for External Monitoring
- Attachment-3 : Socio-Economic Survey Questionnaire Form
- Attachment-4 : Radio Announcement and Notice Poster for PCM
- Attachment-5 : Minutes of Meeting SHM & PCM for ESIA
- Attachment-6 : Minutes of Meeting MoGLSD

## Units

|                         |                                 |
|-------------------------|---------------------------------|
| kg                      | kilogram                        |
| ton                     | Metric tons = 1,000 kg          |
| hr                      | hour                            |
| mm                      | millimetre                      |
| cm                      | meter                           |
| km                      | kilometre                       |
| ha                      | hectare                         |
| HP                      | Horsepower                      |
| km <sup>2</sup> , sq.km | square kilometre                |
| m <sup>3</sup>          | cubic meter                     |
| MCM                     | million cubic meters            |
| MSL                     | Mean Sea Level                  |
| MW                      | mega Watt                       |
| LPS, l/s                | litters per second              |
| mm/mon                  | millimetre per month            |
| mm/d                    | millimetre per day              |
| m/s                     | meter per second                |
| m <sup>3</sup> /s       | cubic meter per second          |
| °C                      | degrees centigrade              |
| %                       | percent                         |
| US\$                    | United States of America Dollar |
| UGX                     | Uganda Shillings                |
| ¥                       | Japanese Yen                    |

### Glossary of Acronyms

|        |   |
|--------|---|
| ALT-L  | Alternative Alignment   |
| ALT-P  | Alternative Plan  |
| ALC    | Area Land Committee   |
| ARAP   | Abbreviated Resettlement Action Plan  |
| BCG    | Bacillus Calmette–Guérin (vaccine for tuberculosis (TB) disease)                    |
| BZ     | Buffer Zone   |
| CAO    | Chief Administrative Officer  |
| CBD    | Convention on Biological Diversity  |
| CBWMP  | Community-Based Wetland Management Plan   |
| CDO    | Community Development Officer   |
| CGV    | Chief Government Valuer   |
| CITES  | Convention on the International Trade in Endangered Species of Wild Flora and Fauna |
| C/P    | Counterpart   |
| CWMP   | Community Wetland Management Plan   |
| DAO    | District Agriculture Officer  |
| DARAP  | Draft Abbreviated Resettlement Action Plan  |
| DCDO   | District Community Development Officer  |
| DDP    | District Development Plans  |
| DEO    | District Environment Officer  |
| DISO   | District Security Officer   |
| DLB    | District Land Boards  |
| DLT    | District Land Tribunals   |
| DPT    | Diphtheria, Pertussis, Tetanus  |
| DWD    | Directorate of Water Development  |
| DWO    | District Wetland Officer  |
| DWRM   | Directorate of Water Resource Management  |
| EIA    | Environmental Impact Assessment   |
| EIR    | Environmental Impact Review   |
| EIS    | Environmental Impact Statement  |
| EMA    | External Monitoring Agent   |
| EMP    | Environmental Management Plan   |
| F/S    | Feasibility Study   |
| GoU    | Government of Uganda  |
| IMA    | Internal Monitoring Agent   |
| JICA   | Japan International Cooperation Agency  |
| JST    | JICA Study Team   |
| MAAIF  | Ministry of Agriculture, Animal Industry & Fisheries                                |
| MoGLSD | Ministry of Gender, Labour & Social Development                                     |
| MoLHUD | Ministry of Lands, Housing and Urban Development                                    |

|        |  |
|--------|--|
| MWE    | Ministry of Water and Environment                                      |
| NBI    | Nil Basin Initiative   |
| NDP    | National Development Plan  |
| NEA    | The National Environment Act   |
| NEMA   | National Environment Management Authority                              |
| NGO    | Non-Governmental Organization  |
| O/D    | Overall Design   |
| O&M    | Operation and Maintenance  |
| OPV    | Oral Poliovirus Vaccines   |
| PACC   | PISD Area Coordination Committee                                       |
| PAP    | Project Affected Person  |
| PAH    | Project Affected Household   |
| PDCC   | PISD District Coordination Committee                                   |
| PISD   | Project on Irrigation Scheme Development in Central and Eastern Uganda |
| PLC    | Parish Land Committees   |
| RAP    | Resettlement Action Plan   |
| RIC    | Resettlement Implementation Committee                                  |
| RDC    | Resident District Commissioner   |
| RTSUs  | Regional Technical Support Units                                       |
| S.O.L. | School of Open Learning  |
| UBOS   | Uganda Bureau of Statistics  |
| ULC    | Uganda Land Commission   |
| UNFCCC | United Nations Framework Convention on Climate Change                  |
| WB     | World Bank   |
| WMD    | Wetland Management Department  |
| WSSP   | The Wetlands Sector Strategic Plan                                     |

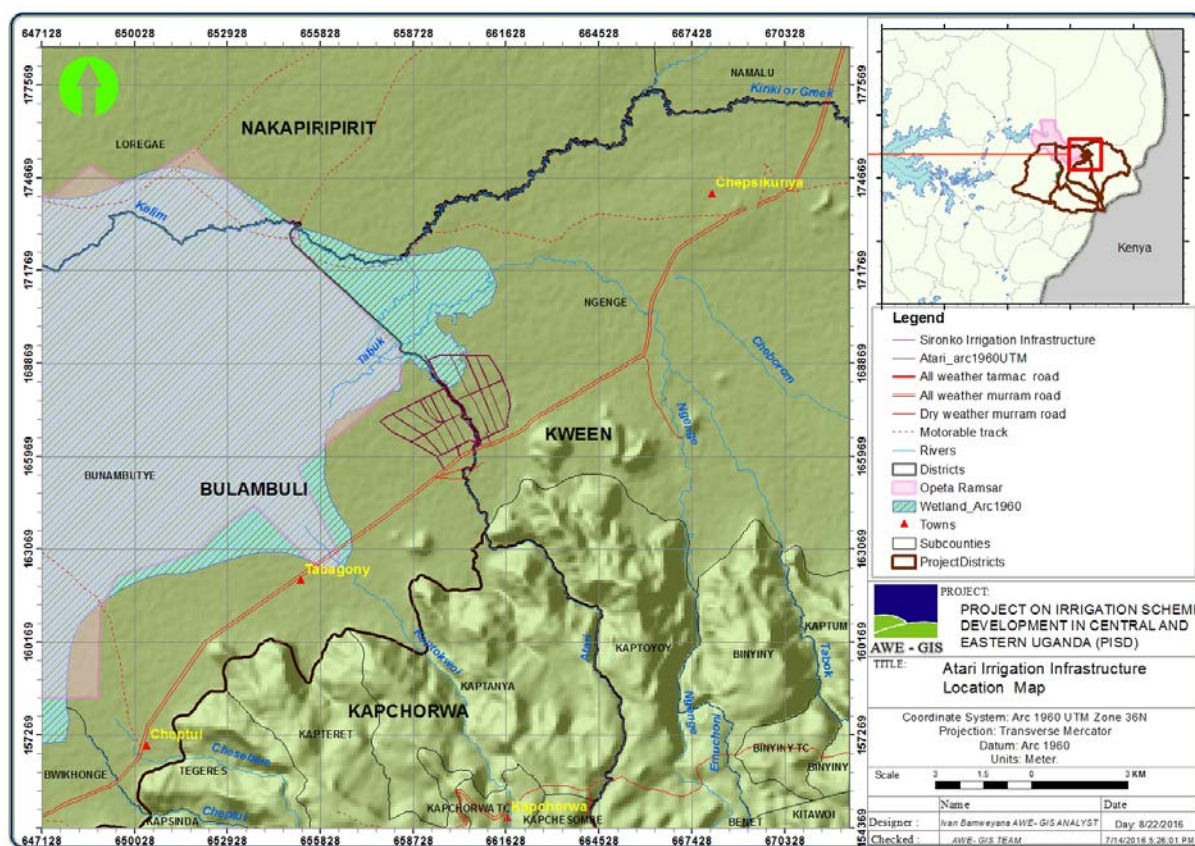


## Chapter 1 ENVIRONMENT AND SOCIAL CONSIDERATIONS

### 1.1 Environment and Social Considerations

#### 1.1.1 Outline of Project Component to Give Impact on Environmental and Social Aspects

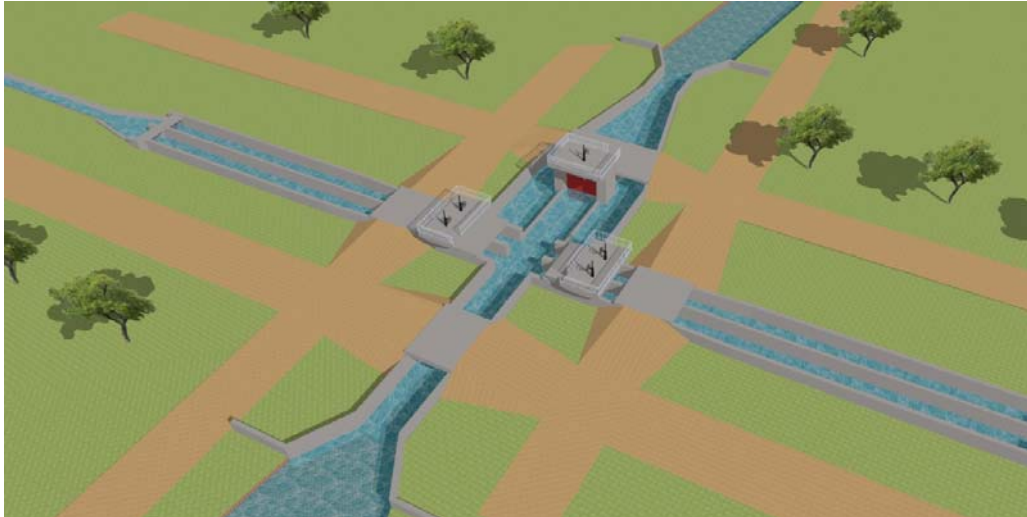
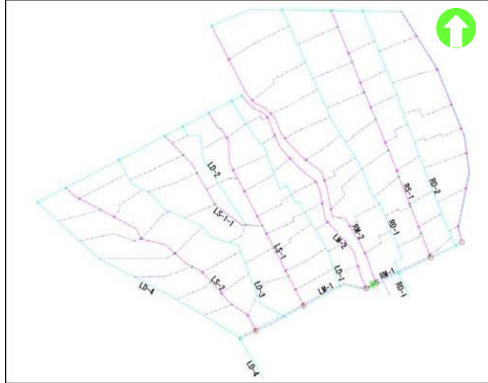
The irrigation project installs facilities for sound farming in the Atari area such as head work and canals. Construction of these facilities and their operation can be factors to give impacts on the environmental and social aspects. Figure 1.1.1 illustrates the location of the project area and outline of the irrigation facilities installed is show in Table 1.1.1.



Source: JICA Study Team

**Figure 1.1.1 Location of Atari Project Area**

**Table 1.1.1 Outline of Facilities for the Irrigation Project in Atari Area**

| No | Facility               | Outline  |
|----|------------------------|--|
| 1  | <b>Head Work</b>       | <p>It consists of diversion weir with gates, spillway, and fish way and intake structure equipped with gates and settling basin will be provided. The width of diversion weir shall be wide enough to flush out flood discharge when the gates are fully opened. Gates will be manually operated and made of steel works and reinforced concrete.</p>    |
| 2  | <b>Main Canal</b>      | <p>The layout of main canal will be set considering the gradient of project area, inclination of canal, location of dwelling area and existing road or boundary of plots of farmland as a rule. Where possible the alignment of the main canal shall be kept as straight as possible to avoid too many corners and reduce loss in flow (hydraulic) energy. Main canal route will be selected at highest location taking the gradient of canal into consideration.</p>  |
| 3  | <b>Secondary Canal</b> | <p>Secondary canal shall be lined with proper materials such as concrete so as to avoid erosion by water flow. Secondary canal shall be provided within 0.5-1.0 km intervals so as to limit lengths of tertiary canals up to 500 m long as a rule. Where possible the alignment of the secondary canal shall be kept as straight as possible to avoid too many corners and reduce loss in flow (hydraulic) energy. In the project, the fish bone type layout will be adopted taking into consideration topography and efficiency.</p>  |
| 4  | <b>Tertiary Canal</b>  | <p>Size of farmland for tertiary network system shall be about 10 ha as a rule. Tertiary canal shall not be lined with concrete material. Length of tertiary canal for each block shall be limited to 500 m at most.</p>   |

Source: JICA Study Team

Impacts caused by the project before/during construction and operation phases were examined and mitigation measures were developed through the environmental impact assessment (EIA).

## 1.1.2 Fundamentals of Environment and Social Conditions

### (1) Environmental Condition

#### 1) Climate

Uganda has a tropical climate with rainy and dry seasons. According to the “Hydro-Climatic Study Report on the Water Resources of Uganda (2010)” by DWRM analysis of monthly rainfall records at 102 rain gauges for the period 1940-75 were classified into 16 climate zones. Atari project area is located in zone F it is assumed that there is virtually one rainy season from March to October, with the main peak in April and a secondary peak in August and one dry season December to about mid March, as shown in Table 1.1.2.

**Table 1.1.2 Summary of Monthly Meteorological Data for Atari Project Area**

| Month                 | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep | Oct  | Nov  | Dec  | Total or Average |
|-----------------------|------|------|------|------|------|------|------|------|-----|------|------|------|------------------|
| <b>Item</b>           |      |      |      |      |      |      |      |      |     |      |      |      |                  |
| Temperature (°C)      | 24.1 | 24.7 | 24.5 | 23.8 | 23.6 | 22.7 | 22.4 | 22.6 | 23  | 23.4 | 23.1 | 23.5 | 23.4             |
| Relative Humidity (%) | 62   | 58   | 65   | 70   | 72   | 69   | 68   | 70   | 69  | 70   | 71   | 65   | 67               |
| Rainfall (mm)         | 81   | 69   | 145  | 212  | 215  | 103  | 87   | 123  | 118 | 172  | 158  | 85   | 1566             |
| Sunshine hours (hr)   | 9.2  | 8.1  | 8    | 6.9  | 7.5  | 7.6  | 6.5  | 6.8  | 7.7 | 7.6  | 7.3  | 8.3  | 7.6              |
| Evaporation (mm)      | 5.9  | 6.1  | 6.1  | 5.3  | 4.4  | 4.5  | 3.8  | 4.2  | 5   | 5    | 5.2  | 5.6  | 5.1              |

Source: JICA Study Team based on the data from Uganda National Meteorological Authority

Monthly mean maximum temperature is 31.9 °C in February, while the monthly mean minimum temperature is 16.4 °C in August. The annual difference of mean temperature is 3.5 °C. Humidity is minimum, 57.6 % in February and maximum, 72.0 % in May. Maximum sunshine hours are about 9.2 hours in January and minimum sunshine hours is about 6.5 hours in July.

Annual rainfall ranges from 1,048 mm to 1,992 mm and the average annual rainfall is about 1,566 mm in accordance with the data of Tororo meteorological Station. Pan-evaporation data show their highest value of 6.1 mm during February and March, and a minimum of 3.8 during July. According to the progress report developed by MWE, the annual mean pan evaporation is 1,853 mm. The value exceeds annual mean rainfall in the study area, thus justifying the requirement for irrigation to supplement crop water requirements.

#### 2) River and Water Body

There is a single river system in the project area. Atari Riverside Basin which lay its stream channel straight from mountainous area of Mt. Elgon National Park (around Piswa area near to the peak Muzoa; 3,338 m) and forwards to confluence point with Kelim River which flows into the Lake Opeta (Awoja Wetland System). A tributary of the Atari River, the Tabok River which emerges from the same Mt. Elgon National Park and passes through another project site of Ngenge River Basin (Kween district), joint in the Atari River approximately 1.5 km downstream from the lower end (at position of drainage culvert) of the planned scheme of Atari Riverside Basin.

Water resources for this area are Atari River with catchment area of 112 km<sup>2</sup>. Within a part of the area, 450 ha of paddy planting is prectised so far, but acreage is rather small and restricted compared with its potential. As for existing intake facilities at Atari River, irrigation water is drawn from the rivers through weir made of reinforce concrete installed by NGO. However, lower parts of gates are corroded and hoisting devices are out of functioning.

The Atari River flows in the direction of south to north from halfway up the Mt. Elgon region as the origin then the flow enters into study area. The Atari River flows into the Kelim River and finally reached to the Lake Opeta.

### 3) Topography and Geology

The topography of the project area, generally, is characterized as flat plain relief dissected by rivers emerging from the mountainous area and flowing toward low-lying area of Awoja Wetland system. The area has mainly two types of soils, i.e., loam and sandy loam soils that are mainly accumulated around seasonal swamps where major agricultural activities are practised. These soils are greatly in favor of the growth of pastures for livestock and growth of agricultural products.

### 4) Soils

The soils in the project area are mainly luvisols and vertisols characterized with a reddish colour and heavily textured. The soils have moderate-high productivity in terms of agricultural production. However, the soils are also susceptible to runoff and logging due its looseness and poor infiltration rates. The above properties make these particular soils not ideal for construction and hence they will need to be stabilized during implementation. Based on the particle size distribution, majority of the soil particles ranges between 180 µm to 2 mm which is above 100 µm that is considered susceptible to erosion.

### 5) Vegetation

The vegetation cover of the area is characterized as scattered trees, tall grass and shrubs. In several areas the vegetation has degenerated into secondary vegetation. The major contributing factor is human deliberate activities like animal grazing, construction, cutting of grass and trees for firewood and bush burnings.

The most important and natural vegetation are Wooded Grassland and seasonally flooded grassland. There are also patches of permanent wetland. The wetlands are critical in maintaining a link with the Ramsar Sites of Bisina and Opeta downstream.

## (2) Social Condition

Table 1.1.3 and Table 1.1.4 show summaries of social condition in Bulambuli and Kween and districts respectively, to which the project area belongs.

**Table 1.1.3 Summary of Social Condition in Bulambuli District**

| <b>Table 1: Number of administrative units by county and Sub County</b> <i>Source: Uganda bureau of statistics</i> |             |                                       |                            |
|--|-------------|---------------------------------------|----------------------------|
| County   | No. S/C     | No. parishes/ wards                   | No. villages /zones /cells |
| Bulambuli  | 19          | 98                                    | 1,193                      |
| Total  | 19          | 98                                    | 1,193                      |
| <b>Table 2: General indicators</b> <i>Source: Uganda bureau of statistics</i>                                      |             |                                       |                            |
| Selected characteristics   | Values      | Selected characteristics              | Values                     |
| Surface area (Sq km)   | 648         | Deprivation of a decent S.O.L         | 41.50                      |
| Total population (2014 provisional result)   | 177,322     | Poverty head county                   | 34.68                      |
| Average Dependency ration  | 123.6       | Adult literacy level                  | 61.50                      |
| Life expectancy  | 56.08       | Population growth rate                | 2.5                        |
| <b>Table 3: Key MDG indicator for Education</b> <i>Source: Ministry of education 2012</i>                          |             |                                       |                            |
| MDG indicator  | Rate/ Ratio | MDG indicator                         | Rate/ Ratio                |
| Primary school net enrolment rate  | 146         | Secondary school gross enrolment rate | 39                         |
| Primary school gross enrolment rate  | 167         | Pupil teacher ratio                   | 55                         |
| Secondary school net enrolment rate  | 36          | Pupil classroom ratio                 | 76                         |
| <b>Table 4: Education enrolment by gender</b> <i>Source: Ministry of education 2012</i>                            |             |                                       |                            |
|  | Male        | Female                                | Total                      |
| Primary schools enrolment  | 21,168      | 21,737                                | 42,905                     |
| Secondary school enrolment   | 2,987       | 2,680                                 | 5,667                      |
| Total  | 24,155      | 24,417                                | 48,572                     |

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**Table5: Availability of facilities Source: Ministry of health 2011**

| Facility | GOVT | NGO | Private | Total |
|----------|------|-----|---------|-------|
| HOSPITAL | 0    | 0   | 0       | 0     |
| HC IV    | 1    | 0   | 0       | 1     |
| HC III   | 8    | 1   | 0       | 9     |
| HC II    | 6    | 1   | 0       | 7     |
| Total    | 15   | 2   | 0       | 17    |

**Table 6: Point water sources Source: Ministry of water and environment 2010**

| Source                 | Functional | Non functional |
|------------------------|------------|----------------|
| Protected spring       | 243        | 16             |
| Shallow wells          | 49         | 12             |
| Deep boreholes         | 47         | 5              |
| Rainwater harvesting   | 7          | 0              |
| Access to safe water % | 73         | -              |

**Table 7: District routine immunization rates by type of diseases Source: Ministry of health 2012/13**

| Antigen | Percentage (%) | Antigen | Percentage (%) |
|---------|----------------|---------|----------------|
| BCG     | 104.5          | OPV 3   | 99.9           |
| Measles | 125.8          | DPT 3   | 98.3           |

**Table 8: District population 2014 Source: 2014 census provisional result, UBOS**

| Sub County / Division/ Town Council | 2014   |        |         | Poverty Headcount |
|-------------------------------------|--------|--------|---------|-------------------|
|                                     | Male   | Female | Total   |                   |
| BUGINYANYA                          | 2,819  | 2,711  | 5,530   | 30.3              |
| BUKHALU                             | 12,429 | 13,244 | 25,673  | 35.3              |
| BULAAGO                             | 4,817  | 4,639  | 9,456   | 35.3              |
| BULAMBULI T.C.                      | 2,504  | 2,572  | 5,076   | 31.6              |
| BULEGENI                            | 2,163  | 2,307  | 4,470   | 31.6              |
| BULEGENI T.C.                       | 4,962  | 6,129  | 11,091  | 34.7              |
| BULUGANYA                           | 4,412  | 4,539  | 8,951   | 32.0              |
| BUMASOBO                            | 4,113  | 4,009  | 8,122   | 31.0              |
| BUMUGIBOLE                          | 3,419  | 3,278  | 6,697   | 30.3              |
| BUNAMBUTYE                          | 4,405  | 4,143  | 8,548   | 42.7              |
| BWIKHONGE                           | 3,884  | 3,999  | 7,883   | 43.0              |
| KAMU                                | 2,913  | 3,358  | 6,271   | 31.6              |
| LUSHA                               | 7,291  | 8,188  | 15,479  | 30.0              |
| MASIIRA                             | 4,832  | 4,938  | 9,770   | 37.2              |
| MUYEMBE                             | 3,797  | 3,993  | 7,790   | 30.0              |
| NABONGO                             | 4,789  | 4,811  | 9,600   | 35.0              |
| NAMISUNI                            | 4,078  | 4,689  | 8,767   | 32.0              |
| SIMU                                | 1,917  | 3,454  | 5,371   | 34.0              |
| SISIYI                              | 6,293  | 6,484  | 12,777  | 34.1              |
| DISTRICT                            | 85,837 | 91,485 | 177,322 | 34.7              |

Source: JICA Study Team

**Table 1.1.4 Summary of Social Condition in Kween District**

**Table 1: Number of administrative units by county and Sub County Source: Uganda bureau of statistics**

| County | No. S/C | No. parishes/ wards | No. villages /zones /cells |
|--------|---------|---------------------|----------------------------|
| Kween  | 12      | 66                  | 481                        |
| Total  | 12      | 66                  | 481                        |

**Table 2: General indicators Source: Uganda bureau of statistics**

| Selected characteristics                   | Values | Selected characteristics      | Values |
|--|--------|-------------------------------|--------|
| Surface area (Sq km)                       | 791    | Deprivation of a decent S.O.L | 24.8   |
| Total population (2014 provisional result) | 95,623 | Poverty head county           | 37.90  |
| Average Dependency ration                  | 115.8  | Adult literacy level          | 54     |
| Life expectancy                            | 60.21  | Population growth rate        | 4.2    |

**Table 3: Key MDG indicator for Education Source: Ministry of education 2012**

| MDG indicator                         | Rate/ Ratio |
|---------------------------------------|-------------|
| Primary school net enrolment rate     | 116         |
| Primary school gross enrolment rate   | 137         |
| Secondary school net enrolment rate   | 29          |
| Secondary school gross enrolment rate | 32          |
| Pupil teacher ratio                   | 50          |
| Pupil classroom ratio                 | 51          |

**Table4: Education enrolment by gender Source: Ministry of education 2012**

|                           | Male   | Female | Total  |
|---------------------------|--------|--------|--------|
| Primary schools enrolment | 14,527 | 14,984 | 29,511 |

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|                            |        |        |        |
|----------------------------|--------|--------|--------|
| Secondary school enrolment | 2,012  | 2,058  | 4,070  |
| Total                      | 16,539 | 17,042 | 33,581 |

**Table 5: Availability of facilities Source: Ministry of health 2011**

| Facility | GOVT | NGO | Private | Total |
|----------|------|-----|---------|-------|
| HOSPITAL | 0    | 0   | 0       | 0     |
| HC IV    | 1    | 0   | 0       | 1     |
| HC III   | 4    | 0   | 0       | 4     |
| HC II    | 7    | 4   | 0       | 11    |
| Total    | 12   | 4   | 0       | 16    |

**Table 6: Point water sources Source: Ministry of water and environment 2010**

| Source                 | Functional | Non functional |
|------------------------|------------|----------------|
| Protected spring       | 94         | 18             |
| Shallow wells          | 0          | 0              |
| Deep boreholes         | 25         | 0              |
| Rainwater harvesting   | 8          | 4              |
| Access to safe water % | 41         | -              |

**Table 7: District routine immunization rates by type of diseases Source: Ministry of health 2012/13**

| Antigen | Percentage (%) |
|---------|----------------|
| BCG     | 93.8           |
| Measles | 58.9           |
| OPV 3   | 53.3           |
| DPT 3   | 51.4           |

**Table 8: District population 2014 Source: 2014 census provisional result, UBOS**

| Sub County / Division/ Town Council | 2014   |        |        | Poverty headcount |
|-------------------------------------|--------|--------|--------|-------------------|
|                                     | Male   | Female | Total  |                   |
| BENET                               | 5,639  | 5,675  | 11,314 | 36.9              |
| BINYINY                             | 2,516  | 2,568  | 5,084  | 38.3              |
| BINYINY T.C.                        | 1,755  | 1,821  | 3,576  | 37.9              |
| KAPRORON                            | 3,162  | 2,585  | 5,747  | 40.4              |
| KAPTOYOY                            | 4,142  | 4,294  | 8,436  | 40.4              |
| KAPTUM                              | 4,690  | 4,778  | 9,468  | 40.0              |
| KIRIKI                              | 2,417  | 1,981  | 4,398  | 33.0              |
| KITAWOI                             | 3,855  | 4,051  | 7,906  | 37.0              |
| KWANYIY                             | 5,190  | 5,139  | 10,329 | 39.2              |
| KWOSIR                              | 6,126  | 6,284  | 12,410 | 37.0              |
| MOYOK                               | 2,877  | 2,904  | 5,781  | 39.0              |
| NGENGE                              | 6,210  | 4,964  | 11,174 | 32.0              |
| DISTRICT                            | 48,579 | 47,044 | 95,623 | 37.9              |

Source: JICA Study Team

### 1.1.3 Regulation and Organization of Uganda

#### (1) Policy and Laws related to Environmental Considerations in Uganda

Important legal framework for environment and social considerations in Uganda mainly consists of the country's Constitution (1995), National Environment Management Policy (1995), and National Environment Act (NEA 1995). The objectives and principle of these important laws and policy are shown below.

##### 1) Constitution of the Republic of Uganda (1995)

The national objectives and directive principles for environment indicated in the Constitution are as follows:

#### Chapter XXVII: The Environment

The State shall promote sustainable development and public awareness of the need to manage land, air, and water resources in a balanced and sustainable manner for the present and future generations.

The utilization of the natural resources of Uganda shall be managed in such a way as to meet the development and environmental needs of present and future generations of Ugandans; and, in particular, the State shall take all possible measures to prevent or minimize damage and destruction to land, air, and water resources resulting from pollution or other causes.

The State shall promote and implement energy policies that will ensure that people's basic needs and those of environmental preservation are met.

The State, including LGs, shall

- create and develop parks, reserves, and recreation areas and ensure the conservation of natural resources;
- promote the rational use of natural resources so as to safeguard and protect the biodiversity of Uganda.

### 2) National Environment Management Policy (1995)

The overall policy goal is sustainable social and economic development which maintains or enhances environmental quality and resource productivity on a long-term basis that meets the needs of the present generations without compromising the ability of future generations to meet their own needs.

### 3) National Environment Act Cap. 153 (NEA) (1995)

The NEA provides for the establishment of institutional structures right from national to village levels and clearly outlines their roles and responsibilities. The institutional structures and roles are shown in Table 1.1.5.

**Table 1.1.5 Roles for Each Institution on Environment and Natural Resources Management**

| Institution                                      | Role   |
|--|--|
| National Environment Management Authority (NEMA) | - To coordinate, monitor and supervise all activities in the field of environment in the country.  |
| Policy Committee on the Environment              | - To formulate and provide national policy guidelines on environment management.   |
| Technical Committee on the Environment           | - To give advice on subjects to the environment such as soil conservation, licensing pollution, biodiversity conservation and environment impact assessment.   |
| District Environment Committee                   | <ul style="list-style-type: none"> <li>- To coordinate the activities of the district relating to the management of environment and natural resources.</li> <li>- To ensure all environment concerns are integrated in all plans and projects approved by the district council.</li> <li>- To assist in the development and formulation of bylaws relating to environment and natural resources management.</li> <li>- To promote the dissemination of information about the environment through education and outreach programs.</li> <li>- To coordinate with NEMA on all issues relating to environment management.</li> <li>- To coordinate the activities of local environment committees in the management of the environment.</li> <li>- To receive reports from the local environment committees every year.</li> <li>- To prepare a District State of the Environment Report every year.</li> </ul> |

Source: JICA Study Team

Other legislation and policies governing the environment and social considerations are:

- The Fish Act, Cap 152 (1951);
- The Decentralization Policy (1993);
- The Wildlife Act, Cap 200 (1996);
- The Local Government Act (1997);
- The Water Act (1997);

- The Water Act, Cap 152 (1997);
- The Land Act (1998);
- Environment Impact Assessment Regulations (1998);
- The National Environment (Conduct and Certification of Environment Practitioners) Regulations (2003);
- The National Environment (Wetlands, River bank, and Lake Shores Management) Regulations (2000);
- Occupational safety and Health Act, (2006);
- The National environment (Audit) regulations (2006)

**(2)International Environmental Instruments/Obligations for Uganda**

Uganda is a signatory to several international instruments on environmental management as shown below.

- The African Convention on the Conservation of Nature (1968);
- The Protection of World and Cultural Heritage convention (1972);
- The Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES, 1973);
- The Ramsar Convention on wetlands of International Importance (1988);
- Convention on Biological Diversity (CBD, 1992);
- United Nations Framework Convention on Climate Change (UNFCCC, 1992);
- Nile Basin Initiative (NBI, 1999)

**(3)Policy and Laws Related to Wetland**

**1)National Policy for the Conservation and Management of Wetlands (1995)**

This policy provides the basis for management and use of wetlands in Uganda. It promotes wetland conservation and sustainable use for present and future generations. However, no legislation specific to wetlands exists at the moment. In Article 7, Specific Policy Strategies are described as follow.

|     |                                     |  |
|-----|-------------------------------------|--|
| 7.1 | Drainage of wetlands                | There will be no drainage of wetlands unless more important environmental management requirements supersede.   |
| 7.2 | Environmentally sound management    | Only those uses that have proved to be non-destructive to wetlands and their surroundings will be allowed and/or encouraged. These include water supply, fisheries, wetland edge gardens, and grazing.   |
| 7.3 | Sustainable use of wetlands         | Wetlands may be utilized in such a way that they do not lose traditional benefits presently obtained from them.<br>Any decisions to use wetlands must consider the requirements of all other users in the community.   |
| 7.4 | Conversion of wetlands              | Government will establish fully “Protected Wetland Areas” of important biological diversity.<br>Government may also establish wetlands which will be used for partial exploitation as research.<br>No modification, drainage or other impacts will be entertained for the so protected wetlands. |
| 7.5 | Water supply and effluent treatment | Any wetland serving as a source of water supply or receiving effluent as part of a designated service to any human settlement shall be fully protected wetland from any encroachment, drainage, or modification.   |
| 7.6 | Tenure and use                      | All wetlands are a public resource to be controlled by the government on behalf of the public. There shall be no leasing of any wetland to any   |



|     |  |   |
|-----|--|---|
|     |  | person or organization in Uganda at any given moment and for whatever reason.<br>However, communal use will be permitted, but only if environmental conservation and sustainable use principles and strategies are adhered to.  |
| 7.7 | Recovery of previously drained wetlands              | Government may require that some wetlands, which have already been drained, should be allowed to regenerate. For this purpose, Government aims at restoring the soil hydration so as to re-establish the wetland vegetation as far as ecologically possible. Such an operation may range from partial rehabilitation of wetlands along drainage channel in the case of lease holder, to full rehabilitation after the lease has been cancelled or eviction in case of users with no leases. |
| 7.8 | Environmental Impact Assessment (EIA) and monitoring | There will be a requirement that all proposed modifications on wetlands be subject to an EIA.<br>All planned new wetland developments will be subjected to an EIA process to determine the required environmental controls.   |

Source: National Policy for the Conservation and Management of Wetlands (1995)

## 2)The National Environment (Wetlands, River Bank, and Lake Shores Management) Regulations (2000)

These regulations are important regarding irrigation development project in wetland. Related articles for the environmental assessment of the project are show as below.

|    |                                  |   |
|----|----------------------------------|---|
| 5  | Principles                       | The principles set out in this Part shall be observed in the management of all wetlands as follows:<br>- Wetland resources shall be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological functions and service;<br>- Environmental impact assessment as required under the statute is mandatory for all activities in wetlands likely to have an adverse impact on the wetland;<br>- Special measures are essential for the protection of wetlands of international, national and local importance as ecological systems and habitat for fauna and flora species, and for cultural and aesthetic purposes, as well as for their hydrological functions; and<br>- Wise use <sup>1</sup> of wetlands shall be interpreted into the national and local approaches to the management of their resources through awareness campaigns and dissemination of information. |
| 11 | Uses of wetlands                 | A person desiring to carry out of the regulated activities listed in the Second Schedule or extract any wetland produce in a wetland shall make an application in Form A set out in the First Schedule to these regulations. Notwithstanding the provisions of sub-regulation (1), the following traditional users of wetland resources shall not be subject to the application of these regulations.<br>- Harvesting of papyrus, medicinal plants, trees and reeds;<br>- Any cultivation where the cultivated area is not more than 25% of the total area of the wetland;<br>- Fishing using traps, spears and baskets or other methods than weirs;<br>- Collection of water for domestic use; and<br>- Hunting subject to the provisions of the Wildlife Act Cap.200.   |
| 12 | Wetland resource use permit      | Subject to the provisions of Regulations, a person shall not carry out any activity in a wetland without a permit issued by the Executive Director (of NEMA).   |
| 29 | Protection zones for river banks | The rivers specified in the sixth Schedule to these Regulations shall have a protection zone of one hundred meters from the highest watermark of the river.<br>River not specified in the Sixth Schedule shall have a protected zone of   |

<sup>1</sup> "wise use" means sustainable utilization of wetlands in a way compatible with the maintenance of the natural properties of the ecosystem.

thirty meters from highest watermark of the river.

No activity shall permit within protected zones without the written authority of the Executive Director (of NEMA).

Each local environment committee shall determine watering points and routes for animals to have access to the water in each river.

In Article 11 (2) (b), cultivation less than 25% of the total area of the wetland is allowed, however, the area of “the total area of the wetland” is not clear. Actually more than 25% of wetland is already cultivated in many wetlands. Nevertheless wetland farmers who are cultivating illegally are not necessarily chased away by authorities. It because, according to DWM, burdens on wetlands should be decreased gradually with wetland users’ understanding and cooperation based on the “wise-use” concept.

Rivers and lakes stipulated in sixth Schedule and seventh Schedule in Article 29 and 30 are shown in Table 1.1.6. Width of protection zone for rivers and lakes can be assumed as a temporally measure put in nation widely due to lack of river information for protecting river bank.

**Table 1.1.6 Rivers and Lakes Stipulated in Sixth Schedule and Seventh Schedule**

| No. | Rivers                                    | Lakes           |
|-----|---|-----------------|
| 1   | R. Nile from Lake Victoria to Lake Albert | L. Victoria     |
| 2   | R. Aswa                                   | L. Kyoga        |
| 3   | R. Katonga                                | L. Albert       |
| 4   | R. Nkusi                                  | L. Edward       |
| 5   | R. Kafu                                   | L. George       |
| 6   | R. Rwizi                                  | L. Bisina       |
| 7   | R. Kagera                                 | L. Mburo        |
| 8   | R. Mpanga                                 | L. Bunyonyi     |
| 9   | R. Manafwa                                | L. Kijanibarora |
| 10  | R. Mpologoma                              | L. Kwania       |
| 11  | R. Semliki                                | L. Wamala       |
| 12  | R. Mubuku                                 | L. Mutanda      |
| 13  | R. Mayanja                                | L. Marebe       |
| 14  | R. Sezibwa                                | L. Opeta        |
| 15  | R. Malaba                                 | L. Nabugabo     |
| 16  | R. Sipi                                   | L. Nkugute      |
| 17  | R. Namatala                               | L. Katunga      |
| 18  | R. Sironko                                | L. Nyabihoko    |
| 19  | R. Muzizi                                 | L. Nakivale     |
| 20  | R. Nabuyonga                              |                 |

Source: JICA Study Team, based on the National Environment (Wetlands, River bank, and Lake Shores Management) Regulations (2000)

### 3) Institutional Framework on Wetlands

The Wetland Management Department (WMD) in Ministry of Water and Environment is responsible for the implementation of Uganda’s Wetland Policy. The Wetlands Sector Strategic Plan 2001-2010 (WSSP) guides the activities of the WMD. The current WSSP (2011-20) is the latest version. Its goals are to increase knowledge and public and stakeholder awareness about wetlands, further develop the institution structure for wetland management, improve management and protection, establish, and strengthen community-based wetland management, and mobilize local and international financing mechanisms.

Districts are encouraged to designate a wetlands focal point to carry out wetland activities, and they can seek support from one of the three Regional Technical Support Units (RTSUs) established by WMD to provide technical backstopping to the field for wetland management. Districts are responsible for development of District Wetland Action Plans and their integration into District Development Plans (DDPs). They are also encouraged to formulate and implement district-level ordinances and local bylaws for wetland management. Community Based Wetland

Management Plans (CBWMPs) are to be prepared by community groups.

However, the effectiveness of these institutions is constrained by under staffing, lack of funding and limited coordination among the different sectors involved in the management process.

#### (4) Gap Analysis between JICA and Uganda's EIA Requirements

Table 1.1.7 summarizes a gaps analysis between JICA and Uganda's EIA regulatory requirements. It is seen that no notable gap exists in principle objectives in regard to process, impacts to assess, stakeholder engagement and information disclosure.

**Table 1.1.7 Gap Analysis between JICA and Uganda's EIA Requirements**

| JICA Guidelines<br>(Appendix 2. EIA Reports for Category A<br>Projects)   | Laws/regulation in Uganda<br>(as of July 2016)   | Gaps between<br>two countries                | Policy to fill up<br>gaps in this Study                                 |
|---|--|--|---|
| 1. When assessment procedures already exist in host countries, and projects are subject to such procedures, project proponents etc. must officially finish those procedures and obtain the approval of the government of the host country.  | The EIA Regulations (1998) require that an EIA is undertaken. Section 25. Details the decision of the Executive Director in relation to approval of EIA. Section 26 indicates that conditions of approval of a project will be provided.   | - (no difference)                            | Not Required  |
| 2. On implementing a project, in the planning stage impacts on the environmental and social aspects shall be examined as early as possible to develop alternatives or mitigation measures for mitigating or minimizing such impacts. The results obtained shall be incorporated in the project plan.      | Section 14 (1) of the EIA regulations describes the content of the EIS including to provide a description of;<br>(b) the proposed site and reasons for rejecting alternatives;<br>(f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them;<br>(i) the measures proposed for eliminating, minimizing or mitigating adverse impacts;  | - (no difference)                            | Not Required  |
| 3. In order to mitigate and minimize undesired impacts by the project and select a more desirable plan on environmental and social considerations, multiple alternatives shall be examined.   | Section 14 (1) of the EIA regulations describes the content of the EIS including to provide a description of;<br>(b) the proposed site and reasons for rejecting alternatives;<br>(f) the technology and processes that shall be used, and a description of alternative technologies and processes, and the reasons for not selecting them;  | - (no difference)                            | Not Required  |
| 4. Impacts to be surveyed and examined on environmental and social considerations includes those on human health and safety, natural environment (including trans- boundary or global impacts) and the society through air, water, soil, waste, accident, water use, climate change, ecosystem and biota. | EIA is a statutory requirement for projects that are likely to have a significant impact on the environment, and the EIA Regulations (1998) specify that social issues be included and that consultation be undertaken.<br>NEMA may require a public hearing to be held following submittal of the EIS.<br>Section 13 (2) of the EIA regulations requires the developer to pay attention to the issues laid down in the First Schedule in making an environmental impact statement. The First Schedule to the EIA Regulations (1998) lists issues that may be considered in the assessment.<br>Section 14 (1) of the EIA regulations describes the content of the EIS including to provide a description of;<br>(k) an indication of whether the environment of any other State is likely to be affected and the available alternatives and mitigating measures; | - (no difference)                            | Not Required  |
| 5. EIA reports (which may be referred to differently in different systems) must be written in the official language or in a language widely used in the country in which the project is to be implemented.  | Section 12 (2) (a) of the EIA regulations requires the developer to publicize the intended project, its anticipated effects and benefits through the mass media in a language understood by the affected   | The language of the report is not specified. | This EIA report is written in the official language of Uganda - English |

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| <b>JICA Guidelines</b><br>(Appendix 2. EIA Reports for Category A Projects)  | <b>Laws/regulation in Uganda</b><br>(as of July 2016)   | <b>Gaps between two countries</b> | <b>Policy to fill up gaps in this Study</b> |
|--|---|-----------------------------------|---|
| When explaining projects to local residents, written materials must be provided in a language and form understandable to them.   | communities for a period of not less than fourteen days;  |                                   |   |
| 6. EIA reports are required to be made available to the local residents of the country in which the project is to be implemented. The EIA reports are required to be available at all times for perusal by project stakeholders such as local residents and copying must be permitted.   | Section 29 (1) of the EIA regulations states that the EIA reports submitted to the Executive Director shall be public documents;<br>Section 29 (2) of the EIA regulations indicates that any person who desires to consult the EIA Report documents, be granted access by the Authority on such terms and conditions as the Authority considers necessary.  | - (no difference)                 | Not Required                                |
| 7. In preparing EIA reports, consultations with stakeholders, such as local residents, must take place after sufficient information has been disclosed. Records of such consultations must be prepared.  | The EIA Regulations (1998) specify that information disclosure and public meetings be undertaken as part of the EIA process. The regulations allow for a public hearing to be undertaken, if deemed necessary by NEMA.<br>Section 12 (1) of the EIA regulations requires the developer to take all measures necessary to seek views of the people in communities which may be affected by the project during the process of conducting the study;<br>Section 12 (2) (a) of the EIA regulations requires the developer to publicize the intended project, its anticipated effects and benefits through the mass media in a language understood by the affected communities for a period of not less than fourteen days;  | - (no difference)                 | Not Required                                |
| 8. Consultations with relevant stakeholders, such as local residents, should take place if necessary throughout the preparation and implementation stages of a project. Holding consultations is highly desirable, especially when the items to be considered in the EIA are being selected, and when the draft report is being prepared.            | The EIA guidelines (NEMA, 1997) require public consultation during the scoping phase to determine terms of reference for the EIA, which have to be agreed by NEMA. These terms of reference must include a full list of stakeholders to be consulted during the EIA.<br>The EIA Regulations (1998) specify that information disclosure and public meetings be undertaken as part of the EIA process. The regulations allow for a public hearing to be undertaken, if deemed necessary by NEMA.  | - (no difference)                 | Not Required                                |
| 9. The donor country shall check the monitoring results which are deemed important for a certain period, in order to verify whether the host country considers the environmental and social impacts. Information necessary for verifying the monitoring results shall be reported by the host country via a proper manner such as documentation etc. | Section 32 (1) An inspector designated under section 80 of the Act may, at all reasonable times, enter on any land, premises or other facility related to a project for which a project brief, or an environmental impact statement has been made under these regulations, to determine how far the predictions made in the project brief, or the environmental impact statement, whichever the case may be, are complied with.<br>Section 33 (1) After studying the audit report made under regulations 31 and 32, the Executive Director may require that the developer takes specific mitigation measures to ensure compliance with the predictions made in the project brief, or environmental impact statement whichever the case may be.<br>The National Environment Act provides for environmental monitoring and impact assessment; environmental audit; environmental restoration orders and improvement notices; environmental easements; environmental performance | - (no difference)                 | Not Required                                |

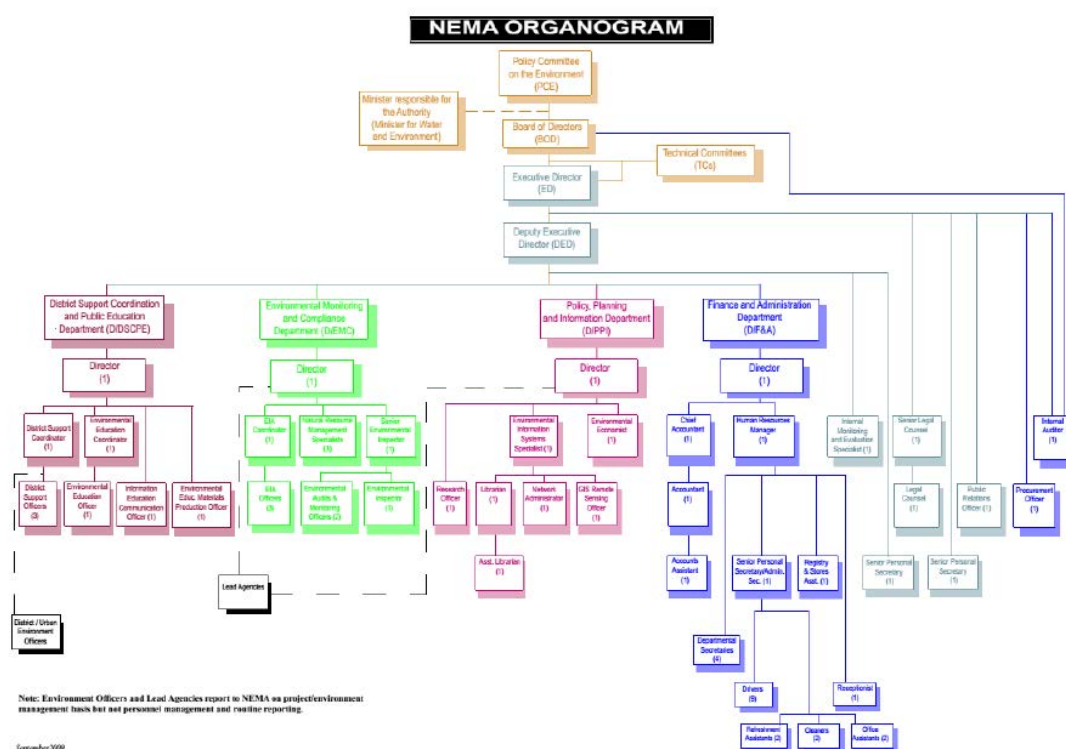
| JICA Guidelines<br>(Appendix 2. EIA Reports for Category A<br>Projects) | Laws/regulation in Uganda<br>(as of July 2016)  | Gaps between<br>two countries | Policy to fill up<br>gaps in this Study |
|---|---|-------------------------------|---|
|   | bonds; licensing and standard setting; use of economic and social incentives; civil and penal sanctions, including community service, among others.<br>Section 77 (1) requires keeping of records.<br>Section 78 (1) The records kept under section 77 shall be transmitted to the authority or its designated representative annually to be received not later than one month after the end of each calendar year. |                               |   |

Source: JICA Study Team

## (5) Procedure of Environmental Impact Assessment

### 1) Responsible Organization

EIA responsible institution in Uganda is the National Environment Management Authority (NEMA). The National Environment Act (NEA), Cap. 153, stipulates the Mandate of NEMA as the principal Agency in Uganda responsible for the management of the environment by coordinating, monitoring, regulating, and supervising all activities in the field of environment. The organogram is shown in Figure 1.1.2.



**Figure 1.1.2 NEMA Organogram**

### 2) The EIA Process in Uganda

The EIA process is summarized as follows:

- a) Project brief preparation (for projects that may not require full/ detained EIA);
- b) Screening;
- c) Detailed environmental impact study; and

d) Decision making by NEMA (and lead agencies).

These processes are explained in Table 1.1.8 and illustrated in Figure 1.1.3.

**Table 1.1.8 Summary of EIA Process in Uganda**

| Process                      | Description   |
|------------------------------|---|
| a) Project brief preparation | <p>A project brief is necessary for some development projects that are listed in the Third Schedule of the National Environment Act (NEA) Cap 153, for NEMA to determine the category of the project. This arises out of the screening process which assesses the cost or benefit of the particular project.</p> <p>The developer has the responsibility to prepare a project brief which must provide the required information given in below.</p> <ul style="list-style-type: none"> <li>- Name and address of the developer;</li> <li>- Name, purpose, objectives and nature of the water project in accordance with the categories identified in the Third Schedule of the NEA;</li> <li>- Description of the project site and its surroundings where the project is to be located (including Global Positioning System (GPS) coordinates, village, parish, Sub County, County, and District);</li> <li>- Site location map;</li> <li>- Policies, laws, regulations governing such project;</li> <li>- Description of project design and activities that shall be undertaken during and after the development of the project;</li> <li>- Description of equipment to be installed and any buildings or related facilities;</li> <li>- Description of the materials and input that the project shall use;</li> <li>- Description of the products and by-products, including waste to be generated;</li> <li>- Description of any likely environmental impacts of the project, and how they will be eliminated or mitigated during the implementation of various phases/stages of the project;</li> <li>- Description of any other alternatives, which are being considered (e.g. siting, technology, construction and operation procedures, sources of raw materials, handling of wastes etc.); and</li> <li>- Any other information that may be useful in determining the level of EIA required by NEMA, and Decommissioning and restoration plans for closure and restoration of the site to productive post-closure use.</li> </ul>   |
| b) Screening                 | <p>It is a requirement that any developer intending to develop a project submits a project brief to NEMA, containing a prescription of the activity being considered. The project brief shall be screened by NEMA in consultation with DWRM. The review process shall remain the same as stated in the National Environment Act Cap 153 and EIA regulations 1998. After the review, NEMA shall make a decision whether:</p> <ul style="list-style-type: none"> <li>- The project is exempt from any further assessment through EIR or EIA and consequently;</li> <li>- A conditional or unconditional approval for the project shall be granted; or</li> <li>- Where it is envisaged that the project is likely to lead to significant impact on the environment, it shall require that an EIR or a full EIS study be carried out.</li> </ul> <p>Water resources related projects have four screening categories such as:</p> <p><b>Category 1:</b> Small projects which do not have potential significant impacts and for which separate EIAs are not required, as the environment is the major focus of project preparation. These could include borehole drilling, hand augured shallow wells, protected springs and earth reservoir construction.</p> <p><b>Category 2:</b> Environmental analysis is normally unnecessary, as the project is unlikely to have significant environmental impacts. A project brief is enough. This could include project location in less sensitive areas or where many such schemes are in the same locality and their synergetic effects have potential impacts.</p> <p><b>Category 3:</b> A limited environmental analysis is appropriate, as the project impacts can be easily identified, and for which mitigation measures can be easily prescribed and included in the design and implementation of the project. Projects in this category could include:</p> <ol style="list-style-type: none"> <li>i. rural water supply,</li> <li>ii. large earth reservoirs, but not located in very sensitive areas</li> <li>iii. big gravity flow schemes</li> <li>iv. all category one projects located in sensitive areas.</li> </ol> |

| Process                               | Description   |
|---------------------------------------|---|
|                                       | <p>v. aquaculture,<br/>vi. small industries, and</p> <p><b>Category 4:</b> An EIA is normally required because the project may have diverse significant impacts. Projects in this category could include:</p> <p>i. water projects requiring water to a level more than 400m<sup>3</sup> in any period of twenty four hours, or projects requiring to use motorized pumps;<br/>ii. storage dams, barrages, weirs, valley tanks and dams;<br/>iii. river diversions and inter-basin water transfer;<br/>iv. flood control schemes, drilling e.g. for geothermal;<br/>v. large reservoirs;<br/>vi. irrigation and drainage schemes;<br/>vii. water use industries e.g. pulp and paper, Breweries, etc.<br/>viii. mining industry;<br/>ix. sewage treatment plants;<br/>x. small and large hydro power projects;<br/>xi. urban water supply projects; and<br/>xii. small to large gravity flow schemes.</p> <p>The EIA process is concluded when NEMA issues an EIA Certificate of Approval to the developer after paying an appropriate fee</p> |
| c)Detailed environmental impact study | According to the EIA Regulations 1998, EIS refers to the detailed study conducted to determine the possible environmental impacts of a proposed project and measures to mitigate their effects. The detailed EIS process is shown in Table 1.1.9.   |

Source: JICA Study Team

### 3)Environmental Impact Study (EIS)

According to the EIA Regulations 1998, the EIS refers to the detailed study conducted to determine the possible environmental impacts of a proposed project and measures to mitigate their effects. Table 1.1.9 indicates key stages and their contents for the EIS process and Figure 1.1.3 summarizes the EIA process in Uganda.

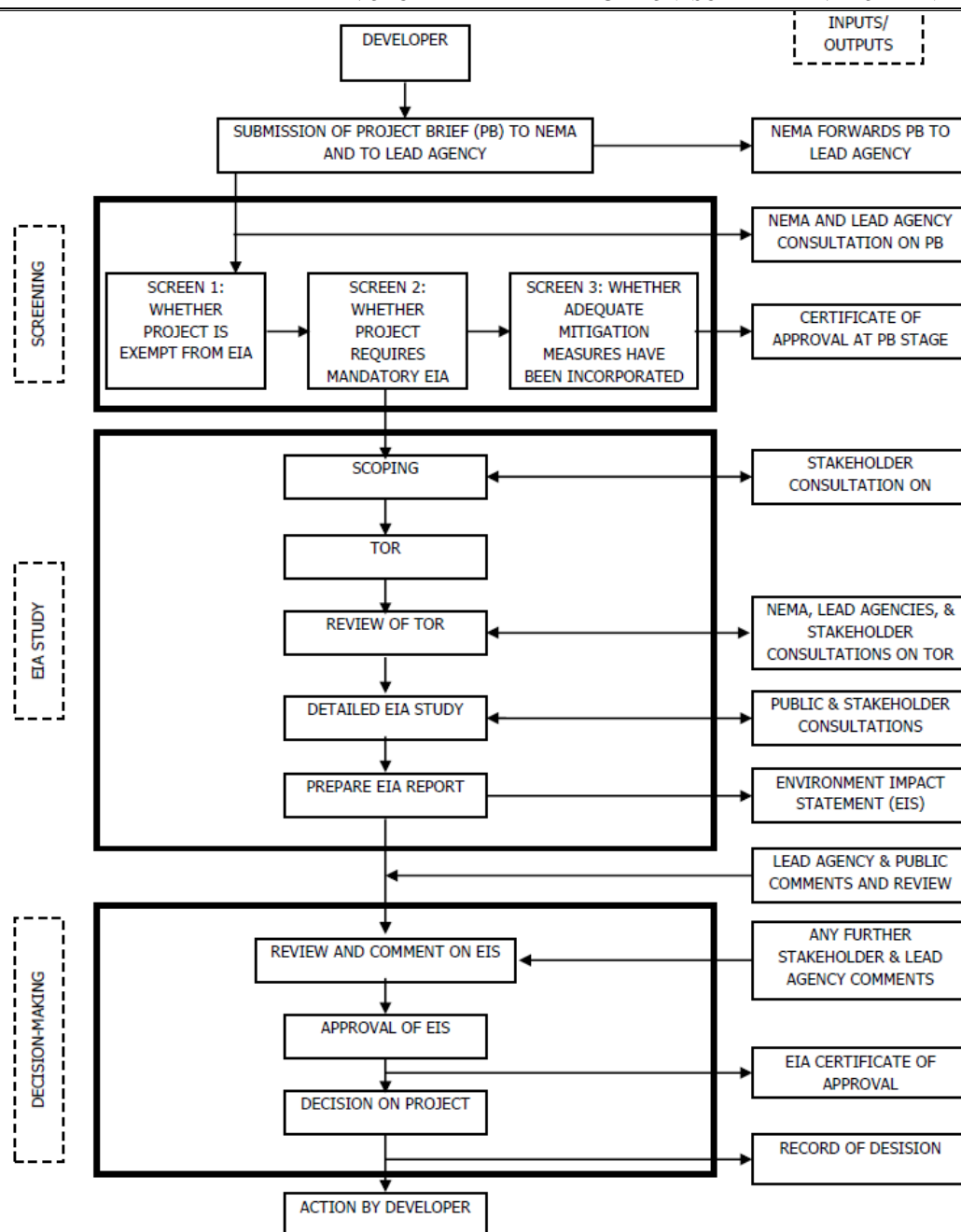
**Table 1.1.9 Key Stages for the EIS Process**

| Stage                                      | Description   |
|--|---|
| i) Scoping and TOR                         | <p>Scoping is the initial step in the EIS. Its purpose is to determine the scope of work to be undertaken in assessing the environmental impacts of the proposed project. It identifies the critical environmental impacts of the project for which in-depth studies are required, and elimination of the insignificant ones. The scoping exercise should involve all the project stakeholders so that consensus is reached on what to include or exclude from the scope of work. It is also at this stage that project alternatives are identified and taken into consideration. The contents of the scoping report are the same as the project brief however more detail is likely to be needed. This may involve some preliminary data collection and field work.</p> <p>The Developer takes the responsibility for scoping and prepares the scoping report after consultation with NEMA, Lead Agencies and other stakeholders. The developer with assistance from technical consultants will draw up the TOR for the EIS and submit a copy to NEMA that shall in turn be forwarded to Lead Agencies for comments (including the District Local Government or District Environment Officer).</p> |
| ii) Preparation of the EIS                 | In preparing an EIS, relevant information is collected on issues of real significance and sensitivity. These are then analyzed, mitigation measures developed for the adverse impacts and compensatory measures recommended for unmitigated environmental impacts. Measures aimed at enhancing beneficial or positive impacts are also given. An EIS documents the findings and is submitted to NEMA by the developer.  |
| iii) Review of EIS and Decision on Project | The Developer is required to submit ten (10) copies of the EIS to NEMA for review and approval. NEMA then forwards a copy to the Lead Agencies for comments. NEMA in consultation with the Lead Agencies (including the District Local Governments or District Environment Officer) shall review the contents of the EIS, paying particular attention to the  |

| Stage  | Description   |
|--|---|
|  | identified environmental impacts and their mitigation measures, as well as the level of consultation and involvement of the affected stakeholders in the EIS process. In this review, the level to which the TOR set out for the study is addressed shall be considered. In making a decision about the adequacy of the EIS, NEMA shall take into account the comments and observations made by the Lead Agencies, other stakeholders and the general public. NEMA may grant permission for the project with or without conditions, or refuse permission. If the project is approved, the Developer will be issued a Certificate of Approval.   |
| iv) Environmental Monitoring and Management Plan | <p>Monitoring is the continuous and systematic collection of data in order to assess whether the environmental objectives of the project have been achieved. Good practice demands that procedures for monitoring the environmental performance of proposed projects are incorporated in the EIS.</p> <p>To assist in implementation of identified mitigation and monitoring strategies, an environmental monitoring plan will be developed. It will describe the various environmental management strategies and programs to be implemented. It will also identify the management roles and responsibilities for ensuring that monitoring is undertaken, results are analyzed and any necessary amendments to procedures are identified and implemented in a timely manner. The monitoring plan shall provide for monitoring of both project implementation and environmental quality. It shall contain a schedule for inspecting and reporting upon the implementation of the project and associated mitigation measures identified in the EIS. The monitoring plan shall also identify the key indicators of environmental impact. Further, the plan shall provide a schedule for monitoring each indicator and for reporting the monitoring results to NEMA or the Local Authority.</p> |
| v) Public Consultation                           | The environmental impacts or effects of a project will often differ depending on the area in which it is located. Such impacts may directly or indirectly affect different categories of social groups, agencies, communities, and individuals. These are collectively referred to as project stakeholders or the public. It is crucial that during the EIA process, appropriate mechanisms for ensuring the fullest participation and involvement of the public are taken by the developer in order to minimize social and environmental impacts and enhance stakeholder acceptance.   |

Source: JICA Study Team





Source: NEMA

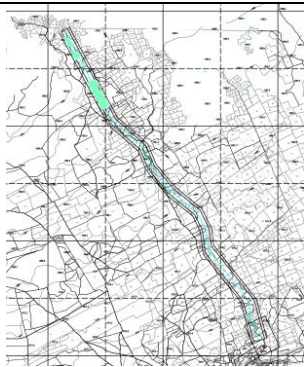
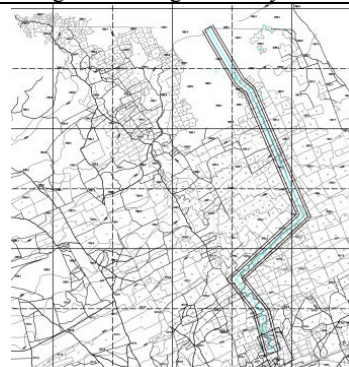
**Figure 1.1.3 Schematic Summary of EIA Process in Uganda**

### 1.1.4 Comparison of Alternatives (including Zero Option)

As discussed in Section 2.3 of Chapter 2 of Volume III, alternatives were compared mainly with 1) flood control, 2) environmental and 3) social impacts and the one was selected on a total-judgment basis. For selection of alignment of protection dyke and area, Alt-P3 (dikes to be set at both sides 30m from the hypothetical river centre) was selected to control flood effectively with reasonable amount of land occupation and fair ecosystem conservation. As per impact to the downstream, namely Ramsar Convention area, building dykes was expected to form sand bars and reduce sediment transport downstream (Alt-P2, P3 & P4).

On water course alternation, Alt-L1 (restoration of original waterway) was selected rather than Alt-L2 (construction of protection dyke along the existing waterway) or Alt-L0 (Zero option). In the comparison, Alt-L1 was not expected to give a critical impact to the downstream compared with others. Table 1.1.10 and Table 1.1.11 show the summary of alternative comparison for both case studies above-mentioned.

**Table 1.1.10 Comparison of Alternative Plan for Water Course (repeated)**

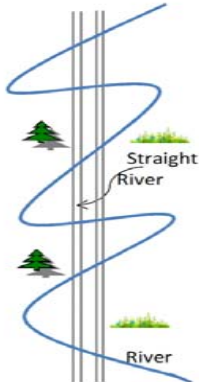
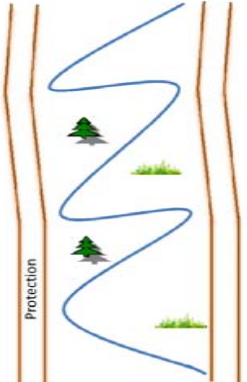
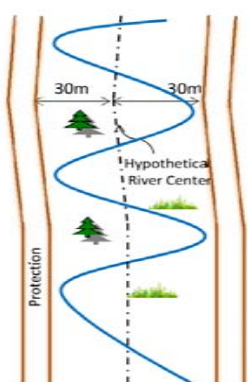
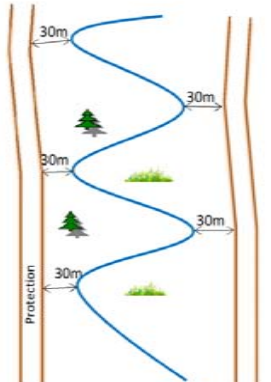
| Alternative               | ALT-L1   | ALT-L2  | ALT-L0   |
|---------------------------|--|---|--|
| Plan name                 | Restoration of original waterway   | Construction of protection dyke along the existing waterway   | Zero Option  |
| Layout                    |   |   |  |
| Outline of the Plan       | <p>This plan has installation of flood protection dyke along the original waterway which is also the boundary of Kween and Bulambuli District. Protection zone shall be set at 30m from hypothetical centre line of original waterway to preserve buffer zone for purification of water and preserve existing natural forest along old river course.</p> <p>Downstream part of original river shall be restored by excavating about 30cm from existing river bed to maintain the waterway and convey the same capacity of discharge with upstream.</p> | <p>This plan has installation of flood protection dyke along the existing river course which was a canal constructed to irrigate the right side of River Atari.</p> <p>Protection zone shall be set with 30m from centre line of irrigation canal to preserve buffer zone for purification of water.</p>  | <p>Nothing shall be done.</p> <p>No regulation and wise-use of wetland become impossible.</p> <p>It is expected that planned CbWMP will be implemented by the community together with related District and to realize wise-use of wetland.</p> |
| Irrigation Area           | 680ha  | 680ha   | 450ha  |
| Length of protection dyke | 3260m  | 3244m   | 0m   |
| Acreage of Buffer zone    | 251,000m <sup>2</sup>  | 215,000m <sup>2</sup>   | 0ha  |
| Acreage of Natural Forest | 25,730m <sup>2</sup> (10.3%)   | 640m <sup>2</sup> (0.3%)  | -  |
| Environmental Impact      | <p>Seasonal water supply to aquatic habitats within buffer zone will be available resulting in supply water and nutrients to flora and fauna species within the enclosed floodplain.</p> <p>Oxbow with rich ecosystems will be affected but the degree is minor.</p> <p>Areas with invasive species will be disrupted during construction of the dyke.</p> <p>River water quality will be affected by excavated sediment where the dyke intersects the river meander during construction of the dyke.</p>  | <p>Seasonal water supply to aquatic habitats within buffer zone will be available resulting in supply water and nutrients to flora and fauna species within the enclosed floodplain.</p> <p>Oxbow with rich ecosystems will be affected but the degree is minor.</p> <p>Areas with invasive species will be disrupted during construction of the dyke.</p> <p>River water quality will be affected by excavated sediment where the dyke intersects the river meander during construction of the dyke.</p> | <p>Current status unchanged. The environment will not be controlled.</p>   |
| Biodiversity              | This is necessary in terms of biodiversity because the old river   | Construction of a dyke is suitable in terms of conservation of  | Current status unchanged and   |

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| Alternative                                    | ALT-L1  | ALT-L2  | ALT-L0   |
|--|---|---|--|
|  | course is still intact and some sections have riverine vegetation that is degraded but it still holds reasonable biodiversity.  | biodiversity because it gives chance for restoration of the river buffer zone that is usually degraded through cultivation  | uncontrolled.  |
| Water quality and purification                 | Better water quality due to sediment deposition, vegetation filtration, increased residence time hence better purification capacity.  | Better water quality due to sediment deposition, vegetation filtration, increased residence time hence better purification capacity.  | Current status unchanged   |
| Environmental condition within protection zone | The restoration of original environmental status is expected by restoring the old river course, such as regeneration of riverine vegetation and aquatic living things like fish and amphibians. Dyke installation will be positive to keep water for aquatic organisms, esp. during wet season.   | Restoration of the environment in the original part of the river is expected for riverine vegetation and aquatic organisms, but not much in the diverted part because of poorer ecological conditions compared with those in the original river part.   | Current status unchanged   |
| Affect to the downstream                       | Formation of sand bars and reduced sediment transport to Ramsar site is anticipated.  | Formation of sand bars and reduced sediment transport to Ramsar site is anticipated.<br>Increased flood protection for the plots on the both sides.   | Less impact to Ramsar site as the river course does not reach to.                                |
| Social Impact                                  | Better land productivity that used to be flooded.<br>Increased difficulty of community mobility across restored river during construction.  | Better land productivity that used to be flooded.<br>Decrease of accessibility to the river.  | Water allocation from the river is still uneven for both sides.                                  |
| Land acquisition and its impact                | Land taking required.<br>Increased difficulty of community mobility during construction.  | Land taking required.<br>Increased difficulty of community mobility during construction.  | No land taking.  |
| Involuntary resettlement within buffer zone    | No resettlement within the buffer zone.   | No resettlement required within the buffer zone.  | No one have impact.  |
| Impact to Local economy                        | 680 ha land to gain the benefits of irrigation and corresponding better economic productivity.  | 680 ha land to gain the benefits of irrigation and corresponding better economic productivity.  | Only 450 ha land to gain the benefits of irrigation.   |
| Land use and utilization of local resources    | Land near the river channel conserved and restricted for use.<br>However, extending the river course will give chance to local people for water use.  | Land near the river channel conserved and restricted for use.<br>However, extending the river course will give chance to local people for water use.  | Inefficient land use and local resource utilization continue.                                    |
| Judgment and reason                            | <b>Adopted</b><br>The river course restoration and protection dyke installation will contribute to the local productivity in term of environmental and social aspect. Flood mitigation will be attained.<br>Restoration of water flow in the downstream will hydrate the Ramsar site that prevents farmers' invention to the Ramsar site. | <b>Not adopted</b><br>The downstream part of left side of the project area will continue to dry up with no river water flow and it leads to dehydrate the Ramsar site that invites farmers' invention to the Ramsar site. Since existing waterway is artificial canal, building the buffer zone does not have much positive impact in terms of environmental and social aspect. | <b>Not adopted</b><br>No flood control is realized and negative impacts on the area are maximum. |

Source: JICA Study Team

**Table 1.1.11 Comparison of Alignment of Protection Dyke and Protection Area (repeated)**

| Alternative                 | ALT-P1  | ALT-P2   | ALT-P3  | ALT-P4  | ALT-P5  |
|-----------------------------|---|--|---|---|---|
| Plan name                   | Linear river by bank protection   | Envelope shape covering river curvature  | Leaving 30m wide area from hypothetical river centre  | Leaving 30m wide area from river curvature  | Zero Option   |
| Image                       |    |    |    |    |   |
| Outline of the Plan         | Rive improvement by straight line with bank protection and no protection dyke against flood. Therefore more land resource can be available for development.   | To install protection dyke along the current river curvature to prevent the flood flow. Even in this case, more space is needed for buffer zone than the 5 to 20m which is agreed on CbWMP | To install protection dyke leaving 30m wide area from hypothetical river centre. The alignment and necessary space is almost the same as ALT-P2.                      | To install protection dyke leaving 30m wide area from river curvature. The National Environment Regulation suggests taking 30m from river bank.                       | Nothing shall be done, so no protection dyke and no buffer zone.  |
| Length of Dyke              | 3.65km  | 3.84km   | 3.66km  | 3.88km  | 0km   |
| Area of BZ (buffer zone)    | 0ha   | 21.2ha   | 22.5ha  | 38.5ha  | 0ha   |
| Mean width of BZ            | —   | 55m  | 61m   | 99m   | —   |
| Area of PZ (protected zone) | 3.3ha   | 35.4ha   | 35.6ha  | 54.1ha  | 0ha   |
| Mean PZ width               | 0m  | 92m  | 97m   | 139m  | 0m  |
| HH in PZ                    | 0HH   | 0HH  | 0HH   | 32Buildings, 20huts   | 0HH   |
| Flood Control               | Design discharge can be drained by low flow channel within short period. As velocity of flood flow is around 4.0m/s, it has a risk of taking away human life. | Installed protection dyke can protect the farmland and residential area from flood damage. Necessary height of FPD is 1.5m inclusive of extra banking for settlement.                      | Installed protection dyke can protect the farmland and residential area from flood damage. Necessary height of FPD is 1.4m inclusive of extra banking for settlement. | Installed protection dyke can protect the farmland and residential area from flood damage. Necessary height of FPD is 1.3m inclusive of extra banking for settlement. | Flood shall overflow the river course and affect to the farmland. |

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|                                | point = 2   | point = 5   | point = 5   | point = 5   | point = 1  |
|--------------------------------|---|---|---|---|--|
| River Slope                    | 1/275   | 1/275   | 1/275   | 1/275   | 1/300  |
| River bed width                | 6.5m  | 2.0m  | 2.0m  | 2.0m  | 2.0m   |
| Height of low flow channel     | 2.3m  | 1.8m  | 1.8m  | 1.8m  | 1.8m   |
| Width of BZ                    | -   | 55m   | 60m   | 99m   | -  |
| Height of dyke                 | -   | 1.5m  | 1.4m  | 1.3m  | -  |
| Max Velocity                   | 4.02m/s   | 0.94m/s   | 0.91m/s   | 0.75m/s   | 1.1m/s   |
| Environmental Impact           | <p>Seasonal water supply to aquatic habitats will be terminated resulting in reduced water and nutrients to flora and fauna species within the floodplain, lifecycle disruption, loss of spawning grounds fish and amphibians.</p> <p>River water quality will be affected by excavated sediment during construction works.</p> | <p>Seasonal water supply to aquatic habitats within buffer zone will be available resulting in supply of water and nutrients to flora and fauna species within the enclosed floodplain.</p> <p>Areas with invasive species will be disturbed during construction of the dyke leading to dispersal and proliferation.</p> <p>River water quality will be affected by excavated sediment where the dyke intersects the river meander during construction of the dyke.</p> | <p>Seasonal water supply to aquatic habitats within buffer zone will be available resulting in supply of water and nutrients to flora and fauna species within the enclosed floodplain.</p> <p>Areas with invasive species will be disturbed during construction of the dyke leading to dispersal and proliferation.</p> <p>River water quality will be affected by excavated sediment where the dyke intersects the river meander during construction of the dyke.</p> | <p>Seasonal water supply to aquatic habitats within buffer zone will be available resulting in supply of water and nutrients to flora and fauna species within the enclosed floodplain.</p> <p>Areas with invasive species will be disturbed during construction of the dyke leading to dispersal and proliferation.</p> <p>River water quality will be affected by excavated sediment where the dyke intersects the river meander during construction of the dyke.</p> | <p>Current status unchanged. This will lead to continued cultivation up to the river banks and higher risk of soil erosion and silt deposition into the river.</p> <p>There will be loss of macrophytes which contribute to proper functioning of the river including, silt filtration, cover and spawning ground for aquatic fauna.</p> |
|                                | point = 1   | point = 3   | point = 3   | point = 3   | point = 2  |
| Biodiversity                   | <p>Not suitable design because it would eat into immediate riverside land cover that is a more stable environment than the wetland areas further afield from the river, for wetland species of plants and animals.</p>  | <p>Suitable because the design considers protection of the river banks including old river course and river banks vegetation thus conserving biodiversity there in.</p> <p>Allows for restoration of spawning grounds for fish and amphibians.</p>  | <p>Suitable because the design considers protection of the river banks including old river course and river banks vegetation thus conserving biodiversity there in.</p> <p>Allows for restoration of spawning grounds for fish and amphibians.</p>  | <p>Suitable in terms of conservation of biodiversity because it gives chance for restoration of the river banks vegetation in a wider area that has been severely degraded through cultivation.</p> <p>Allows for restoration of spawning grounds for fish and amphibians.</p>  | <p>Not suitable for biodiversity conservation because it does not give any consideration for conservation of biodiversity along the river.</p> <p>Flood intolerant vegetation and flora shall be destroyed and replaced by that with more tolerance to water logging conditions.</p>   |
|                                | point = 1   | point = 3   | point = 3   | point = 3   | point = 2  |
| Water quality and purification | Reduced water quality due to sediment load and low  | Good water quality due to sediment deposition, vegetation   | Better water quality due to sediment deposition,  | Best water quality due to sediment deposition,  | Current status unchanged.  |

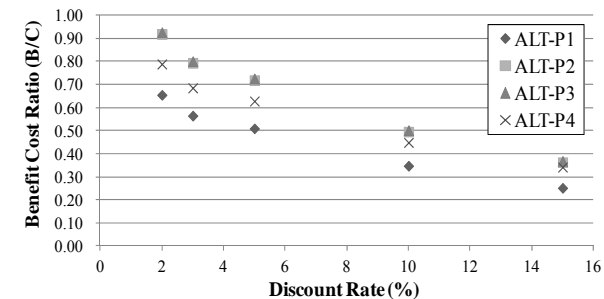
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|  |  |   |   |   |  |
|--|--|---|---|---|--|
|  | purification capacity.   | filtration, increased residence time hence better purification capacity.  | vegetation filtration, increased residence time hence better purification capacity.   | vegetation filtration, and increased residence time hence better purification capacity.   | Water quality continues deteriorating due deposition of eroded silt and nutrients from cultivated plots.   |
|  | point = 1  | point = 3   | point = 4   | point = 4   | point = 3  |
| Environmental condition within protection zone | Encroachment of vegetation into the river flow section. Accumulation of river bed sediment (especially in the dry seasons) which used to be deposited in the floodplain – raising the river bed and increasing potential for flooding – reduced flow river cross sectional area. | All buffer zone within river corridor, contains identified location of invasive species (when such sites are disturbed, the invasive species tend to increase in abundance). Seasonal flooding in buffer zone and continued occurrence of seasonal aquatic habitats.<br><br>Allows for regeneration of riverine vegetation and in time restoration of spawning grounds for fish and amphibians. | All buffer zone within river corridor, contains identified location of invasive species (when such sites are disturbed, the invasive species tend to increase in abundance.), seasonal aquatic habitats. Seasonal flooding in buffer zone.<br><br>Allows for regeneration of riverine vegetation and in time restoration of spawning grounds for fish and amphibians. | All buffer zone within river corridor, contains identified location of invasive species (when such sites are disturbed, the invasive species tend to increase in abundance.), seasonal aquatic habitats. Seasonal flooding in buffer zone.<br><br>Allows for regeneration of riverine vegetation and in time restoration of spawning grounds for fish and amphibians. | Current status unchanged.<br><br>Continued cultivation up to the river banks and higher risk of soil erosion and silt deposition into the river.   |
|  | point = 2  | point = 4   | point = 4   | point = 4   | point = 2  |
| Affect to the downstream                       | Chance of sediment deposition into Ramsar site, High floods with more energy will be conveyed to the Ramsar site.  | Formation of sand bars and reduced sediment transport to Ramsar site.<br><br>Dumped flood flows.  | Formation of sand bars and reduced sediment transport to Ramsar site.<br><br>Dumped flood flows.  | Formation of sand bars and reduced sediment transport to Ramsar site.<br><br>Dumped flood flows.  | Current status unchanged.<br><br>The swamp created due to current diversion will continue to render the land unusable for farming.   |
|  | point = 1  | point = 3   | point = 3   | point = 3   | point = 2  |
| Social Impact                                  |  |   |   |   |  |
| Social Impact                                  | Gardens downstream will be impacted by larger magnitude floods.<br>The land out of the project area to the northeast will have increased risk of flooding.<br><br>Minimal buffer zone area protected thus availing high value land for farming.                                  | The land out of the project area to the northeast will have increased risk of flooding. Thus the productivity of the land will be compromised affecting a resource to support livelihood.<br><br>For communities cultivating up to the river bank, less land will be available for cultivation.<br><br>Reduced disease incidences attributed to flooding.                                       | The land out of the project area to the northeast will have increased risk of flooding. Thus the productivity of the land will be compromised affecting a resource to support livelihood.<br><br>For communities cultivating up to the river bank, less land will be available for cultivation.   | The land out of the project area to the northeast will have increased risk of flooding. Thus the productivity of the land will be compromised affecting a resource to support livelihood.<br><br>For communities cultivating up to the river bank, less land will be available for cultivation.   | The land out of the project area to the northeast will continue under the current seasonal flooding.<br><br>Community land converted into a swamp due to current diversion will continue to be unusable for farming. |

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|   |   |   |   |   |  |                              |
|---|---|---|---|---|--|------------------------------|
|   |   |   | Reduced disease incidences attributed to flooding.  | Reduced disease incidences attributed to flooding.  |  |                              |
|   | point = 2   | point = 3   | point = 3   | point = 3   | point = 2  |                              |
| Land acquisition and its' impact            | Minimal land to be acquired<br>Increased difficulty of community mobility during construction.  | Third largest land takes.<br>Increased difficulty of community mobility during construction.  | Second Largest land takes.<br>Increased difficulty of community mobility during construction.   | Largest land takes.<br>Increased difficulty of community mobility during construction.  | No land take   |                              |
|   | point = 5   | point = 2   | point = 2   | point = 1   | point = 3  |                              |
| Involuntary resettlement within buffer zone | No resettlement within the buffer zone  | No resettlement required within the buffer zone   | No resettlement required within the buffer zone   | No resettlement required within the buffer zone   | Current status unchanged.  |                              |
|   | point = 3   | point = 3   | point = 3   | point = 3   | point = 2  |                              |
| Impact to Local economy                     | A few farmers using river bed as source livelihood will be displaced.<br><br>More land near the river channel to be developed for irrigation will require fertilizers – benefits of deposited alluvium.<br>More land irrigated and thus better economic productivity.<br>Economic loss due to flooding minimized. | A few farmers using river bed as source livelihood will be displaced.<br><br>Benefits of deposited alluvium will be lost.<br><br>Less land to gain the benefits of irrigation and corresponding better economic productivity.<br>Economic loss due to flooding minimized. | A few farmers using river bed as source livelihood will be displaced.<br><br>Benefits of deposited alluvium will be lost.<br><br>Less land to gain the benefits of irrigation and corresponding better economic productivity.<br>Economic loss due to flooding minimized. | A few farmers using river bed as source livelihood will be displaced.<br><br>Benefits of deposited alluvium will be lost.<br>Less land to gain the benefits of irrigation and corresponding better economic productivity.<br>Economic loss due to flooding minimized. | Farmers continue cultivating food crops in the old river bed as source livelihood since the diversion will stay.<br>The land in Bulambuli will continue to be used on a seasonal basis thus limiting economic productivity.<br>Economic loss due to flooding will continue to occur. |                              |
|   | point = 5   | point = 4   | point = 4   | point = 4   | point = 1  |                              |
| Benefit, Cost and Environmental impact      | Investment <sup>1)</sup>  | 10,563,465,000 UGX  | 6,253,774,080 UGX   | 5,960,631,600 UGX   | 6,318,917,560 UGX  | -                            |
|   | O&M cost  | 316,903,950 UGX/yr  | 187,613,222 UGX/yr  | 178,818,853 UGX/yr  | 189,567,527 UGX/yr   | 729,315 UGX/yr <sup>5)</sup> |
|   | Benefit from Cropping <sup>2)</sup>   | 545,514,706 UGX/yr  | 402,771,691 UGX/yr  | 375,495,956 UGX/yr  | 293,668,750 UGX/yr   | 117,509,276 UGX/yr           |
|   | Benefits from Non-crop <sup>3)</sup>  | 0 UGX/yr  | 45,219,273 UGX/yr   | 53,859,899 UGX/yr   | 79,781,775 UGX/yr  | 0 UGX/yr                     |
|   | Out of the BZ   | 60 ha   | 44.3 ha   | 41.3 ha   | 32.3 ha  | 60 ha                        |
|   | Buffer zone   | 0 ha  | 15.7 ha   | 18.7 ha   | 27.7 ha  | 0 ha                         |

| Total, wetland <sup>4)</sup> | 60 ha  | 60 ha | 60 ha | 60 ha | 60 ha |
|------------------------------|--|-------|-------|-------|-------|
| B/C ratio                    | 0.347  | 0.495 | 0.501 | 0.448 | » 2   |
| Data and Assumption          | <p><b>1)</b> Investment cost as direct construction cost for flood protection dyke alone, covering both left and right banks with given length (km), disbursed 50-50% over 2years. Annual O&amp;M cost is set uniformly as 3% of the direct construction cost for all plans.</p> <p><b>2)</b> Cropping values include lowland rice, maize, banana, beans, yams, cassava, and vegetables (leafy) under Without Project condition; while only rice and maize included for With Project condition. Economic values referred to Table 1.3.5 (1.3.4 Wetland and Land Resource). The benefit per unit area (UGX/ha/yr) estimated as summed individual economic values (UGX/yr) divided by the total production area (ha), derived from the GIS image analysis. Net return values under With/Without Project, similarly applied in the Chapter 6, were reflected for lowland rice and maize production. For annual crop benefit of the P5 ZERO OPTION, “0” benefit was applied (benefit is nil) for 10th, 20th and 30th year due to assumed serious damages by 1/10ye-probability flooding.</p> <p><b>3)</b> Non-crop values contain; natural resources available within the BZ including building poles, roofing poles, reeds, grass for building, grass for livestock, fibers, water (domestic and livestock), herbs, fish and firewood. For calculation purpose, the BZ was defined more broadly by including areas of river/swamp/broadleaf.</p> <p><b>4)</b> Total area of wetland assumed as 60 ha; 3,000m (length, river-line) by 200m (width, across the river), and set constant over different ALT plans for comparison purpose. The area of BZ was calculated using the mean width of BZ as presented above, then the Out of BZ area (for cropping) gained by subtracting area of BZ from the total area of targeting wetland. Buffer zones for ALT-P1, P5 were assumed either as demolished due to land development or exploitation due to no protection from flooding/ human economic activities.</p> <p><b>5)</b> O&amp;M cost for P5, refined as environmental management cost, referred to Kakuru et al. (2013)<sup>2</sup> for an annual unit management cost (USD/ha) by the local government.</p> <p><b>Figure:</b> Changes in B/C ratio in accordance with different discount rates considered indicating all alternative plans (P1 to P4) involve similar trend of sensitivity for the B/C ratio in relation to the rate varied. Hasegawa <i>et al.</i> (2005)<sup>3</sup> suggested a need of cross comparison of evaluation for alternative projects by employing different discount-rate from low to high to comprehend environmentally sound discounting factor. This will be critical when we see the relationship between environmental impact by the project and an aspect of long-term life support system of the environment.</p> <p><b>Note:</b> the B/C ratio calculated on the discounted values (present value) of benefit and cost components over a 30-year project life. Discounting rate of 10% was applied as a normal discounting rate which would not favour private investment decisions by individuals; while, viewing a long-term support</p> |       |       |       |       |



<sup>2</sup> Kakuru, W., N. Turyahabwe and J. Mugisha (2013) *Total economic value of wetlands products and service in Uganda*. The Scientific Journal, Vol.2013, Article ID192656, 13pp. The cost used for Zero Option: (15,428USD/yr+68,932ha) x 60ha x 3300UGX/USD + 137HH\*5000UGX/HH, referred to the total management cost on Kyoga plains of 68,932ha. Management cost includes government funding, local revenue and salary/allowance for staffs. Water user fee (communal contribution) also considered for current number of users (households).

<sup>3</sup> Hasegawa, H., K. Mitani and C. Okano (2005) *Methods and case-studies of economic evaluation on environmental impact of the agricultural and forestry projects in developing countries*. Institute for International Cooperation, Japan International Cooperation Agency (JICA). (in Japanese)



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|   |   | system of the wetland for ecosystem services (including water-supply, fuel, materials and foods therefore both as non-cropping and cropping values).   |  |  |  |  |
|---|---|--|--|--|--|--|
|   |   | point = 1  | point = 3  | point = 4  | point = 2  | point = 5  |
| Land use and utilization of local resources | More land near the river channel developed for irrigation. Fishing will be hampered by faster water flow and steep banks. | More land near the river channel in the buffer zone conserved and restricted for use. Better for fishing due to moderate flows, presence of spawning grounds and accessible banks. Allows for regeneration of riverine vegetation that can be used as a renewable resource, medicinal and for craft raw materials. | More land near the river channel in the buffer zone conserved and restricted for use. Better for fishing due to moderate flows, presence of spawning grounds and accessible banks. Allows for regeneration of riverine vegetation that can be used as a renewable resource, medicinal and for craft raw materials. | More land near the river channel in the buffer zone conserved and restricted for use. Better for fishing due to moderate flows, presence of spawning grounds and accessible banks. Allows for regeneration of riverine vegetation that can be used as a renewable resource, medicinal and for craft raw materials. | More land near the river channel in the buffer zone conserved and restricted for use. Better for fishing due to moderate flows, presence of spawning grounds and accessible banks. Allows for regeneration of riverine vegetation that can be used as a renewable resource, medicinal and for craft raw materials. | Current status unchanged. Continued cultivation up to the river banks and higher risk of soil erosion and silt deposition into the river and minimal fishing downstream in the wetlands. |
| <b>Total Point</b>                          | <b>24</b>   | <b>36</b>  | <b>38</b>  | <b>35</b>  | <b>25</b>  |  |
| Evaluation                                  | Very Bad  | Good   | Very Good  | Fair   | Bad  |  |

Source: JICA Study Team

### 1.1.5 Scoping and TOR for Investigation of Environmental and Social Considerations

Scoping of the EIA study for the project was discussed and prepared in accordance with the initial survey. The result of scoping is shown in Table 1.1.12. Based on the scoping table, no item is rated as “A”, and 19 and 16 items as “B” (some positive/negative impacts are expected) for pre/during construction and operation phase, respectively. On the other hand, 9 and 10 items are rated as “D” (few impacts are expected).

**Table 1.1.12 Scoping of the EIA Study for the Atari Irrigation Project**

|                     | No. | Item                                 | Rating      |           | Description of Impacts  |
|---------------------|-----|--------------------------------------|-------------|-----------|---|
|                     |     |                                      | Pre-/Const. | Operation |   |
| Pollution           | 1   | Air Pollution                        | B-          | D         | [Design/Construction phase]<br>Dust and exhaust gas may be generated temporarily. The impact is slight as there are few houses.<br>[Operation phase]<br>Air pollution is not anticipated because there is no source.  |
|                     | 2   | Water Pollution                      | B-          | B-        | [Design/Construction phase]<br>Inflow of turbid water from the construction sites is expected. Drained water like night soil from workers' camp areas can be a source of water pollution if it flows in.<br>[Operation phase]<br>Farmers scarcely use chemical fertilizers and agrochemicals at present. In addition, great increase of such chemical materials that cause water pollution is not expected. However, impact caused by expansion of chemical materials may affect downside of project area, especially to fishery and papyrus. |
|                     | 3   | Soil Contamination                   | B-          | C         | [Design/Construction phase]<br>Spilled oil from construction machinery may cause soil contamination.<br>[Operation phase]<br>Salt damage of farmlands is anticipated but the extent is unsure.  |
|                     | 4   | Wastes                               | B-          | B-        | [Design/Construction phase]<br>Construction works will generate scrap materials and wastes. And wastes from workers' camp can be a source.<br>[Operation phase]<br>Agricultural residues like paddy straw and rice husk after harvesting may be generated and needed a proper treatment.  |
|                     | 5   | Noise and Vibration                  | B-          | D         | [Design/Construction phase]<br>Though impact by construction machinery is expected, the range may be limited as the area is farmland and the population is few.<br>[Operation phase]<br>Impact by noise and vibration is not anticipated because there is no noise/vibration source.  |
|                     | 6   | Ground Subsidence                    | D           | D         | [Design/Construction phase], [Operation phase]<br>The works, which cause ground subsidence (such as excessive pumping-up), is not scheduled and pumping-up of groundwater is not necessary in operation phase. Thus, ground subsidence is not expected.   |
|                     | 7   | Offensive Odors                      | D           | D         | [Design/Construction phase], [Operation phase]<br>Use of machinery and works, which cause offensive odors, is not expected. Generation of offensive odors is not expected   |
| Natural Environment | 8   | Topography and Geographical Features | D           | D         | [Design/Construction phase], [Operation phase]<br>Large-scaled modification in topography and geographical features is not required as the irrigation and drainage channel are designed by making use of existing geographical slope.   |
|                     | 9   | Flora, Fauna and Biodiversity        | B-          | B-        | [Design/Construction phase]<br>Plant trimming, decrease of habitats of wild animals and disturbance of wetland ecosystem are anticipated by construction work.<br>[Operation phase]<br>In case farmers decide local plants are not useful to their activities, they would vanish these plants.  |

|                    | No. | Item  | Rating      |           | Description of Impacts   |
|--------------------|-----|---|-------------|-----------|--|
|                    |     |   | Pre-/Const. | Operation |  |
| Social Environment | 10  | Protected Areas                                       | B-          | B-        | [Design/Construction phase]<br>Drained water caused by construction may disturb the Ramsar Convention in which is located downstream Atari River.<br>[Operation phase]<br>Drained water with fertilizer is anticipated to give certain impact on the Ramsar Convention area but the extent is expected to be limited.  |
|                    | 11  | Soil Erosion  | B-          | B+        | [Design/Construction phase]<br>Soil erosion is expected near borrowing pit.<br>[Operation phase]<br>This project will convert existing farmland and grassland into rice field. Thus, multiple function of rice field will prevent soil erosion.  |
|                    | 12  | Groundwater   | D           | B-        | [Design/Construction phase]<br>Dredging depth is shallow and construction works will be done by open-cut. In addition, the construction method, which decrease groundwater level such as deep well method, is not going to be applied in construction, thus the impact on groundwater is not expected.<br>[Operation phase]<br>Ground water may be contaminated by fertilizers but the impact is expected minimum as river water will be used in irrigation. |
|                    | 13  | Hydrological Situation                                | B-          | B+/-      | [Design/Construction phase]<br>Water flow may be disturbed when constructing the head work.<br>[Operation phase]<br>Reduction of water volume to downstream is expected by utilization of irrigation water. On the other hand, it becomes possible to get irrigation water stably at the area to be given benefit in operation phase.  |
|                    | 14  | Global Warming  | D           | D         | [Design/Construction phase], [Operation phase]<br>Impact on global warming such as massive amount of release of greenhouse gas is not expected both in construction phase and operation phase.   |
|                    | 15  | Involuntary Resettlement/ Land Acquisition            | B-          | C         | [Design/Construction phase]<br>Land acquisition is required for the construction of irrigation facilities. On the other hand, there are very few houses and involuntary resettlement is not expected by modifying alignment of irrigation facilities.<br>[Operation phase]<br>The impact can be estimated by future study.   |
|                    | 16  | Local Economy such as Employment and Livelihood, etc. | B+          | B+/-      | [Design/Construction phase]<br>Generation of new employment is expected during construction.<br>[Operation phase]<br>Increase of irrigation water may raise productivity.<br>On the other hand, person who utilizes wetland for the purpose of fishery, farming, harvesting and processing of Papyrus, etc. (other than rice farming) are likely to be affected.   |
|                    | 17  | Landscape   | B-          | D         | [Design/Construction phase]<br>It is concerned that heavy machinery and material yard may ruin landscape.<br>[Operation phase]<br>Landscape of the project area is not disturbed because the facilities to be planned will not be large.   |
|                    | 18  | Land Use and Utilization of Local Resources           | B-          | B-        | [Design/Construction phase]<br>Person who utilizes wetland for the purpose of fishery, farming, harvesting and processing of Papyrus, etc. (other than rice farming) are likely to be affected.<br>[Operation phase]<br>Building the buffer zone may restrict fishery and other activities around the zone. On the other hand, the ecosystem in the buffer zone will be properly conserved.  |

| No. | Item   | Rating      |           | Description of Impacts   |
|-----|--|-------------|-----------|--|
|     |  | Pre-/Const. | Operation |  |
| 19  | Split in Community                                   | D           | B+/-      | [Design/Construction phase]<br>The boundaries will be identified before the construction, so split in community is not anticipated.<br>[Operation phase]<br>People in community expected to be united as water user's association will be established.<br>On the other hand, tension may be generated between rice farmers and people who utilize wetland for fishing, farming, etc. |
| 20  | Existing Social Infrastructures and Services         | B-          | D         | [Design/Construction phase]<br>Although it is expected traffic volume of construction related vehicles will increase, the impact is limited as the site is located in rural area.<br>[Operation phase]<br>Since the irrigation project provides new facilities and utilizes the existing social infrastructures, no adverse impacts are anticipated.                                 |
| 21  | The Poor, Indigenous and Ethnic People               | B+          | B+/-      | [Design/Construction phase]<br>New employment is expected to be generated during construction.<br>[Operation phase]<br>Increase of irrigation water may raise productivity.<br>On the other hand, person who utilizes wetland for the purpose of fishery, farming, harvesting and processing of Papyrus, etc. (other than rice farming) are likely to be affected.                   |
| 22  | Misdistribution of Benefit and Damage                | D           | B-        | [Design/Construction phase]<br>The project will try to provide fair support to affected people, so the misdistribution of benefit and damage is not anticipated.<br>[Operation phase]<br>There may be gaps between beneficiaries and non-beneficiaries.  |
| 23  | Cultural Heritage                                    | D           | D         | [Design/Construction phase], [Operation phase]<br>There is no cultural heritage authorized by GoU in/around project area. Then adverse impacts are not anticipated during design/construction phase as well as operation phase.  |
| 24  | Local Conflict of Interests                          | C           | B-        | [Design/Construction phase]<br>Although farmers sometimes fight with regard to boundaries but large-scale objection movement regarding land dispute and project has not reported in project area. However, careful attention should be paid to local residents.<br>[Operation phase]<br>There may be gaps between beneficiaries and non-beneficiaries.                               |
| 25  | Water Usage or Water Rights and Rights of Common     | B-          | B+/-      | [Design/Construction phase]<br>Impact on water usage of farmers at downstream is expected by unstable water flow.<br>[Operation phase]<br>Planned water usage will be established by the project.  |
| 26  | Gender/ Children's Rights                            | C           | C         | [Design/Construction phase], [Operation phase]<br>Slight impact on children by water drawing work is expected, but the extent is unsure.   |
| 27  | Hazards (Risk), Infectious Diseases such as HIV/AIDS | C           | C         | [Design/Construction phase]<br>Since local residents will be employed as construction worker, outbreak of infection disease is not so expected, but the extent is unclear.<br>[Operation phase]<br>Spread of infectious diseases by the project is not anticipated because this is an irrigation project. However, endemic diseases caused by spread of water use may be potential.  |
| 28  | Working Conditions/ Accidents                        | B-          | D         | [Design/Construction phase]<br>Deterioration of working condition is concerned by breaking regulations.<br>[Operation phase]<br>The project will not give negative impact on-farmers since the farming way will not be drastically changed.  |

|        | No. | Item                    | Rating      |           | Description of Impacts  |
|--------|-----|-------------------------|-------------|-----------|---|
|        |     |                         | Pre-/Const. | Operation |   |
| Others | 29  | Accident                | B-          | B-        | [Design/Construction phase]<br>Accident may be caused by neglect of regulation and imperfect following to safety countermeasures.<br>[Operation phase]<br>Car and motorbike traffic on the service roads along the canals may be a cause of traffic accident. Children who play around borrow pits may have a physical accident. The development of canals in the area may induce approaching unexpected animals like wild reptiles and giving damages to farmers and domestic animals. |
|        | 30  | Across-boarder problems | D           | C         | [Design/Construction phase]<br>Considering the scale of facility, impact on the Nile River basin is not expected.<br>[Operation phase]<br>Water intake from Atari River is not sure to give an adverse impact on the Nile River basin. Further study is needed.   |
|        | 31  | Monitoring System       | B-          | B-        | [Design/Construction phase], [Operation phase]<br>Malfunction may be caused by the neglect of monitoring system during construction and operation phases, respectively.   |

Rating:

A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown

(Examination is needed. Impacts may become clear as study progresses.)

D: No impact is expected

Source : JICA Study Team

Based on the scoping results shown in Table 1.1.12, necessary survey items for the EIA study were selected and examined study methods as well as expected countermeasures. The terms of reference (TOR) for the EIA study for the Atari irrigation project is shown in Table 1.1.13.

**Table 1.1.13 TOR for EIA Study for the Atari Irrigation Project**

| No. | Environmental Item  | Study Item   | Study Method  |
|-----|---------------------|--|---|
| 1   | Air Pollution       | <ul style="list-style-type: none"> <li>Related environmental standards</li> <li>Current condition of project area</li> <li>Confirmation of construction works and heavy machinery</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> </ul>   |
| 2   | Water Pollution     | <ul style="list-style-type: none"> <li>Related environmental standards</li> <li>River water quality</li> <li>Current status of river water in domestic use</li> </ul>                          | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Water quality examination (pH, Turbidity, EC, BOD, DO, TSS, T-P, T-N, NH<sub>4</sub>-N, NO<sub>3</sub>-N, PO<sub>4</sub>-P) at 3 sites (upstream, intake and downstream) at 4 times (each 2 for dry &amp; rainy seasons respectively).</li> <li>Interview survey to farmers regarding the usage of agrochemicals and fertilizers</li> </ul> |
| 3   | Soil Contamination  | <ul style="list-style-type: none"> <li>Confirmation of related regulations</li> <li>Confirmation of similar cases</li> <li>Confirmation of agrochemicals</li> </ul>                            | <ul style="list-style-type: none"> <li>Review of existing laws</li> <li>Data collection from other Irrigation Scheme in the country, MAAIF, MWE, and farmers</li> <li>Data collection from farmers on usage of fertilizer and pesticides and its impact on soil</li> <li>Soil fertilizer analysis (pH, EC, O-C, T-N, CEC, minerals (Ca, Mg, K, Na, P))</li> </ul>   |
| 4   | Waste               | <ul style="list-style-type: none"> <li>Confirmation of related regulations</li> <li>Information gathering regarding disposal measures from similar cases</li> </ul>                            | <ul style="list-style-type: none"> <li>Reviewing of existing regulations</li> <li>Data collection from other Irrigation Scheme in the country, MAAIF, MWE, and farmers</li> <li>Any other method acceptable to the Client</li> </ul>  |
| 5   | Noise and Vibration | <ul style="list-style-type: none"> <li>Related environmental regulations</li> <li>Current condition of project area</li> <li>Confirmation of construction works and heavy machinery</li> </ul> | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> </ul>   |

| No. | Environmental Item  | Study Item   | Study Method  |
|-----|---|--|---|
| 9   | Flora, Fauna and Biodiversity   | <ul style="list-style-type: none"> <li>Current status of ecologically important site (site for breeding and feeding)</li> <li>Current living condition</li> <li>Confirmation of construction work and site</li> </ul>  | <ul style="list-style-type: none"> <li>Review of existing laws</li> <li>Review of existing data and information such as IBA and IUCN, especially for those in the Red List</li> <li>Hearing from DEO and farmers</li> <li>Field survey and hearing from concerned body (plant, mammals, birds, amphibians, reptiles and aquatic living things at 1 site for 2 seasons)</li> </ul> |
| 10  | Protected Areas   | <ul style="list-style-type: none"> <li>Information about protected area</li> <li>Confirmation of current status of river water usage</li> <li>Confirmation of construction works and location</li> </ul>   | <ul style="list-style-type: none"> <li>Reviewing of current regulations</li> <li>Study on existing materials</li> <li>Site survey and interview survey (targeting Ramsar area)</li> </ul>   |
| 11  | Soil Erosion  | <ul style="list-style-type: none"> <li>Confirmation of current status of project area</li> <li>Confirmation of construction works and location</li> </ul>  | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey (grain size &amp; component, specific gravity of suspended solid)</li> </ul>   |
| 12  | Ground Water  | <ul style="list-style-type: none"> <li>Related environmental standards</li> <li>Ground water quality (boreholes)</li> <li>Current status of groundwater in domestic use</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Water quality examination</li> <li>Interview survey to farmers regarding the usage of agrochemicals and fertilizers</li> </ul>  |
| 13  | Hydrological Situation (e.g. river discharge and change of river bed) | <ul style="list-style-type: none"> <li>Confirmation of current status of project area</li> <li>Confirmation of construction contents and location</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> <li>Volume of river discharge</li> </ul>  |
| 15  | Involuntary Resettlement/ Land Acquisition                            | <ul style="list-style-type: none"> <li>Related regulations</li> <li>Similar cases</li> <li>Confirmation of construction works and location</li> <li>Confirmation of procedure of land acquisition and compensation</li> <li>Confirmation of residents whose land will be acquired</li> <li>Confirm the asset of affected residents</li> <li>Confirm the life and livelihood of affected residents</li> </ul> | <ul style="list-style-type: none"> <li>Reviewing of current regulation regarding land acquisition</li> <li>Interview to MAAIF, MWE, and district</li> <li>Study on existing materials</li> <li>Baseline survey</li> <li>Interview survey to farmers</li> <li>*Surveys related are done in DARAP study.</li> </ul>   |
| 16  | Local Economy such as Employment and Livelihood, etc.                 | <ul style="list-style-type: none"> <li>Confirmation of domestic economy</li> <li>Current status of occupation and livelihood including non-farmer</li> </ul>   | <ul style="list-style-type: none"> <li>Reviewing of existing information</li> <li>Consultation meeting</li> <li>Baseline survey</li> <li>Interview survey to farmers</li> </ul>   |
| 17  | Landscape   | <ul style="list-style-type: none"> <li>Confirmation of location of heavy machinery and stockyard</li> <li>Confirmation of the place where special attention should be paid to keep landscape</li> </ul>  | <ul style="list-style-type: none"> <li>Site survey (landscape survey)</li> <li>Baseline survey</li> </ul>   |
| 18  | Land Use and Utilization of Local Resources                           | <ul style="list-style-type: none"> <li>Confirmation of land use</li> <li>Current status of occupation and livelihood of the household on which the project may cause impact</li> </ul>   | <ul style="list-style-type: none"> <li>Reviewing of existing information</li> <li>Consultation meeting</li> <li>Baseline survey</li> <li>Interview survey to farmers</li> </ul>   |
| 19  | Split in Community  | <ul style="list-style-type: none"> <li>Confirmation of existing dispute in project area</li> </ul>   | <ul style="list-style-type: none"> <li>Consultation meeting</li> <li>Interview survey to farmers</li> </ul>   |
| 20  | Existing Social Infrastructures and Services                          | <ul style="list-style-type: none"> <li>Confirmation of surrounding traffic condition</li> </ul>  | <ul style="list-style-type: none"> <li>Interview to district and farmers</li> </ul>   |
| 21  | The Poor, Indigenous and Ethnic People                                | <ul style="list-style-type: none"> <li>Confirmation of poor and indigenous people among affected people</li> </ul>   | <ul style="list-style-type: none"> <li>Acquisition of related regulations and cases</li> <li>Population census survey</li> <li>Baseline survey</li> </ul>   |
| 22  | Misdistribution of Benefit and Damage                                 | <ul style="list-style-type: none"> <li>Current status of occupation and livelihood of the household on which the project may cause impact</li> </ul>   | <ul style="list-style-type: none"> <li>Consultation meeting</li> <li>Baseline survey</li> <li>Interview to farmers</li> </ul>   |
| 24  | Local Conflict of Interests   | <ul style="list-style-type: none"> <li>Confirmation of existing dispute in project area</li> </ul>   | <ul style="list-style-type: none"> <li>Consultation meeting</li> <li>Interview to farmers</li> </ul>  |

| No. | Environmental Item                                   | Study Item   | Study Method  |
|-----|--|--|---|
|     |  | <ul style="list-style-type: none"> <li>Current status of occupation and livelihood of the household on which the project may cause impact</li> </ul>   |   |
| 25  | Water Usage or Water Rights and Rights of Common     | <ul style="list-style-type: none"> <li>Confirmation of current status</li> </ul>   | <ul style="list-style-type: none"> <li>Consultation meeting</li> <li>Baseline survey</li> <li>Inventory survey</li> </ul>   |
| 26  | Gender/ Children's Rights                            | <ul style="list-style-type: none"> <li>Confirmation of water drawing work and location of well</li> <li>Access to medical facilities</li> <li>School attendance rate</li> <li>Rate of vaccination</li> </ul> | <ul style="list-style-type: none"> <li>Consultation meeting</li> <li>Baseline survey</li> <li>Interview to farmers</li> </ul>   |
| 27  | Hazards (Risk), Infectious Diseases such as HIV/AIDS | <ul style="list-style-type: none"> <li>Confirmation of construction works and location</li> <li>Similar cases</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> <li>Interview survey to Doho irrigation plan</li> </ul>                 |
| 28  | Working Conditions/ Accidents                        | <ul style="list-style-type: none"> <li>Confirmation of construction works and location</li> <li>Similar cases</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> <li>Interview survey to Doho irrigation plan, MAAIF, and MWE</li> </ul> |
| 29  | Accident   | <ul style="list-style-type: none"> <li>Confirmation of construction works and location</li> <li>Similar cases</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> <li>Interview survey to Doho irrigation plan, MAAIF, and MWE</li> </ul> |
| 30  | Across-boarder problems                              | <ul style="list-style-type: none"> <li>Information gathering</li> </ul>  | <ul style="list-style-type: none"> <li>Consultation with Nile River basin initiative</li> </ul>   |
| 31  | Monitoring System                                    | <ul style="list-style-type: none"> <li>Confirmation of construction works and location</li> <li>Similar cases</li> </ul>   | <ul style="list-style-type: none"> <li>Study on existing materials</li> <li>Site survey and interview survey</li> <li>Interview survey to Doho irrigation plan, MAAIF, and MWE</li> </ul> |

Source: JICA Study Team

## 1.1.6 Results of Investigation of Environmental and Social Considerations

### (1) Air Pollution

Most pollutants measured (NO<sub>x</sub>, SO<sub>2</sub>, CO, VOCs) at 4 sites were below the detected limits as well as national standards. Only particulates were detected (wet season: 2-18 µg/m<sup>3</sup>, dry season: 13-78 µg/m<sup>3</sup>) and they were below the national standard (200 µg/m<sup>3</sup>) but exceeded the WHO's guideline values of dust (PM<sub>10</sub>) of 50 µg/m<sup>3</sup> during the wet season. The level of particulates derived from sand dust and burnt fume by woods. Sampling sites and result of dust concentration are indicated in Figure 1.1.5 and Table 1.1.15.

Dust will be generated mainly during canal excavation work. However, the receptor sensitivity is assessed as very low given the very low density of the population that actually stay where the construction will be undertaken in the project area.

The impact is reversible upon implementation of the mitigation measures and adherence to good construction methods. Thus the impact severity can be minor.

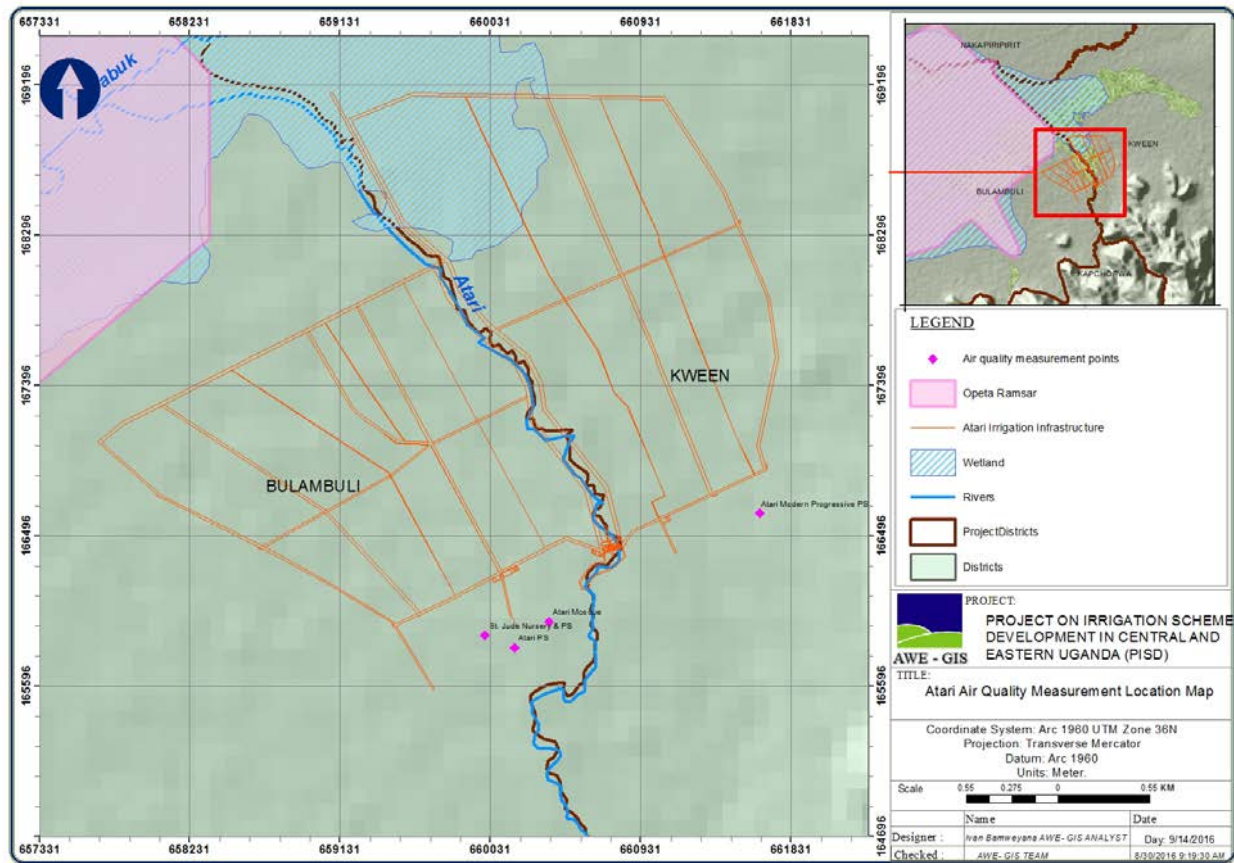


Figure 1.1.4 Location of Air Quality and Noise Survey in Atari Project Site

Table 1.1.14 Result of Dust Concentration (Atari Area)

| No.                            | Location                          | Dust Concentration (ug/m <sup>3</sup> ) |            | Note                                 |
|--------------------------------|-----------------------------------|---|------------|--------------------------------------|
|                                |                                   | Dry Season                              | Wet Season |                                      |
| 1                              | St. Jude Nursery & primary School | 23                                      | 18         | Clear sunny weather, vehicle traffic |
| 2                              | Atari primary School              | 27                                      | 17         | Clear sunny weather, vehicle traffic |
| 3                              | Atari Mosque                      | 13                                      | 5          | Clear sunny weather, vehicle traffic |
| 4                              | Atari Modern Progressive School   | 78                                      | 2          | Clear sunny weather, vehicle traffic |
| National Standard (by NEMA)    |                                   | 200                                     |            | Standard for grain dust (24hr)       |
| WHO's standard for ambient air |                                   | 50                                      |            | PM <sub>10</sub>                     |

Source: JICA Study Team

## (2) Water Pollution

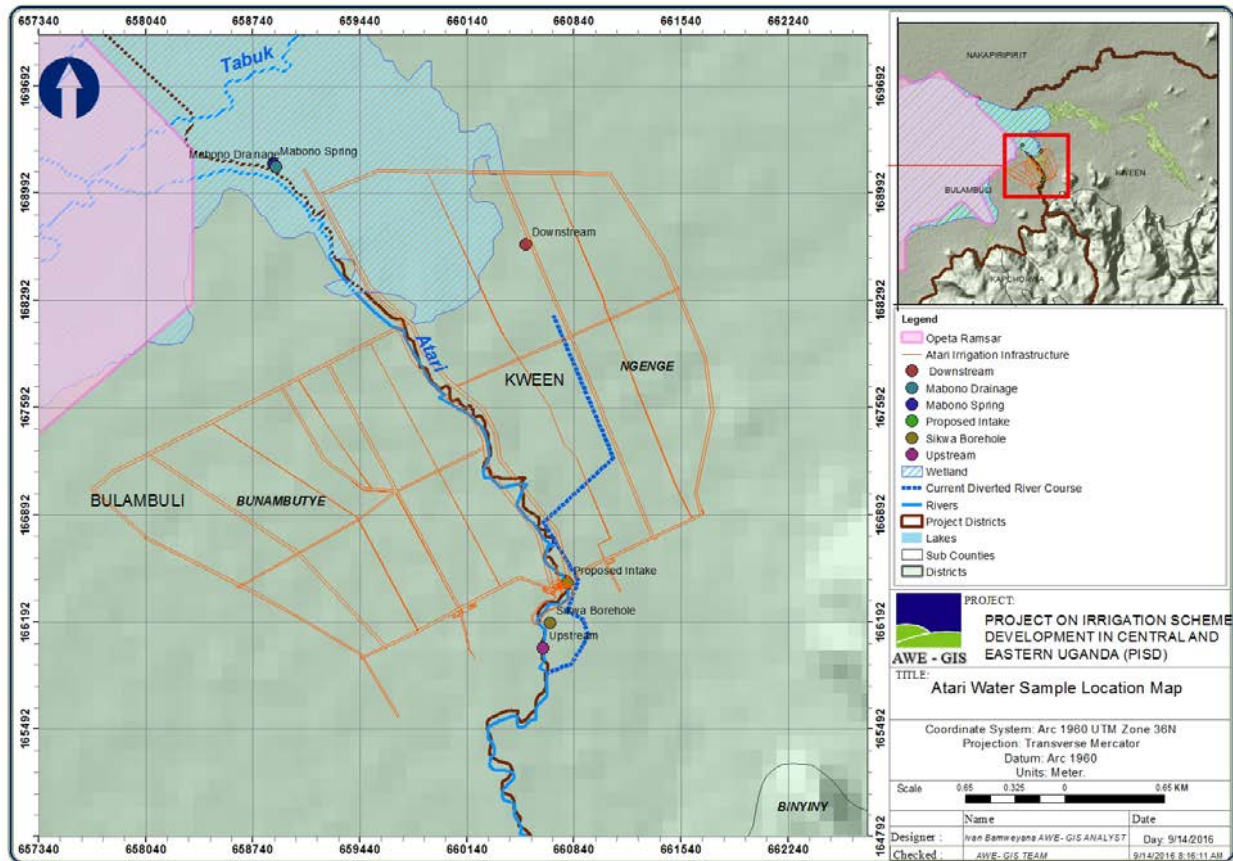
Although the surface water in River Atari was always cloudy, the levels of TDS were within the national standard (1,200 ug/L). Other parameters which the national standards are set were below the criteria (temperature, pH, EC). Level of DO in Atari River varied 5.0-6.5 mg/L in dry season and 4.0-5.2 mg/L in wet season respectively and these trends may have been influenced by water turbidity. For parameters normally contained in fertilizers (T-N, T-P, BOD), concentrations of T-N and T-P were higher in wet season than those in dry season, while there was opposite trend for BOD. Sampling sites and result of water quality are shown in Figure 1.1.7 and Table 1.1.15 respectively.

During construction, excavation of the canals and piling gravel to build the dykes may works for canals and may lead to increased surface runoff, carrying with it eroded soil particles and organic material esp. during heavy rainfall. In addition, organic polluted water may be discharged from construction base camp. In operation, runoff of fertilizers may be a source of contamination, but the



amount of used will be managed for eco-friendly farming and the impact be limited.

The impact is reversible upon implementation of the mitigation measures and adherence to good construction methods such as installing silt fence, sedimentation pond, portable toilet, appropriate management of construction machinery. In operation, training and enhancing non-chemical use farming will contribute to mitigating water pollution. However, the impact severity can be moderate since water pollution is an important issue for local people.



**Figure 1.1.5 Location of Water Quality and Noise Survey in Atari Project Site**

**Table 1.1.15 Result of Major Surface Water Quality (Atari River)**

| Season  | Site       | EC (uS/cm) | DO (mg/L) | TDS (ug/L) | BOD (mg/L) | T-N (mg/L)       | T-P (mg/L) |
|---|------------|------------|-----------|------------|------------|------------------|------------|
| Wet   | Upstream   | 114        | 4.8       | 62         | 2.6        | 9.0              | 0.9        |
|   | Intake     | 101        | 5.2       | 50         | 5.3        | 13               | 1.1        |
|   | Downstream | 88         | 4.0       | 44         | 2.9        | 12               | 1.0        |
| Dry   | Upstream   | 125        | 6.1       | 62         | 10         | 1.7              | 0.21       |
|   | Intake     | 105        | 6.5       | 52         | 17         | 0.28             | 0.28       |
|   | Downstream | 89         | 5.0       | 44         | 15         | 0.90             | 0.20       |
| National Standards for potable water (un-treated water)         |            | 25,000     | -         | 1,200      | -          | -                | -          |
| Japan's National Standards (class-C river water <sup>*1</sup> ) |            | -          | 5.0       | -          | 5.0        | 10 <sup>*2</sup> | -          |

Note: The samplings were conducted twice in each season. Each value indicates the average of two data sampled.

Wet season: October 2015 & April 2016, dry season: February & March 2016

\*1: Adaptability of usage for a class-C river includes 3rd degree of fishery and 1st of industrial water, following class-AA, A and B. \*2: Standard of mixture of NO<sub>3</sub>-N and NO<sub>2</sub>-N in drinking well water.

Source: JICA Study Team

### (3) Soil Contamination

The soils were mainly ferrallitic and characterized with a dark reddish brown colour and heavily textured and moderately productive in terms of agricultural production. - Based on the particle size distribution, majority of the soil particles ranged between 180  $\mu\text{m}$  to 2 mm which is above 100  $\mu\text{m}$  that is considered susceptible to erosion.

Leakages from construction machinery can contaminate soils. This may affect soil quality in the project area.

Since some impacts are anticipated, adequate mitigation measures shall be applied such as good maintenance of construction machinery etc. Thus the impact severity can be minor.

### (4) Waste

National Environment (waste management) Regulation 1999 stipulates overall waste management of the project as wastes will be produced as a result of both construction and maintenance activities. Since there was not a public waste collection system in the project area, farmers often used wasted rice straw or plants for house use or feed to animals.

During construction, the construction activities of canals and concrete head works will produce construction waste, including excavated soil, cement packaging, wood, food and drinks packaging waste consumed by construction workers. In addition, construction workers generate considerable amount of sewage on a daily basis. In operation, agricultural residues like paddy straw and rice husk after harvesting can be wastes but reuse of such residues for house materials or feed to livestock is possible.

Proper waste management during construction will mitigate impacts by wastes. The mitigation measures include setting temporary sanitation facilities and disposing sites in designated areas etc. The receptor sensitivity is medium since waste contamination may result in diseases giving rise.

### (5) Noise and Vibration

Noise levels indicated a generally 'natural' environment with respect to ambient noise levels. Daily average LAeq in dry season and wet season ranged 49 - 59 dB(A) and 45 - 52 dB(A) respectively among 3 sites. The highest levels were monitored at Atari primary school in both seasons, and the levels were over both the national standard (50 dBA) and WHO's guideline value (50 dBA), respectively. Any sources of nuisance noise were observed to be localized and mainly due to human activity. Results of noise level are shown in Table 1.1.16.

During construction, noise generated by construction machinery may affect to the residents nearby, but the impact is minor as people in the area will be relocated. It is needed to take care of noise generation near the sensitive receptors such as schools, hospitals etc.

The impact is reversible upon implementation of the mitigation measures and adherence to good construction methods, such as installing soundproof barriers on the boundary, adopting proper working time schedule etc. Thus the impact severity can be minor.

**Table 1.1.16 Results of Noise Level (Atari Area)**

| No. | Location                          | LAeq (dB(A)) |            | Note   |
|-----|-----------------------------------|--------------|------------|--|
|     |                                   | Dry Season   | Wet Season |  |
| 1   | St. Jude Nursery & primary School | 52           | 50         | People's conservation, distant vehicular traffic, chipping birds |
| 2   | Atari primary School              | 59           | 52         | People's conservation, distant vehicular traffic, chipping birds |
| 3   | Atari Mosque                      | 49           | 46         | People's conservation, distant vehicular traffic, chipping birds |

| No.  | Location                        | LAeq (dB(A)) |            | Note   |
|--|---------------------------------|--------------|------------|--|
|  |                                 | Dry Season   | Wet Season |  |
| 4  | Atari Modern Progressive School | 55           | 45         | People's conservation, distant vehicular traffic, chipping birds |
| National Standard (by NEMA)                          |                                 | 50           |            |  |
| WHO's standard for outdoor noise (daytime & evening) |                                 | 50           |            |  |

Source: JICA Study Team

## (6) Flora, Fauna and Biodiversity

[Flora]

119 plant species in 36 families were detected by the survey, and most species encountered were common and many of them being weeds of cultivation.

[Fauna]

### 1) Fish and aquatic insects

5 species in 4 families were detected in Atari River. All are classified in LC (least concern) or NE (not evaluated) by IUCN List. Fishing is usually carried at substantial level, mainly along the main river course, especially during the dry season. Details are shown in Box 1. For aquatic insects, 92 specimens belonging to 3 orders and 4 families were found and all the families had moderate tolerance to disturbance/pollution.

### 2) Amphibians

12 species were recorded during the survey and all belonging to LC in IUCN List.

### 3) Reptiles

12 species were recorded and all belonging to LC in IUCN List.

### 4) Mammals

Except domesticated mammals, 10 species including rats and shrew were observed and all categorized as LC in IUCN List.

### 5) Birds

90 species of dryland birds were observed during the survey and listed as LC. Gray-crowned Crane (EN) and Pallid Harrier (NT) were observed. For water birds, 31 species were recorded along Atari River and anywhere. The river may act as a corridor to reach a better place since the water was muddy not for a good habitat. The Atari site has a range of vegetation types including wetlands, seasonal and permanent. Permanent wetlands are the most natural habitats in the site. Although these and other vegetation types were not found to be habitats for any globally or regionally threatened species, they still harbour some fauna.

The wetlands are also critical in maintaining a link with the Ramsar Sites of Bisina and Opeta downstream. This delicate connectivity needs to be maintained by avoiding drainage or any other form of degradation of the wetlands. Since no species of global concern were identified at the site, the receptor sensitivity is evaluated as medium due the presence of invasive species.

The intensity of the impact will be low since the construction activities will last for short time and project footprint will be limited. Consequently impact severity is assessed as moderate.

**Box 1: Fishing Status in the Atari Area**

The percentage of fishing as primary occupation in Atari area was small (0.4% of total), compared to farming (78%) and casual labour (8.3%). However, fishing was listed as a secondary economic activity in the project area. This is carried out in open water sources and provides an important source of livelihood and food security for many people in the project area. According to the field survey, most respondents (85%) indicated that they get most of the fish from the river while (15%) get their fish from inland pond in the project area.

Binny (*Barbus binni*) was one of the dominant fish observed in both wet and dry seasons in Arari River and sometimes edible. Fishery people responded in the river Nile tilapia (*Oreochromis niloticus*) and Smooth-head catfish (*Clarias carsoni*) were the key species using hooks and locally made baskets. On the other hand, Marbled lungfish (*Protopterus aethiopicus*) and African sharptooth catfish (*Clarias gariepinus*) were the key species for fishing in the swampy and vegetated areas (see).

Binny (*Barbus binni*)Smooth-head catfish (*Clarias carsoni*)**Figure 1.1.6 Example of Fish Observed in the Atari River****(7) Protected Areas**

There were no authorized protected areas in the project area. The Ramsar Convention area is the downstream Atari River and considerations are required especially for contamination through the river water (discussion is made in the later section).

Although reaching contaminants to Ramsar area through Atari River is the major concern to protected areas, water contamination is expected limited as discussed in above (2) Water Pollution. Also, water intake for irrigation will be properly managed and the volume so small compared to the scale of basins (Bisina-Opeta >>> project area).

The impact is reversible upon implementation of the mitigation measures and adherence to good construction methods such as installing silt fence, sedimentation pond, portable toilet, appropriate management of construction machinery to avoid water contamination. In operation, training and enhancing non-chemical use farming will contribute to mitigating water pollution. However, the impact severity can be moderate since water pollution is an important issue for local people.

**(8) Soil Erosion**

The soils exhibited medium texture ranging sandy clay loam to sandy clay, and characterized with granular soil particles, porous and poor rooting system with moderate bulk density. The soils were also susceptible to runoff and logging due to looseness and poor infiltration rates. During construction, the flat terrain makes soil erosion less likely impacts but silt deposition more likely.

In operation, water logging of soils will cause soil degradation through restriction of normal saturation of air. Water flowing within the canals especially the main and secondary canals has the potential to

cause erosion which not only results in soil degradation but also sediment deposition in the irrigation system and thus compromising the system hydraulic capacity. The sensitivity of the receptor is moderate because the river section downstream is used a source of water for domestic use and livestock watering in the immediate communities.

The impact severity can be moderate when proper mitigation measures such as managing construction machinery, installing sediment pond, providing training to farmers etc.

### (9) Groundwater

Based on the water quality analysis at a borehole (Sikwa), levels of salinity and TDS marked a bit higher than those of the surface water but not extremely. DO levels in the wet and dry seasons were 1.5 and 3.2 mg/L respectively, indicating a bit higher in the dry season shown in Table 1.1.17. On the other hand, levels of T-N and T-P were almost same compared to those in the surface water. Atari River was a source of water for some people (24%), while 65% of people used the water from community boreholes. The source of groundwater derives from Mt. Elgon, far from the project area.

Since the depth of dredging for canals is planned shallow, there will be no or few impacts to the waterway under the ground. In operation, it is estimated little chance that farming activity gives impact on the groundwater, but it is needed considering cares because half people use the groundwater for dairy use.

The impact is reversible upon implementation of the mitigation measures and adherence to good construction methods such as controlling dredging depth, appropriate management of construction machinery. In operation, training and enhancing non-chemical use farming will contribute to mitigating water pollution. However, the impact severity can be moderate since water pollution is an important issue for local people.

**Table 1.1.17 Result of Major Groundwater Quality (Sikwa Borehole)**

| Season  | Site     | EC<br>(uS/cm) | DO<br>(mg/L) | TDS<br>(ug/L) | BOD<br>(mg/L) | T-N<br>(mg/L)    | T-P<br>(mg/L) |
|---|----------|---------------|--------------|---------------|---------------|------------------|---------------|
| Wet   | Sikwa BH | 558           | 1.5          | 277           | 3.3           | 33               | 0.3           |
| Dry   |          | 52            | 3.2          | 260           | 4.5           | 4.0              | 0.2           |
| National Standards for potable water (un-treated water)         |          | 25,000        | -            | 1,200         | -             | -                | -             |
| Japan's National Standards (class-C river water <sup>*1</sup> ) |          | -             | 5.0          | -             | 5.0           | 10 <sup>*2</sup> | -             |

Note: The samplings were conducted twice in each season. Each value indicates the average of two data sampled.

Wet season: October 2015 & April 2016, dry season: February & March 2016.

\*1: Adaptability of usage for a class-C river includes 3rd degree of fishery and 1st of industrial water, following class-AA, A and B. \*2: Standard of mixture of NO<sub>3</sub>-N and NO<sub>2</sub>-N in drinking well water.

Source: JICA Study Team

### (10) Hydrological Situation

Based on the statistics 2004-2012, average annual runoff during the period in Atari River was 83 million m<sup>3</sup> or 2.6 m<sup>3</sup>/sec. Annual maximum runoff of Atari River was 188 million m<sup>3</sup> or 6.0 m<sup>3</sup>/sec (in 2010) while 22 million m<sup>3</sup> or 0.7 m<sup>3</sup>/sec as annual minimum runoff (in 2009). By statistics, annual rainfall ranged 1,048 to 1,992 mm and the average was 1,566 mm. There is one rainy season from March to October and flooding is common during the season.

During construction, some water from Atari River will be used for construction activities but the volume is limited. For irrigation, the percentage of annual water intake from the river is planned 19% and 4% during the low-water season and high-water season, respectively.

The impact is reversible upon implementation of the mitigation measures and adherence to good

construction methods such as controlling water use from Atari River. On the other hand, water use for irrigation is not large and the impact to the downstream can be minor. Water for irrigation will contribute to sound farming. The impact severity can be minor since water use for irrigation is limited and productive.

### (11) Global Warming

The amount of annual GHG emission (CO<sub>2</sub> equivalent) caused by rice growing is estimated about 2,800 tons of CO<sub>2</sub> equivalent in Atari area. According to an threshold value proposed by IFC - a part of World Bank - per project (25,000 tons of CO<sub>2</sub> equivalent per year), the estimated amount is quite lower thus a critical impact by the project is not anticipated. Breakout of GHG emission in Atari area is shown as below table:

**Table 1.1.18 Breakout of GHG Emission in Atari Area**

| Gas Type         | Activity     | Estimated Amount (tons) | Conversion Factor | Converted CO <sub>2</sub> Equivalent (tons) |
|------------------|--------------|-------------------------|-------------------|---|
| CH <sub>4</sub>  | Rice growing | 108.8                   | 25                | 2,720                                       |
| N <sub>2</sub> O | Fertilizing  | 0.24                    | 298               | 71  |
| <b>Total</b>     |              |                         |                   | <b>2,791</b>                                |

$$\text{CH}_4: 0.0000016(\text{tCH}_4/\text{m}^2) \times 1,480(\text{ha}) \times 10,000(\text{m}^2/\text{ha})$$

$$\text{N}_2\text{O}: 0.0049(\text{tN}_2\text{O}/\text{tN}) \times 71.6(\text{kgN}/\text{ha}) \times 1,480(\text{ha}) \times 1,000(\text{kgN}/\text{tN})$$

### (12) Involuntary Resettlement/Land Acquisition

According to DARAP survey, no (0) affected buildings and 284 PAFs were identified. Among them, 97 PAFs were inside the buffer zone.

Though no resettlement will be done inside the proposed irrigation area (outside buffer zone), compensation for land acquisition and livelihood assistance shall be prepared in accordance with JICA Guidelines as well as Uganda's related regulations.

The impact is reversible upon implementation of the mitigation measures such as adequate compensation and livelihood assistance based on the completed ARAP. The impact severity can be major since the issue is a problem of deep concern to PAFs.

### (13) Local Economy such as Employment and Livelihood, etc.

Based on the DARAP survey, farming (78%) was the major occupation in the project area, followed by casual labour (8.3%), trading (7.3%). For average monthly income level, 25% of PAFs earned UGX500,001-1,000,000, followed by 16% (UGX100,001-200,000), 12% (UGX400,001-500,000).

During construction, the project will give local people employment opportunities such as workers, business for workers and construction. In operation, the project development will result in improved crop yield and thus higher profitability per unit acreage.

The income accruing from the opportunities will contribute to improved standards of living for the people involved. Acute impact on income rise will be realized during construction; however, a positive long-term impact will be lasting during the operation of the project.

### (14) Landscape

There were no memorial or impressive things to conserve the landscape in the project area. Mountains upstream Atari river were located far from the project area and seen from almost everywhere.

During construction, layout of construction machinery may disturb the scene of area, but the impact is

minor since the project area is not for tourism. In operation, structures for irrigation will give minor impact on the landscape since the scale is not big.

The impact is reversible upon implementation of the mitigation measures such as careful layout of machinery. The impact severity can be minor since the adequate measures will be taken.

#### **(15) Land Use and Utilization of Local Resources**

The land in the project area was mainly used for farming for maize, beans, vegetables etc. as well as for grazing. People used woods as energy source.

The project will require land for the construction of canals, protection dikes, roadworks and headworks and temporarily farming is suspended. The estimated lands affected with ownership are 38 ha outside the buffer zone and 19 ha within the zone, based on DARAP and boundary survey. In operation, the established buffer zone will have restricted use by the local communities.

Some impacts are anticipated, thus those impacts and risks will be minimized by appropriate land use management in the project area by the community. The impact severity can be moderate since some restrictions of land use will be arose.

#### **(16) Split in Community**

Communities were well associated to use the resources in the project area.

It is expected the community-based groups will enhance the project, but some would be against due to being excluded from the benefits of the project.

The impact is reversible upon implementation of the mitigation measures such as delegating the power, intensive monitoring by the project entity etc. The impact severity can be minor since the baseline community condition is good.

#### **(17) Existing Social Infrastructures and Services**

There were roads for transportation and moving in the project site but not paved. According to DARAP survey, 41% of PAPs were living within 100-500 m from the nearest health facility, while 19% living within 1-1.5 km and 8% over 5 km. As per school, 38% of PAPs lived within 100-500 m from the primary school, but almost 10% needed over 5 km to the nearest secondary school.

The unpaved surface roads in the project areas will be used for accessing the site during the construction and O&M, and the damage to existing public roads could be due to considerable volume of construction traffic using the existing roads and passage of heavy construction equipment.

This impact is mainly short-term, occurring during the construction phase and limited to infrastructure in the proposed project area, impact intensity is assess as low. The impact severity can be moderate since road network in the area is not good.

#### **(18) The Poor, Indigenous and Ethnic People**

10% and 16% of PAPs earned below UGX 100,000 and UGX 100,001-200,000 as monthly income, respectively. There was a variation of tribes in the project area: 54% of Bamasaba, 32% Sabiny, and 6% Banyole. The biggest religious group was Muslims (33%), followed by Catholics (23%), Protestants (22%), Pentecostals (20%) etc.

During construction, the project will give local people employment opportunities such as workers, business for workers and construction. In operation, the project development will result in improved crop yield and thus higher profitability per unit acreage.

The income accruing from the opportunities will contribute to improved standards of living for the people involved. Acute impact on income rise will be realized during construction; however, a positive long-term impact will be lasting during the operation of the project.

#### **(19) Misdistribution of Benefit and Damage**

No misdistributions were found by the survey.

In operation, some farmers may be excluded from the benefit of the project, namely increase of income and productivity.

The impact is reversible upon careful assistance and monitoring of people concerned. The impact severity can be moderate since such misdistribution may derive conflicts among the stakeholders.

#### **(20) Local Conflict of Interests**

As boundaries of land tenanted were not clear and sometimes became a source of conflict, the JICA Study Team conducted boundary surveys to clarify the own plots. Local people requested providing work opportunities as a construction worker during construction, according to stakeholder meetings.

The local conflicts regarding work opportunities between local people/communities may be raised in case of unfair employment. In operation, conflicts between beneficiaries and non-beneficiaries may be raised in case non-beneficiaries make claims.

The impact is reversible upon implementation of the mitigation measures such as fair provision of work opportunities during construction, smooth solution of claims etc. The impact severity can be moderate since the chance of happening is anticipated.

#### **(21) Water Usage or Water Rights and Rights of Common**

Atari River was a source of water for some people (24%), while 65% of people used the water from community boreholes. On the other hand, 10% of PAPs used the rain water because of accessibility to water resources.

Construction may give impact on water usage in the river as certain degree of water pollution is anticipated. In operation, accessibility to Atari River will be limited by developing the buffer zone. On the other hand, the irrigation project will provide more effective water use for farming.

The impact is reversible upon implementation of the mitigation measures such as installing silt fence, sedimentation pond, portable toilet, appropriate management of construction machinery, establishing fair water use rule etc. The impact severity can be moderate since access to water will be limited.

#### **(22) Gender/ Children's Rights**

Children played a role to help families like water carrying, housework, farming etc. Most children had a chance to go to primary schools. During construction, children may be involved construction works to help their families.

In operation, effective farming activity may improve children's working condition but unsure. This matter is closely related to local culture and family condition. In order to give a better environment to children, the project entity should give local people concerned sufficient support.

The impact severity can be moderate since it takes long time to improve.



### **(23) Hazards (Risk), Infectious Diseases such as HIV/AIDS**

Major infectious diseases which PAPs have experienced in the project area were malaria (98%), followed by water-related diseases (67%) etc. HIV/AIDS was a part of major infectious diseases for 18% of PAPs, according to the DARAP study.

Infectious diseases such as STD are possible to spread due to inflow of construction workers carrying them. In addition, alternation of ground and river conditions by excavation and dredging may provoke to provide habitats of disease vectors such as mosquitoes that transmit malaria.

The impact is reversible upon implementation of the mitigation measures such as managing construction yard properly, providing health check and education for workers. The impact severity can be minor since such diseases are still endemic.

### **(24) Working Conditions/ Accidents**

Some farmers did not wear boots or suitable shoes on farming and it caused physical accidents. Farmers seemed not to care about securing safety during working, mainly deriving from lack of knowledge and money.

There are risks for workers during construction, in case the construction manager does not comply with relevant labour rules and regulations.

The impact is reversible upon implementation of the mitigation measures such as complying with relevant rules by the construction manager under the project entity. The impact severity can be moderate since it is not easy to keep the condition among unskilled workers.

### **(25) Accident**

Traffic accidents by bota-bota motorbike were reported but minor. Regarding accident during working, refer to No.28 above.

Since the unpaved roads will be used for transportation of construction vehicles, accident chances regarding traffic are anticipated to increase during construction. In operation, traffic in the project area through new farm roads will increase due to road improvement and high productivity.

The impact is reversible upon implementation of the mitigation measures such as installing traffic sign boards, complying with traffic rules etc. The impact severity can be moderate.

### **(26) Across-boarder Problems**

The counterparts(MAAIF and MWE), local governments and community-based associations were really positive to the project and played a role to solve problems. Atari River belongs to a part of the Nile River Basin Initiative (NRBI) but the scale of the project is quite small compared to the whole basin.

It is expected no or minor impact to happen such problems because the scale of the project is too small compare to that in the NRBI.

The impact severity can be minor due to the scale of border.

### **(27) Monitoring System**

In constructions in Uganda, monitoring and supervision by the project entity were common activities for effective progress.

Both during construction and in operation, monitoring activities are anticipated to be neglected or

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omitted due to lack of recognition.

The impact is reversible upon implementation of the mitigation measures such as supervising monitoring activity by the supervisor, making reporting compulsory etc. The impact severity can be moderate since it takes efforts to keep monitoring on track.

Based on the results and impact analysis from the baseline survey, the scoping results are re-rated and shown in Table 1.1.19.

**Table 1.1.19 Result of Re-rating and the Reasons for Atari Irrigation Project**

|           | No. | Item               | Rating during Scoping |           | Re-Rating   |           | Reasons for Re-Rating  |
|-----------|-----|--------------------|-----------------------|-----------|-------------|-----------|--|
|           |     |                    | Pre-/Const.           | Operation | Pre-/Const. | Operation |  |
| Pollution | 1   | Air Pollution      | B-                    | D         | B-          | N/A       | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>There are two types of the sources of air pollution: 1) dust caused by operation of construction and 2) vehicles and heavy machineries for construction.</li> <li>They may put some impacts but their impacts on the existing air environment are limited.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Considering the nature of the project, the source of pollution is not expected in operation.</li> </ul>  |
|           | 2   | Water Pollution    | B-                    | B-        | B-          | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>The expected impacts by construction are soil and drained water inflow and increase of suspended solids from the waste of the construction sites, including workers' camp.</li> <li>Considering the current situation of Atari River and the coverage of construction, the impacts of construction are considered limited.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Drained water from the irrigation area is a potential source when excess fertilizers contain. The impact is, however, expected limited since the use of fertilizers will be systemically managed.</li> </ul> |
|           | 3   | Soil Contamination | B-                    | C         | B-          | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Soil contamination from heavy machineries and vehicles for construction is anticipated, but the impact is limited.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Salt damage of farmlands may be anticipated but the level seems minor considering the current soil condition, but the following up will be needed because a new farming manner is introduced.</li> </ul>   |
|           | 4   | Waste              | B-                    | B-        | B-          | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Excavated/ dredged soil needs to be treated appropriately (transport and emplacement).</li> <li>Wastes from workers' camp are one of sources during the construction as well.</li> <li>It may be necessary to conduct EIA and obtain an appropriate environmental certificate if another treatment site is required.</li> </ul> <p>[Operation Phase]</p> <ul style="list-style-type: none"> <li>In operation phase, residues from agri-products (e.g. rice straw) will be the major waste generated and needed to treat.</li> </ul>  |

| No.                 | Item | Rating during Scoping                |           | Re-Rating   |           | Reasons for Re-Rating |   |
|---------------------|------|--------------------------------------|-----------|-------------|-----------|-----------------------|---|
|                     |      | Pre-/Const.                          | Operation | Pre-/Const. | Operation |                       |   |
|                     | 5    | Noise and Vibration                  | B-        | D           | B-        | N/A                   | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>As heavy machineries are going to be used in construction, the impacts on the residents living within certain distance (e.g. 50m) are concerned.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>The level of noise increases only temporarily during construction, there are no activities expected to cause noise in operation.</li> </ul>   |
|                     | 6    | Ground Subsidence                    | D         | D           | N/A       | N/A                   | <p>[Design/construction phase], [Operation phase]</p> <ul style="list-style-type: none"> <li>Ground subsidence is not anticipated during construction and in operation since the project will not plan to do activities causing the ground subsidence.</li> </ul>   |
|                     | 7    | Offensive Odor                       | D         | D           | N/A       | N/A                   | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>The construction work itself is not anticipated to generate serious offensive odor since heavy operation of machines in a small area is not planned.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Impacts by offensive odor in operation are not anticipated because there are no sources of odor.</li> </ul>   |
|                     | 8    | Topography and Geographical Features | D         | D           | N/A       | N/A                   | <p>[Design/construction phase], [Operation phase]</p> <ul style="list-style-type: none"> <li>The project will not give large-scaled modification in topography and geography of the area. No impacts are expected.</li> </ul>   |
| Natural Environment | 9    | Flora, Fauna and Biodiversity        | B-        | B-          | B-        | B-                    | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>The area has variety of faunal and floral species and the construction work will give adverse impacts on the wetland ecosystem like loss of some plants and wild animal habitats.</li> <li>Based on the EIA survey, a few animals (Gray-crowned crane etc.) to be treated carefully were observed.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>There remain fears that local people may vanish local resources without knowledge of the importance.</li> </ul> |
|                     | 10   | Protected Areas                      | B-        | B-          | B-        | B-                    | <p>[Design/construction phase], [Operation phase]</p> <ul style="list-style-type: none"> <li>Since a certain level of impacts to the Ramsar Convention wetland by the river water from the project area during construction and operation phases respectively is anticipated, careful management of river water is required in order to secure the preservation.</li> </ul>   |
|                     | 11   | Soil Erosion                         | B-        | B+          | B-        | B+                    | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Soil erosion is anticipated near a borrowing pit as being scoped.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>The project will contribute to land arrangement and prevent soil erosion because the introduced irrigation system will strengthen fragile basement of the land.</li> </ul>   |

| No.                | Item   | Rating during Scoping                     |           | Re-Rating   |           | Reasons for Re-Rating  |  |
|--------------------|--|---|-----------|-------------|-----------|--|--|
|                    |  | Pre-/Const.                               | Operation | Pre-/Const. | Operation |  |  |
| 12                 | Groundwater  | D   | B-        | N/A         | B-        | [Design/construction phase]<br><ul style="list-style-type: none"> <li>The construction will not give impact on the groundwater ways since the construction applies shallow dredging manner.</li> </ul>   |  |
|                    |  |   |           |             |           | [Operation phase]<br><ul style="list-style-type: none"> <li>In operation, however, there remains to be a possibility that fertilizers used could give an impact to groundwater and the mitigation measures are required.</li> </ul>  |  |
|                    |  |   |           |             |           |  |  |
| 13                 | Hydrological Situation                               | B-  | B+/-      | B-          | B+/-      | [Design/construction phase]<br><ul style="list-style-type: none"> <li>There is a temporal change of the river flow during construction (mainly in closing rivers).</li> </ul>  |  |
|                    |  |   |           |             |           | [Operation phase]<br><ul style="list-style-type: none"> <li>Water intake from Atari River can disturb the flow to an extent but the extent of disturbance is limited. In contrast, the stable water distribution for irrigation contributes to the area development and gives benefits.</li> </ul> |  |
|                    |  |   |           |             |           |  |  |
| 14                 | Global Warming                                       | D   | D         | N/A         | N/A       | [Design/construction phase]<br><ul style="list-style-type: none"> <li>Although the construction vehicles emit greenhouse gas, the extent and impact are expected minor.</li> </ul>   |  |
|                    |  |   |           |             |           | [Operation phase]<br><ul style="list-style-type: none"> <li>In operation, the project is not supposed to give an impact on global warming.</li> </ul>  |  |
|                    |  |   |           |             |           |  |  |
| Social Environment | 15   | Involuntary Resettlement/Land Acquisition | B-        | C           | B-        | D  | [Design/construction phase]<br><ul style="list-style-type: none"> <li>Despite no involuntary resettlement, land acquisition caused by the implementation of the project shall be conducted according to laws and regulations of Uganda and JICA Guidelines. The affected residents are going to be compensated.</li> <li>ARAP is prepared to be prepared before the construction.</li> </ul> |
|                    |  |   |           |             |           |  | [Operation phase]<br><ul style="list-style-type: none"> <li>The land issue will and shall be solved before operation, and then adverse impacts are not expected in operation phase.</li> </ul>   |
|                    |  |   |           |             |           |  |  |
| 16                 | Local Economy such as Employment and Livelihood etc. | B+  | B+/-      | B+          | B+/-      | [Design/construction phase]<br><ul style="list-style-type: none"> <li>The construction work provided will generate additional employment in the area (positive impact).</li> </ul>   |  |
|                    |  |   |           |             |           | [Operation phase]<br><ul style="list-style-type: none"> <li>In operation, the crop productivity will grow and livelihood of farmers be improved.</li> <li>On the other hand, fishing activity in existing ponds or papyrus harvesting may have an adverse impact.</li> </ul>                       |  |
|                    |  |   |           |             |           |  |  |
| 17                 | Landscape  | B-  | D         | B-          | N/A       | [Design/construction phase]<br><ul style="list-style-type: none"> <li>The alignment of construction machines can be a source of landscape disturbance.</li> </ul>  |  |
|                    |  |   |           |             |           | [Operation phase]<br><ul style="list-style-type: none"> <li>In operation, the facilities to be installed are not anticipated to give adverse impacts.</li> </ul>   |  |
|                    |  |   |           |             |           |  |  |

| No. | Item  | Rating during Scoping |           | Re-Rating   |           | Reasons for Re-Rating   |
|-----|---|-----------------------|-----------|-------------|-----------|---|
|     |   | Pre-/Const.           | Operation | Pre-/Const. | Operation |   |
| 18  | Land Use and Utilization of Local Resources       | B-                    | B-        | B-          | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>The construction work will disturb the current land use by farmer and need cares.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Farmers will be restricted activities inside the buffer zone by embankment installation. However the impact seems limited because the zone is managed by the community.</li> </ul>   |
| 19  | Split Community                                   | D                     | B+/-      | N/A         | B+/-      | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Community issues will be solved prior to the construction since the boundaries will be identified.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>The irrigation project gives effective water use for communities concerned, but some disturbances due to the project implementation such as less use of local resources may be a cause of community split.</li> </ul> |
| 20  | Existing Social Infrastructures and Services      | B-                    | D         | B-          | N/A       | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Construction vehicles will give an adverse impact to the local traffic condition.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>In operation phase, the adequate provision of public services is realized.</li> </ul>  |
| 21  | The Poor, Indigenous and Ethnic People            | B+                    | B+/-      | B+          | B+/-      | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Construction work will give employment to local people, especially for lower-earned class.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>The new irrigation will propose positive impacts on these people as well as adverse ones such as minor disturbance of local resource use.</li> </ul>  |
| 22  | Misdistribution of Benefit and Damage             | D                     | B-        | D           | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>The affected people will be supported in accordance with ARAP.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Although the project does not intend to generate a gap between beneficiaries and non-beneficiaries, it shall be considered in case.</li> </ul>  |
| 23  | Cultural Heritage                                 | D                     | D         | N/A         | N/A       | <p>[Design/construction phase], [Operation phase]</p> <ul style="list-style-type: none"> <li>The cultural heritage to be considered does not exist in the project area since no important heritage was observed.</li> </ul>   |
| 24  | Local Conflict of Interest                        | C                     | B-        | B-          | B-        | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Some local people may show privately frustration about boundary determination even during the construction phase.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>Although the project does not intend to generate a gap between beneficiaries and non-beneficiaries, it shall be considered in case.</li> </ul>   |
| 25  | Water Usage or Water Rights and Rights of Commons | B-                    | B+/-      | B-          | B+/-      | <p>[Design/construction phase]</p> <ul style="list-style-type: none"> <li>Usage of the downstream water will be impacted due to changed water flow during the construction.</li> </ul> <p>[Operation phase]</p> <ul style="list-style-type: none"> <li>New irrigation system will realize effective and fair water use, but unbalanced water usage is anticipated in operation phase.</li> </ul>  |

| No.    | Item   | Rating during Scoping   |           | Re-Rating   |           | Reasons for Re-Rating   |  |
|--------|--|-------------------------|-----------|-------------|-----------|---|--|
|        |  | Pre-/Const.             | Operation | Pre-/Const. | Operation |   |  |
| 26     | Gender/Children's Rights                             | C                       | C         | B-          | B-        | [Design/construction phase],<br><ul style="list-style-type: none"> <li>As children play a role to help their families, they may be involved in works.</li> </ul> [Operation phase]<br><ul style="list-style-type: none"> <li>As a result of project, women's farming burden may be increased and women may lose their opportunity of participating in social activities and acquiring new farming skills.</li> </ul>  |  |
|        | Hazards (Risk), Infectious Diseases such as HIV/AIDS | C                       | C         | B-          | B-        | [Design/construction phase]<br><ul style="list-style-type: none"> <li>Infectious diseases such as STD are possible to spread due to inflow of construction workers carrying them.</li> <li>Crimes including sexual harassment toward women due to inflow of construction workers may occurred.</li> </ul> [Operation phase]<br><ul style="list-style-type: none"> <li>A possibility remains the project would bring endemic diseases by an increase in water area.</li> </ul> |  |
|        | Working Conditions/Accidents                         | B-                      | D         | B-          | N/A       | [Design/construction phase]<br><ul style="list-style-type: none"> <li>Intensive measures to avoid accidents by the construction work shall be installed because some farmers do not wear shoes. Borrowing pit is still an accident source.</li> </ul> [Operation phase]<br><ul style="list-style-type: none"> <li>Occurrence of accidents by the project will not expected since there are not construction works in operation phase.</li> </ul>                              |  |
| Others | 29   | Accident                | B-        | B-          | B-        | B-  | [Design/construction phase]<br><ul style="list-style-type: none"> <li>Due to an increase in traffic volume by construction vehicles, the possibility of traffic accident can be higher.</li> </ul> [Operation phase]<br><ul style="list-style-type: none"> <li>In operation, increased vehicles which drive for crop conveyance on the farm roads inside the irrigation area. Although attack by wild animals is expected minor, cautions will be still needed.</li> </ul> |
|        | 30   | Across-boarder problems | D         | C           | N/A       | D   | [Design/Construction phase], [Operation phase]<br><ul style="list-style-type: none"> <li>Since the water intake for the irrigation project during construction and operation phases is tiny compared to the Nile River basin, across-border problems are not anticipated.</li> </ul>   |
|        | 31   | Monitoring System       | B-        | B-          | B-        | B-  | [Design/Construction phase], [Operation phase]<br><ul style="list-style-type: none"> <li>Although the EIA establishes the monitoring system for pollution, natural and social environment, malfunction of monitoring system shall be avoided through mitigation measures.</li> </ul>   |

A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown (Examination is needed. Impacts may become clear as study progresses.)

D: No impact is expected

Source: JICA Study Team

### 1.1.7 Project Impacts on the Farmland Ecosystem

Through EIA it is confirmed that a part of the project area has been converted to farmlands but is inhabited by various fauna and flora. Regarding flora, the Shannon-Weiner index, which is an index of biodiversity, is as below Table 1.1.20 showing that the diversity of flora is generally high.

**Table 1.1.20 The Shannon-Weiner Index of Atari Area**

| Species | Shannon-Weiner Index (H') | Number of species |
|---------|---------------------------|-------------------|
| Herb    | 4.80                      | 68                |
| Grass   | 4.09                      | 32                |
| Tree    | 4.16                      | 28                |
| Shrub   | 3.46                      | 24                |
| Climber | 3.27                      | 18                |
| Total   |                           | 170               |

Components of the ecosystem of farmlands include farmlands such as paddies and fields, waterways/ ponds, trees and grasslands such as pastures and meadows.

- 1) Development of agricultural fields: reformation of wetlands into well-drained paddy field, increase in size of a plot, decrease of ridge areas, concrete construction of waterways.
- 2) Use of pesticides and herbicides: water pollution.
- 3) Use of chemical fertilizer: eutrophication of waters.
- 4) Change of operation and maintenance methods: mechanization, chemicalization, and labour saving of farming activities, careless operation, and maintenance.
- 5) Increase of deserted cultivated lands: devastation of cultivated lands and water utilization facilities, decrease of paddy areas.

The project is to improve farmland use and agricultural productivity under proper management by the introduction of irrigation facilities in the project area. By introducing the irrigation system to rain-fed rice cultivation, it becomes possible to supply water to farmlands stably as planned. In addition, the project provides farmers with farming instructions which contribute to wise-use of wetlands and promotes/ ensures the proper usage of fertilizers. This shall contribute to mitigate serious impacts on the ecosystem of farmlands. Continuous monitoring of biota and water quality shall also contribute to the mitigation of impacts.

### 1.1.8 Evaluation of Environmental Impact to the Lake Opeta

One of the concerns on the local environment is whether the irrigation project would give a serious impact to the Ramsar Convention wetland area, including Lake Opeta-Bisina wetland system which is located downstream Atari River. Examinations made the degree of impacts through the EIA study, and the study reveals the impact will not be serious mainly by the reasons below:

- 1) The volume of water supply from Atari River to the Lake Opeta-Bisina wetland system is estimated quite low compared to the catchment areas and the volume of intake for irrigation;
- 2) The concentration of ammonia nitrogen (NH<sub>4</sub>-N) in the Lake Opeta-Bisina system is already high since livestock farming is run around the system;
- 3) Although fertilizers will be used for the irrigation project, the level of fertilizers in the back flow water from the irrigation area to Atari River is estimated low compared to the difference of catchment areas. Also, in case of the fertilizer flowing in the system, the high level of NH<sub>4</sub>-N at the mouth of Lake Opeta would not be affected to increase the level. It is feasible to avoid excessive use of fertilizers and ban the use of agrichemicals by employing sufficient farming management, and such management is a part of the project menu;
- 4) Since the proposed irrigation area is located at 500 m of the shortest distance from the Ramsar Convention wetland area (800 m through Atari River) shown in Figure 1.1.8, impacts to the farmers and fisher folks are not anticipated because of no direct touches to the wetland (e.g. encroachment or farming in the Ramsar wetland); and
- 5) The Lake Opeta-Bisina wetland system is rich in the ecosystem and designated as a bird conservation area serious impacts are not anticipated on aspects of water volume and quality and human-induced action.

Table 1.1.21 indicates the background information on the Lake Opeta-Bisina wetland system.

**Table 1.1.21 Background Information of the Lake Opeta-Bisina Wetland System**

**a. Ecological background**

- The Lake Opeta-Bisina wetland system is designated as an important bird area (IBA) by BLI, which is the biggest natural conservation partnership in the world.
- The number and types of floral and faunal species identifies are:
  - Flora: 84 species from 63 genera and 23 families, with 60 species of herbs and 24 of shrubs;
  - Birds: 194 species with 41 migratory and 26 of conservation concern;
  - Fish: 28 species including lots of Marbled lungfish and African catfish;
  - Mammals: About 100 species from 13 orders such as 20 artiodactyla (bovidae, hippopotamidae etc.), 29 carnivora, 16 rodentia etc;
  - Reptiles: Nile crocodile (*Crocodylus niloticus*), water cobra (*Naja melanoleuca*), and water snake (*Grayia sp.*) are identified.

**b. Topographic and social background**

- During the dry season, local people (Karimojong, Pokot) use the wetland for grazing.
- During the rainy season, major activity is fishery.
- Apedura River is the largest water supply source into Lake Opeta-Bisina system, from the northern part of Lake Bisina.

**c. Hydrological background**

- 689 km<sup>2</sup> of Lake Opeta wetland system area and 8,412 km<sup>2</sup> of the Lake Opeta catchment area.
- 103 km<sup>2</sup> of the catchment area of the Atari project area, and about 1.2% of the Lake Opeta catchment area.
- Annual intake volume from Atari River for irrigation is planned at 19% of total flow during the minimum year and 3% during the maximum year respectively. In addition, 30% of the water taken will be returned into the river (equivalent to 4.1 million m<sup>3</sup> in the design year).
- In order to maintain the environment for the living things in the river, at least 0.17 m<sup>3</sup>/sec of the irrigation water is planned to return into the downstream Atari River.

**d. Water quality background**

- Levels of total phosphate (T-P, mg/L) and ammonia nitrogen (NH<sub>4</sub>-N, mg/L) range as below:

| Sampling Point                              | T-P (mg/L) | NH <sub>4</sub> -N (mg/L) | Source                          |
|---|------------|---------------------------|---------------------------------|
| Atari River downstream                      | 0.2-1.4    | 0.2-0.6                   | EIA survey by JICA Study Team   |
| Mouth of Lake Opeta (inside Ramsar wetland) | 0.19-0.21  | 0.04-3.22                 | JICA Wetland Management Project |

- The high level of NH<sub>4</sub>-N at the mouth of Lake Opeta is expected by the enteruria inflow from livestock.
- Though the level of T-P at the downstream Atari River was a bit higher than that in the mouth of Lake Opeta, it is reducing up to the Ramsar wetland.
- \*The distance from the end of downstream Atari River in the project area to the nearest edge of the Ramsar Convention area is 800 m and to the Lake Opeta is about 32 km.

**e. Farming style**

- The current rice cropping uses few or no fertilizers and agrochemicals.
- The project plans to use 62.5 kg and 125 kg per ha of DAP (Di-ammonium phosphate) and urea respectively as the standard usage.
- Use of agrochemicals is not recommended.

Source: PISD Study Team



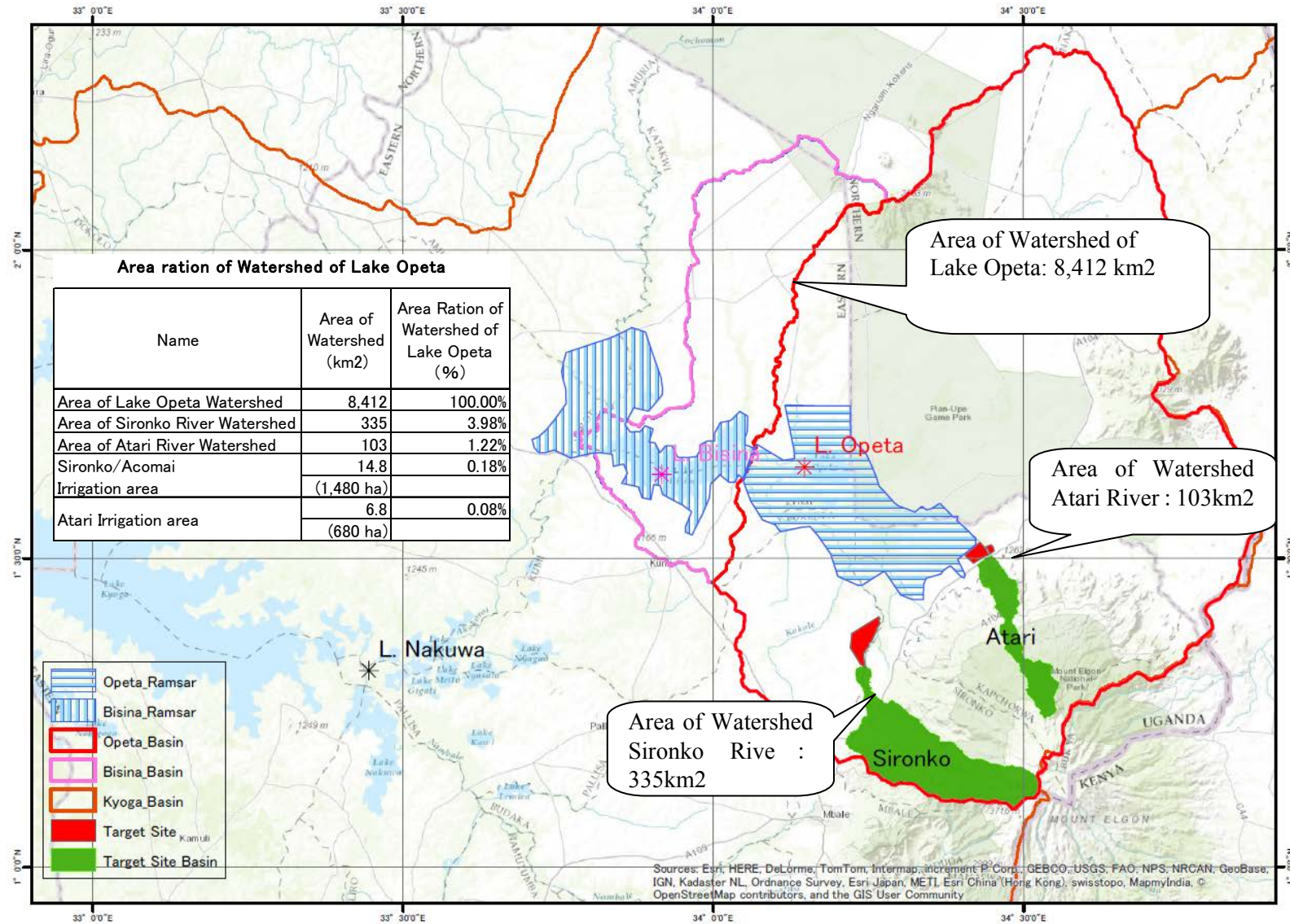
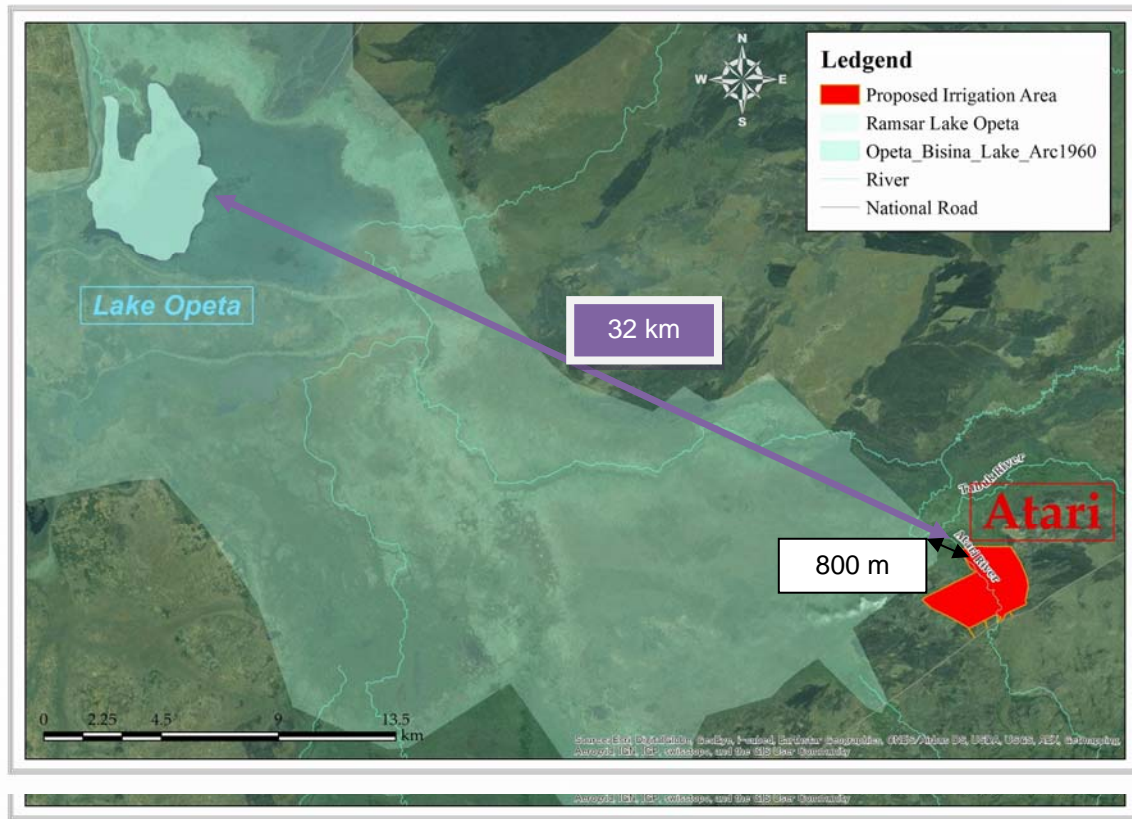


Figure 1.1.7 Area Ration of Watershed between the Lake Opeta, Sironko site, and Atari site



Source: JICA Study Team

**Figure 1.1.8 Distance Relationship between the Atari River and the Ramsar Wetland/ the Lake Opeta**

In order to understand the impact to downstream Ramsar Convention wetlands by the river or drainage water, Table 1.1.23 summarizes case studies published regarding impact to the downstream (including non Ramsar Convention areas).

**Evaluation of the chemical fertilization on river water quality**

In this section the impact of chemical fertilization on river water quality is simulated and discussed based on a simple condition for amount, method of the fertilizers and its behaviors assumed under the rice paddy system being proposed for Atari site.

Farmers in Atari hardly apply chemical fertilizer and/or pesticide under the present condition; while, the lowland soil over Atari require supplemental input of nutrients to maximize their inherent agronomic potentiality and to achieve targeting unit-yield and amount of rice. It is therefore a practical level of chemical fertilization is introduced here to present the impact of applied fertilizers on the water quality of Atari River, quantitatively. Application rate (dosage) of the chemical fertilizers is set as 62.5 kg per hectare; as  $(\text{NH}_4)_2\text{HPO}_4$  for DAP (diammonium phosphate), and 125 kg per hectare; as  $(\text{NH}_2)_2\text{CO}$  for Urea, accounting for source of Phosphorus (P) and Nitrogen (N), respectively. Total amounts of the nutrients as Nitrogen-based and Phosphorus-based over the area of total 680 ha of lowland paddy plots of Atari are presented in Table 1.1.22.

**Table 1.1.22 Assumed Amount of Element Dozen in Atari Irrigation Project**

| Fertilizer | Irrigation area (ha) | Unit dosage (kg/ha) | Total dosage (kg) | % of P/N | P/N dozed (kg) | Formula (MW)   |
|------------|----------------------|---------------------|-------------------|----------|----------------|--|
| DAP (P)    | 680                  | 62.5                | 42,500            | 23       | 9,775          | (NH <sub>4</sub> ) <sub>2</sub> HPO <sub>4</sub> , (132) |
| Urea (N)   | 680                  | 125                 | 85,000            | 47       | 39,950         | (NH <sub>2</sub> ) <sub>2</sub> CO, (60)                 |

Note: MW; molecular weight

The drainage volume is expressed by the following equation, the discharge rate is assumed to vary with wide range and according to the previous study<sup>1</sup> it is reported that discharge rate of phosphorus (P) was varied from 3 to 51%.

Drainage volume = amount of fertilizer × discharge rate

Where;

Discharge flow rate: 3% to 51%

Therefore, drainage volume after the Project is estimated as shown below;

$$9,775 \times (0.03 \sim 0.51) = 293 \sim 4985\text{kg} \quad \text{---->} \quad 0.3 \sim 5\text{ton}$$

When you estimate the drainage volume of phosphorus from the flow regime of the water balance calculation results and the current status and plans become as in the following figure.

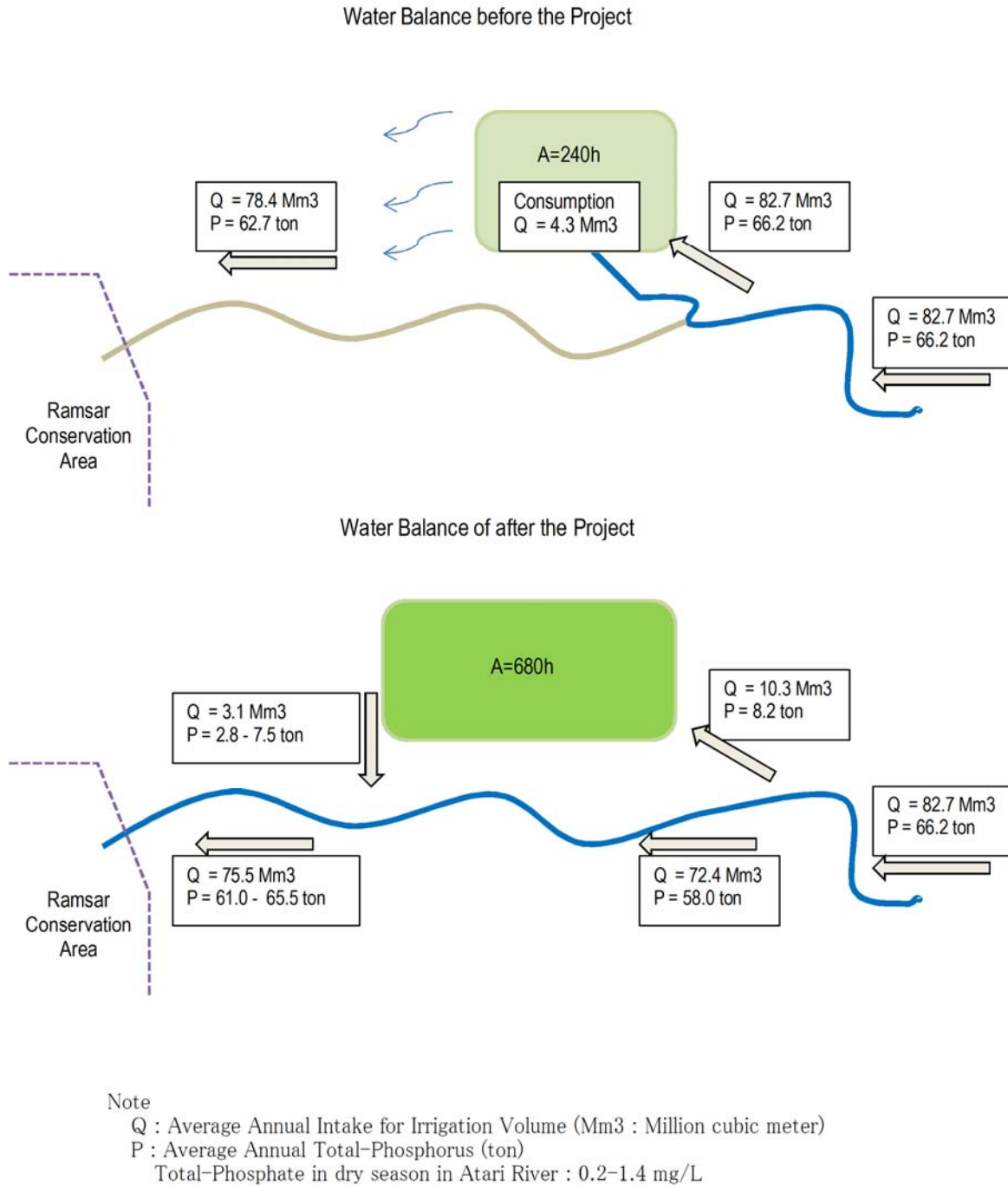
Flow regime of the water balance calculation results and

Figure 1.1.9 shows the schematic flow of the annual amount of water and phosphorus under the current condition and after completion of the Project. Assumption was done under the following way;

- ✓ Hydrological and water quality background was applied the results of this Study which is summarized in Table 1.1.21.
- ✓ River discharge was applied the average annual runoff volume for all of records which was calculated and described in Volume III Chapter 2.4.3.
- ✓ Average annual intake for irrigation volume was applied average of calculation period.
- ✓ Current consumption was calculated converting the design water requirement by the ration of irrigation area
- ✓ Total-Phosphorus was applied the mean of the observed data.

From the result of the study, it is probable that the T-P after project vary from 61.0 to 65.5 ton/year while current T-P is assumed 62.7ton as discharge rate has a wide range depend on the utilization or control of water from paddy field. This indicate that impact of chemical fertilizer depend on the how to control the excess water from the paddy and under well-managed cultivation, it can be reduced negative impact to the downstream of the Project site.

<sup>1</sup> “Discharge Characteristic of Pollutants from Paddy Fields” (Yasuko SASADA et al., Kagawa Prefecture Environmental Health Research Center, 2005)



**Figure 1.1.9 Result of Simulation before and After the Project**

**Table 1.1.23 Case Study on the Impact to the Downstream Ramsar Convention Wetlands and Others**

| No. | Affected Site                          | Country          | Impact Factor                            | Outline  | Source  |
|-----|--|------------------|--|--|---|
| 1   | Fujimae-higata Tideland (Ramsar Conv.) | Japan (Aichi)    | Worm discharged water from a power plant | <ul style="list-style-type: none"> <li>- The report concluded there was no serious impact to creatures in the tideland because the distance from the planned power plant was 3 km or more and it might give little chance to reach the diffusion area of the discharged water to the tideland.</li> <li>- The pre-survey revealed there were no impacts on the birds from the wetland because of few use of the project area by Limicolae and Charadriidae which are typical in the wetland.</li> </ul>  | <a href="http://www.meti.go.jp/committee/kenkyukai/safety_security/kankyo_karyoku/pdf/23fy/230825/230825-3-2-2.pdf">http://www.meti.go.jp/committee/kenkyukai/safety_security/kankyo_karyoku/pdf/23fy/230825/230825-3-2-2.pdf</a> |
| 2   | Miyajima-numa Bog (Ramsar Conv.)       | Japan (Hokkaido) | Farming drainage                         | <ul style="list-style-type: none"> <li>- Although it is assumed the eutrophication in Miyajima-numa Bog might be derived by the discharged water with rich nutrients from surrounding paddy fields, the assumption is not necessarily true based on results of T-N inflow per unit area. And the survey reveals there is a difference of impact level to Miyajima-numa Bog by the neighbouring situations such as dry or paddy fields etc.</li> <li>- It remains possibility to consume nitrogen etc. by fixation with gramineous plants and limit inflowing nutrient salts with high concentrations, but the results of the study reveal that nutrient loads was higher from farm lands with high proportion of paddy field.</li> <li>- Even though some farmlands owned a removal function of nutrient salts, it is obvious that the surrounding farmlands give impacts on the eutrophication in Miyajima-numa Bog because the whole water catchment area is a load source of nutrient salts.</li> </ul> | <a href="http://gra.rakuno.ac.jp/wp-content/themes/aplan/pdf/roh_201502.pdf">http://gra.rakuno.ac.jp/wp-content/themes/aplan/pdf/roh_201502.pdf</a>   |
| 3   | Sagata Tideland (Ramsar Conv.)         | Japan (Nigata)   | Farming drainage                         | <p>Precise of rice paddy dam (plan)</p> <ul style="list-style-type: none"> <li>- To control the water flow in drainage channels with slower discharge by adjusting the discharged water volume from paddy fields to store the rain water in paddy fields during heavy rains.</li> <li>- A higher water control effect is expected with lower costs by using rice fields spreading horizontally.</li> <li>- The rice paddy dam does not give negative nor positive impacts to rice production, but does not give a big advantage to collaborating farms as well.</li> <li>- We are studying under an assumption that farms could receive advantages if the rice paddy dam contributes to controlling outflows of fertile soils from the paddy fields, mitigating the water quality in the rivers and bogs, and improving the function of water control by soil deposition.</li> </ul>   | <a href="https://www.city.niigata.lg.jp/shisei/kataken/kataken_getsurei.files/getsureikaigaiyou_2.pdf">https://www.city.niigata.lg.jp/shisei/kataken/kataken_getsurei.files/getsureikaigaiyou_2.pdf</a>                           |
| 4   | Blesbokspruit Wetland (Ramsar Conv.)   | South Africa     | Mine drainage                            | <ul style="list-style-type: none"> <li>-Following discharges of mine-waters in the mid-1990s, the wetland no longer complied with the Ramsar criteria.</li> <li>-Monthly water quality data (SO<sub>4</sub>, Na, Cl and Mg concentrations, pH and EC values), from January 2000 to December 2011, were obtained, and the major ions were grouped into two distinct time-variation patterns (SO<sub>4</sub>-Mg) and (Na-Cl).</li> <li>-Following the cessation of underground mine-water pumping operations, mineralization of the Blesbokspruit showed a large stepwise reduction, in contrast to a slowly decreasing trend over the previous 10 years, in both the SO<sub>4</sub>-Mg and Na-Cl groups, and EC.</li> <li>-While the Blesbokspruit may have had a high mineralization problem, this was not simply an acid mine drainage problem, but a combination of the effects of mining and industry.</li> </ul>   | <a href="http://www.scielo.org.za/scielo.php?script=sci_arttext&amp;pid=S1816-79502015000500006">http://www.scielo.org.za/scielo.php?script=sci_arttext&amp;pid=S1816-79502015000500006</a>                                       |
| 5   | Suwa-ko Lake                           | Japan (Nagano)   | Agrichemicals in the inflowing river     | <ul style="list-style-type: none"> <li>- Agrichemical compositions in the lake vary by season.</li> <li>- Based on the results of agrichemical concentrations in 11 flowing rivers into Suwa-ko Lake, there were large differences of concentrations among the rivers.</li> <li>- The seasonal variation of agrichemical concentrations in Suwa-ko Lake was similar to the order to use agrochemicals for rice cropping. These agrochemicals may have given impacts on the lake water in the catchment areas since a similar variation was observed in the river water.</li> <li>- Based on the level distribution of agrochemicals, the level was higher in the river inflowing from the south part of Suwa-ko Lake where was occupied with paddy fields with high agrichemical concentrations.</li> <li>- There was no relationship between the agrichemical concentrations in the rivers and toxicity to living organisms.</li> </ul>   | <a href="http://www.shinshu-u.ac.jp/group/env-sci/Vol35/paper2013/35_06_Miyabara.pdf">http://www.shinshu-u.ac.jp/group/env-sci/Vol35/paper2013/35_06_Miyabara.pdf</a>   |
| 6   | Lake Manyara basin                     | Tanzania         | River water quality around the lake      | <ul style="list-style-type: none"> <li>- There are a number of rivers which drain into the lake such as Mto wa Mbu etc. which are also used for irrigated farming by the local community around.</li> <li>- Farmers indiscriminately used pesticides. Based on the water nutrient analysis in the lake, the results revealed relatively low levels of P, NO<sub>3</sub>, NO<sub>2</sub>, and ammonium in all the seasons. However, a significantly higher level of P level in water during rainy season may be associated with high uses of fertilizers during the season.</li> <li>- Therefore, evidences of lake fertilization may still rely on evidences of high uses of fertilizers in the farms around, poor farming practices, soil erosions, and frequent floods.</li> </ul>   | <a href="http://www.academicjournals.org/article/article1381130464_Nonga%20et%20al.pdf">http://www.academicjournals.org/article/article1381130464_Nonga%20et%20al.pdf</a>   |

Source: JICA Study Team

**1.1.9 Environmental Management Plan (EMP)**

Table 1.1.24 indicates a proposed mitigation measures pre-/during construction and in operation phases.

**Table 1.1.24 Environmental Management Plan for the Atari Project**

| No                              | Potential Impact              | Mitigation Measures  | Responsibility  |   | Estimated Cost or Burden Organization |
|---------------------------------|-------------------------------|--|---|---|---------------------------------------|
|                                 |                               | Pre-/during Construction   | Implementation  | Supervision   |                                       |
| <b>Pre-/during Construction</b> |                               |  |   |   |                                       |
| 1                               | Air Pollution                 | - Water sprinkling near residential area<br>- Speed limit for construction machines at construction sites adjacent to settlement areas   | Construction contractor   | Supervising consultant, MAAIF, MWE  | Construction contractor               |
| 2                               | Water Pollution               | - Discharge through sedimentation pond and silt fence<br>- Installation of portable toilet for workers<br>- Appropriate waste and construction machines management   | Construction contractor   | Supervising consultant, MWE (DWD, DWRM, WMD), MAAIF   | Construction contractor               |
| 3                               | Soil Contamination            | [Excavated soil]<br>- Reuse or dispose at designated disposal site after treatment.<br>[Oil from machinery]<br>- Maintain the machinery and vehicle to prevent oil leakage   | Construction contractor   | Supervising consultant, MWE (DWD, DWRM, WMD), MAAIF   | Construction contractor               |
| 4                               | Waste                         | [Construction waste (trees and waste soil)]<br>- After considering the possibility of reuse, construction waste is disposed at designated disposal site<br>[Waste from base camp]<br>- Waste at workers camp and waste oil shall be brought to disposal site or facility<br>[Night soil]<br>- Temporary sanitation facility such as septic tank shall be introduced to the workers camp. | Construction contractor   | Supervising consultant, NEMA MAAIF, MWE, District Local Governments of Bulambuli, and Kween | Construction contractor               |
| 5                               | Noise and Vibration           | [Construction noise]<br>- Installing noise barrier and selecting low-noise equipment when necessary<br>- Avoiding works of heavy equipment during night time.<br>- Informing the construction schedule to surrounding communities to obtain their consensus.   | Construction contractor   | Supervising consultant, MWE, MAAIF  | Construction contractor               |
| 9                               | Flora, Fauna and Biodiversity | - Restrict the construction activities only to the project foot print areas.<br>- Spare large trees by circumventing them as much as possible<br>- For wetland management, collaborate the monitoring framework by the JICA's wetland management project   | Construction contractor   | Supervising consultant, MWE, MAAIF  | Construction contractor MWE/MAAIF     |
| 10                              | Protected Areas               | - Discharge through sedimentation pond and silt fence<br>- Installation of portable toilet for workers<br>- Appropriate waste and construction machines management   | Construction contractor<br>Farmers' Associations in the Project area, District Local Governments of Bulambuli and Kween | MAAIF, MWE  | Construction contractor               |
| 11                              | Soil Erosion                  | - Maintain strength of slope in order to avoid erosion at borrow pits  | Farmers' Associations in the Project area, District Local Governments of  | MAAIF, MWE  | Construction contractor               |

| No | Potential Impact                                      | Mitigation Measures   | Responsibility  |  | Estimated Cost or Burden Organization |
|----|---|---|---|--|---------------------------------------|
|    |   | Pre-/during Construction  | Implementation  | Supervision  |                                       |
|    |   |   | Bulambuli and Kween   |  |                                       |
| 13 | Hydrological Situation                                | <ul style="list-style-type: none"> <li>- Control water use for construction from the river</li> <li>- Monitor water flow as appropriate</li> <li>- Secure waterways in construction area</li> </ul>   | Construction contractor   | Supervising consultant, MWE (DWD, DWRM, WMD), MAAIF                                    | Construction contractor               |
| 15 | Involuntary Resettlement/ Land Acquisition            | <ul style="list-style-type: none"> <li>- Conduct appropriate compensation and livelihood assistance in accordance with ARAP</li> </ul>  | MAAIF, MWE  | Office of the Chief Government Valuer (CGV)  | USD1,108,093 for ARAP activity        |
| 16 | Local Economy such as Employment and Livelihood, etc. | <ul style="list-style-type: none"> <li>- Conduct appropriate compensation and social assistance in accordance with ARAP</li> </ul>  | Farmers' Associations in the Project area, District Local Governments of Bulambuli and Kween  | MAAIF, MWE   | USD1,108,093 for ARAP activity        |
| 17 | Landscape   | <ul style="list-style-type: none"> <li>- Layout the construction machinery properly</li> </ul>  | Construction contractor   | Supervising consultant, MAAIF, MWE   | Construction contractor               |
| 18 | Land Use and Utilization of Local Resources           | <ul style="list-style-type: none"> <li>- Conduct appropriate land acquisition and compensation</li> <li>- Conduct appropriate land use management</li> </ul>  | Farmers' Associations in the Project area, District Local Governments of Bulambuli and Kween  | MAAIF, MWE   | MAAIF, MWE                            |
| 20 | Existing Social Infrastructures and Services          | <ul style="list-style-type: none"> <li>- Install safety sign boards</li> <li>- Install fences around the construction site to keep out local people such as children</li> <li>- Install parking for idling construction machines</li> </ul>   | Construction contractor   | Supervising consultant, District Local Governments of Bulambuli, and Kween             | Construction contractor               |
| 21 | The Poor, Indigenous and Ethnic People                | <ul style="list-style-type: none"> <li>- Conduct appropriate compensation and social assistance in accordance with ARAP</li> </ul>  | Farmers' Associations in the Project area   | District Local Governments of Bulambuli and Kween<br>MAAIF, MWE                        | USD1,108,093 for ARAP activity        |
| 24 | Local Conflict of Interests                           | <ul style="list-style-type: none"> <li>- Arrange conflicts happened to solve (e.g. boundary conflict etc).</li> </ul>   | Farmers' Associations in the Project area   | District Local Governments of Bulambuli and Kween<br>MAAIF, MWE                        | MAAIF, MWE                            |
| 25 | Water Usage or Water Rights and Rights of Common      | <ul style="list-style-type: none"> <li>- Discharge through sedimentation pond and silt fence</li> </ul>   | Construction contractor<br>Farmers' Associations in the Project area                          | District Local Governments of Bulambuli and Kween, MAAIF, MWE                          | Construction contractor               |
| 26 | Gender/ Children's Rights                             | <ul style="list-style-type: none"> <li>- Conduct appropriate support in accordance with ARAP</li> <li>- In order to prevent child labour, promote awareness of the construction contractor</li> </ul>   | Farmers' Associations in the Project area, Construction Supervisor                            | District Local Governments of Bulambuli and Kween<br>MAAIF, MWE                        | MAAIF, MWE                            |
| 27 | Hazards (Risk), Infectious Diseases such as HIV/AIDS  | <ul style="list-style-type: none"> <li>- Install sufficient drainage facilities not to provide habitat for vector mosquito</li> <li>- Provide adequate temporary sanitation facilities</li> <li>- Enforce medical screening and periodical medical check-up</li> <li>- In order to prevent spread of infectious diseases such as HIV/AIDS, promote awareness of the labours and local people</li> </ul> | Construction contractor<br>MAAIF, MWE<br>Farmers' Associations in the Project area, DPO, DISO | Supervising consultant, District Local Governments of Bulambuli and Kween, MoH, MoGLSD | Construction contractor, MAAIF, MWE   |

| No                  | Potential Impact                 | Mitigation Measures  | Responsibility  |  | Estimated Cost or Burden Organization |
|---------------------|----------------------------------|--|---|--|---------------------------------------|
|                     |                                  | Pre-/during Construction   | Implementation  | Supervision  |                                       |
|                     |                                  | <ul style="list-style-type: none"> <li>- In order to prevent crimes including sexual harassment toward women due to inflow of construction workers, promote awareness of the workers and local people</li> <li>- Recommendation to expel vector shellfish and wear boots</li> </ul>  |   |  |                                       |
| 28                  | Working Conditions/<br>Accidents | <ul style="list-style-type: none"> <li>- Provide safety training for the workers</li> <li>- Conduct safety patrol at the construction site</li> </ul>  | Construction contractor                               | Supervising consultant, MGLSD (OSH Department), District Local Governments of Bulambuli, and Kween | Construction contractor               |
| 29                  | Accident                         | <ul style="list-style-type: none"> <li>- Install safety sign boards</li> <li>- Install fences around the construction site to keep out local people such as children</li> <li>- Install parking for idling construction machines</li> <li>- Restrict mobilization speed in and near the construction site</li> <li>- Setup of a sign for accident warning, regular canal patrol and recommendation of reporting when finding a destructive animal</li> <li>- In order to prevent accident of the child, provide safety education in the elementary school of the neighbourhood.</li> </ul> | Construction contractor                               | Supervising consultant, District Local Governments of Bulambuli, and Kween                         | Construction contractor               |
| 31                  | Monitoring System                | <ul style="list-style-type: none"> <li>- Supervise monitoring activity by the supervisor</li> <li>- Make a routine of reporting monitoring results</li> </ul>  | Construction contractor                               | MAAIF, MWE   | Construction contractor               |
| <b>In Operation</b> |                                  |  |   |  |                                       |
| 2                   | Water Pollution                  | - Train farmers to ensure optimum use farm inputs and the precise emphasized.  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween  | MAAIF, MWE                            |
| 3                   | Soil Contamination               | - Replace the soil seriously damaged by salt.  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween  | MAAIF, MWE                            |
| 4                   | Waste                            | <ul style="list-style-type: none"> <li>- Train farmers to dump such residues at a proper site (e.g. not near the irrigation canals)</li> <li>- Setup of additional waste sites (in case of exceeding projected waste amount)</li> <li>- Dispose the waste at a proper site getting farmers across to enhance the reuse of wastes (feeder, organic material, ploughing-in, fuel etc.) through training.</li> </ul>  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween  | MAAIF, MWE                            |
| 9                   | Flora, Fauna and Biodiversity    | <ul style="list-style-type: none"> <li>- Give training to farmers to conserve the local nature.</li> <li>- For wetland management, collaborate the monitoring framework by the JICA's wetland management project</li> </ul>  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween  | MAAIF, MWE                            |
| 10                  | Protected Areas                  | - Train farmers to ensure optimum use farm inputs such as fertilizers and the precise emphasized.  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween  | MAAIF, MWE                            |
| 12                  | Groundwater                      | - Train farmers to ensure optimum use  | MAAIF, MWE,   | District Local   | MAAIF,                                |



| No | Potential Impact                                      | Mitigation Measures  | Responsibility  |  | Estimated Cost or Burden Organization |
|----|---|--|---|--|---------------------------------------|
|    |   | Pre-/during Construction   | Implementation  | Supervision  |                                       |
|    |   | farm inputs and the precise emphasized.  | Farmers' Associations in the Project area             | Governments of Bulambuli and Kween                             | MWE                                   |
| 13 | Hydrological Situation                                | - Control the volume of water intake based on the water condition status in the irrigation area  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 16 | Local Economy such as Employment and Livelihood, etc. | - Conduct community-based on the wetland management guideline  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 18 | Land Use and Utilization of Local Resources           | - Conduct appropriate land use management base on the related guideline  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 19 | Split in Community                                    | - Conduct activities relating to the project by involving local people   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 21 | The Poor, Indigenous and Ethnic People                | - Follow up the PAPs in line with ARAP   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 22 | Misdistribution of Benefit and Damage                 | - Conduct activities relating to the project by involving local people   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 24 | Local Conflict of Interests                           | - Conduct activities relating to the project by involving local people   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 25 | Water Usage or Water Rights and Rights of Common      | - Install alternative water distribution system when unexpected situation such as reduction of spring water and water level of wells   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 26 | Gender/ Children's Rights                             | - Conduct appropriate support in accordance with ARAP  | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween              | MAAIF, MWE                            |
| 27 | Hazards (Risk), Infectious Diseases such as HIV/AIDS  | - Promote awareness of diseases to local people<br>- Install windows of health consultation<br>- Recommendation to expel vector shellfish and wear boots   | MAAIF, MWE, Farmers' Associations in the Project area | District Local Governments of Bulambuli and Kween, MoH, MoGLSD | MAAIF, MWE                            |
| 29 | Accident  | - Train to comply with traffic rules<br>- Install safety sign boards for traffic and animal attack<br>- Setup of a sign for accident warning, regular canal patrol and recommendation of reporting when finding a destructive animal | MAAIF, MWE  | MAAIF, MWE   | MAAIF, MWE                            |
| 31 | Monitoring System                                     | - Supervise monitoring activity by the supervisor<br>- Make a routine of reporting monitoring results  | MAAIF, MWE  | MAAIF, MWE   | MAAIF, MWE                            |

Source: JICA Study Team

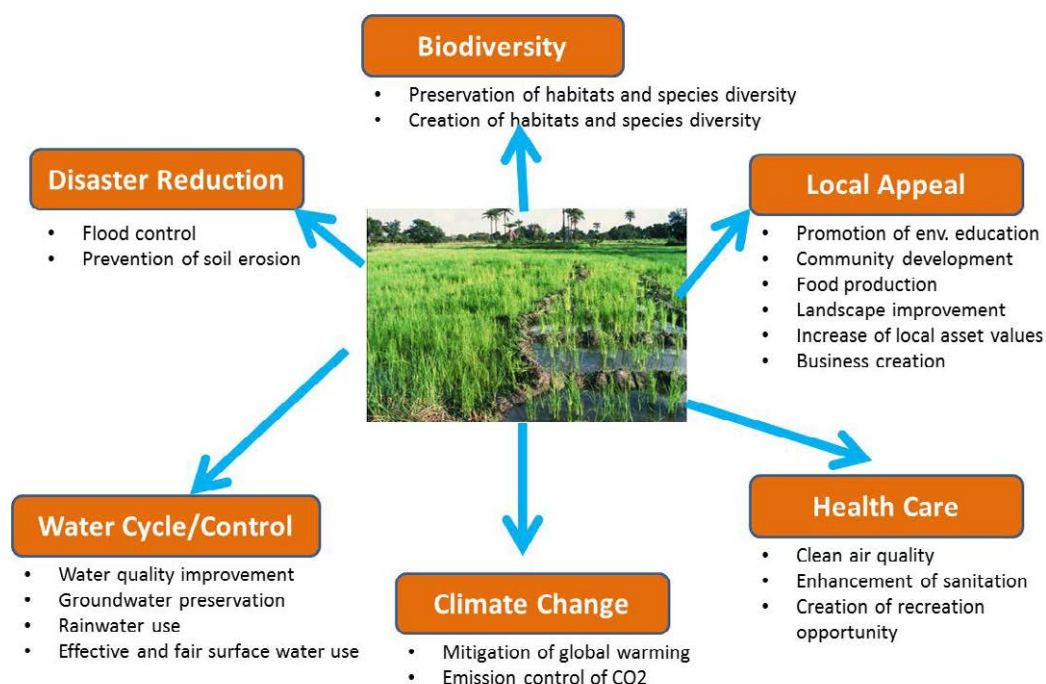
For a better implementation of the project in line with the environmental considerations, a recommendation on the environmental management is as below:

- This project will be the first large-scale irrigation project in Uganda and can be a benchmark in the future.
- Since the project area has a plenty of natural environment and is close to a Ramsar Convention wetland system, farming activities in good harmony with such nature are required.
- The irrigation project is expected to provide a “Green Infrastructure” with a variety of functions such as improvement of farm production, disaster prevention and water cycle improvement etc (see Figure 1.1.10).
- The green infrastructure means social infrastructure improvement and land use which positively utilize the functions of the natural environment and its condition. This project will provide a good case in Uganda.
- In order for the project being sustainable in the future, paying attention to the challenges as shown in Table 1.1.25 is essential.

**Table 1.1.25 Challenge and Solution (draft) for the Project Sustainability**

| No. | Challenge   | Solution (draft)  |
|-----|---|---|
| 1   | Lack of recognition and understanding by farmers and stakeholders | <ul style="list-style-type: none"> <li>- Implement training, workshops etc. by C/P and LGUs</li> <li>- Instill a sense of ownership in stakeholders to join the project activities positively</li> <li>- Enhance community-based activities</li> </ul>      |
| 2   | Insufficient inter-governmental collaboration                     | <ul style="list-style-type: none"> <li>- Delegate responsibility to the designated staff from MAAIF and MWE</li> <li>- Establish a section (group) specific for driving the project</li> <li>- Organize a team in accordance with project stages</li> </ul> |
| 3   | Elusive effect (indicator)  | <ul style="list-style-type: none"> <li>- Set objective indicators for monitoring</li> <li>- Disclose and review monitoring results</li> <li>- Set outcome measures in accordance with stages (flexible)</li> </ul>  |

- In conclusion, it is key that stakeholders fully understand to preserve the environment in the project area by themselves in order for improving values of the area, and the government give sufficient supports.



Source: JICA Study Team

**Figure 1.1.10 A Variety of Functions in Green Infrastructures**

**1.1.10 Environmental Monitoring Plan (EMoP)**

A proposed environmental monitoring plan during and after construction phases is shown in Table 1.1.26. Note the monitoring activity in operation phase shall be carried out at least for two years.

**Table 1.1.26 Environmental Monitoring Plan for the Atari Project**

| No                              | Item   | Parameter  | Location   | Frequency                                      | Responsibility                          |
|---------------------------------|--|--|--|--|---|
| <b>Pre-/during Construction</b> |  |  |  |  |   |
| 1                               | Air Pollution  | Dust, Visual inspection (exhaust gas from machinery)                             | Near the construction site facing sensitive receptor (house, school etc) | When heavy machine operating                   | Construction Supervisor & Subcontractor |
| 2                               | Water Pollution                                      | pH, EC, DO, TDS, turbidity, TN, TP, oil  | Same points as the baseline survey                                       | Monthly (except TN, TP)<br>Biannually (TN, TP) | Construction Supervisor & Subcontractor |
| 3                               | Soil Contamination                                   | Existence of oil in soils (visual inspection)                                    | In working sites where construction machines work                        | Daily  | Construction Supervisor & Subcontractor |
| 4                               | Waste  | Volume of waste soil, trees cut and domestic garbage                             | Excavated site, dumping site, workers' camp                              | Daily  | Construction Supervisor                 |
| 5                               | Noise and Vibration                                  | Noise: LAeq (during operating heavy machine)                                     | Near the construction site facing sensitive receptor (house, school etc) | As appropriate (when complaint happens)        | Construction Supervisor & Subcontractor |
| 9                               | Fauna, Flora and Biodiversity                        | Extent of disturbance of habitat and species                                     | Major construction area  | Monthly  | Construction Supervisor & Subcontractor |
| 10                              | Protected Area                                       | Same as No.2 & 4   | Same as No.2 & 4   | Same as No.2 & 4                               | Construction Supervisor & Subcontractor |
| 11                              | Soil Erosion   | Stability of bank  | At borrow pits   | Monthly or when required                       | Construction Supervisor                 |
| 13                              | Hydrological Situation                               | Volume of river flow   | Same points as the baseline survey                                       | Weekly   | Construction Supervisor & Subcontractor |
| 15                              | Involuntary Resettlement/ Land Acquisition           | Progress of ARAP program (compensation, land acquisition, livelihood assistance) | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE, Consultant                  |
| 16                              | Local Economy such as Employment and Livelihood etc. | Progress of ARAP program (compensation, land acquisition, livelihood assistance) | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE, Consultant                  |
| 17                              | Landscape  | Complaint about the landscape from local people                                  | Wherever complains take place.   | As appropriate                                 | Construction Supervisor & Subcontractor |
| 18                              | Land Use and Utilization of Local Resources          | Progress of ARAP program (compensation, land acquisition, livelihood assistance) | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE, Consultant                  |
| 20                              | Existing Social Infrastructures and Services         | Extent of damage to existing infrastructures such as community roads etc.        | Facilities which the construction give impacts (vehicle roads etc)       | Monthly  | Construction Supervisor, LGU concerned  |
| 21                              | The Poor, Indigenous and Ethnic People               | Progress of ARAP program (compensation, land acquisition, livelihood assistance) | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE, Consultant                  |
| 24                              | Local Conflict of Interests                          | Cause of conflict  | Construction area and affected parishes                                  | As appropriate                                 | MAAIF, MWE, LGU concerned               |
| 25                              | Water Usage or Water Rights and Rights of Common     | Same as No.13  | Same as No.13  | Same as No.13                                  | Construction Supervisor & Subcontractor |

| No                  | Item  | Parameter  | Location   | Frequency                                      | Responsibility  |
|---------------------|---|--|--|--|---|
| 26                  | Gender/Children's Rights                              | Progress of ARAP program (compensation, land acquisition, livelihood assistance)<br>Number of child labours  | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE, Consultant<br>Construction Supervisor & Subcontractor |
| 27                  | Hazards (Risks), Infectious Diseases such as HIV/AIDS | Number of infected patients<br>Number of crimes including sexual harassment toward women<br>Number of raising awareness consultation meeting about crimes including sexual harassment toward women | Construction area, Workers camp<br>Affected parishes           | Quarterly                                      | Construction Supervisor, MAAIF, MWE, LGU concerned                |
| 28                  | Working Conditions/ Accidents                         | Number of instruments required (helmets, shoes etc)<br>Number of accidents relating to construction  | Construction area, Workers camp                                | Quarterly                                      | Construction Supervisor,  |
| 29                  | Accident  | Number of accidents happened<br>Number of the safety education at the elementary school  | In the project area (especially outside the construction area) | Quarterly                                      | Construction Supervisor & Subcontractor                           |
| 31                  | Monitoring System                                     | Progress of monitoring activity as scheduled   | Monitoring forms and reports                                   | Quarterly                                      | MAAIF, MWE, Consultant  |
| <b>In Operation</b> |   |  |  |  |   |
| 2                   | Water Pollution                                       | pH, EC, DO, TDS, turbidity, TN, TP, oil  | Same points as the baseline survey                             | Monthly (except TN, TP)<br>Biannually (TN, TP) | MAAIF, MWE  |
| 3                   | Soil Contamination                                    | EC   | Same points as the baseline survey                             | Monthly  | MAAIF, MWE  |
| 4                   | Waste   | Existence of wastes near canals, rivers  | Along canals and rivers  | Monthly  | MAAIF, MWE  |
| 9                   | Fauna, Flora and Biodiversity                         | Extent of disturbance of habitat and species   | Major construction area  | Yearly   | MAAIF, MWE  |
| 10                  | Protected Areas                                       | Same as No.2 & 4   | Same as No.2 & 4   | Same as No.2 & 4                               | MAAIF, MWE  |
| 12                  | Groundwater   | Same as No.2   | Same points as the baseline survey                             | Same as No.2                                   | MAAIF, MWE  |
| 13                  | Hydrological Situation                                | Volume of river flow   | Same points as the baseline survey                             | Yearly   | MAAIF, MWE  |
| 16                  | Local Economy such as Employment and Livelihood etc.  | Progress of livelihood assistance  | Affected parishes  | Quarterly, or when required                    | MAAIF, MWE  |
| 18                  | Land Use and Utilization of Local Resources           | Progress of land use management guideline  | Affected parishes  | Quarterly                                      | MAAIF, MWE  |
| 19                  | Split in Community                                    | Number of frictions between communities  | Affected parishes  | Yearly   | MAAIF, MWE, LGUs concerned  |
| 21                  | The Poor, Indigenous and Ethnic People                | Number of complaints   | Affected parishes  | Quarterly                                      | MAAIF, MWE, LGUs concerned  |
| 22                  | Misdistribution of Benefit and Damage                 | Number of complaints   | Affected parishes  | Quarterly                                      | MAAIF, MWE, LGUs concerned  |
| 24                  | Local Conflict of Interests                           | Number of conflicts  | Affected parishes  | Quarterly                                      | MAAIF, MWE, LGUs concerned  |
| 25                  | Water Usage or Water Rights and Rights of Common      | Number of complaints   | Affected parishes  | Quarterly                                      | MAAIF, MWE, LGUs concerned  |
| 26                  | Gender/Children's Rights                              | Number of complaints<br>Income of the female-headed household<br>Number of female membership of the water association (to be established)  | Affected parishes  | Quarterly                                      | MAAIF, MWE, LGUs concerned  |

| No | Item  | Parameter   | Location                     | Frequency  | Responsibility             |
|----|---|---|------------------------------|------------|----------------------------|
|    |   | Number of female participants to the community consultation meeting |                              |            |                            |
| 27 | Hazards (Risks), Infectious Diseases such as HIV/AIDS | Number of infected patients   | Affected parishes            | Biannually | MAAIF, MWE, LGUs concerned |
| 29 | Accident  | Number of accidents happened.                                       | Affected parishes            | Quarterly  | MAAIF, MWE, LGUs concerned |
| 31 | Monitoring System                                     | Progress of monitoring activity as scheduled                        | Monitoring forms and reports | Quarterly  | MAAIF, MWE, LGUs concerned |

Source: JICA Study Team

A proposed monitoring form in construction and operation phases is shown in Table 1.1.27.

**Table 1.1.27 Environmental Monitoring Form (draft)**

**Construction Phase**

**1. Response/Action to Comments and Guidance from Government Authorities and the Public**

| Monitoring Item  | Monitoring Results during Report Period |
|--|---|
| No. and contents of formal comments made by the public |   |
| No. and contents of responses from Gov. authorities    |   |

**2. Pollution**

**Air Quality**

| Item                            | Unit              | Measured value (mean)    | Measured value (max) | Standard (country) | Referred Int'l standards <sup>*1</sup> | Measurement point        | Frequency                     |
|---------------------------------|-------------------|--------------------------|----------------------|--------------------|--|--------------------------|-------------------------------|
| Dust (PM10) (instrument)        | ug/m <sup>3</sup> |                          |                      | 300                | 50                                     |                          | When heavy machine operating) |
| Visual inspection (qualitative) |                   |                          |                      |                    |  |                          |                               |
| <b>Item</b>                     |                   | <b>Monitoring result</b> |                      | <b>Reference</b>   |  | <b>Measurement point</b> |                               |

\*1: WHO' Guideline value

**Water Quality**

| Item                         | Unit  | Measured value (mean)    | Measured value (max) | Standard (country) | Standard (contract) | Referred Int'l standards <sup>*2</sup> | Measurement point | Frequency   |
|------------------------------|-------|--------------------------|----------------------|--------------------|---------------------|--|-------------------|---|
| <b>Quantitative Analysis</b> |       |                          |                      |                    |                     |  |                   | Monthly (except TN & TP),<br>Biannually (TN & TP) |
| pH                           | -     |                          |                      | 6.5-8.5            | 6.5-8.5             | 6.5-8.5                                |                   |   |
| EC                           | uS/cm |                          |                      | 25,000             | 25,000              | 110                                    |                   |   |
| DO                           | mg/L  |                          |                      | -                  | 6.5 <sup>*1</sup>   | 5                                      |                   |   |
| TDS                          | mg/L  |                          |                      | -                  | 62 <sup>*1</sup>    | -                                      |                   |   |
| TN                           | mg/L  |                          |                      | -                  | 1.7 <sup>*1</sup>   | -                                      |                   |   |
| TP                           | mg/L  |                          |                      | -                  | 0.3 <sup>*1</sup>   | -                                      |                   |   |
| <b>Qualitative Analysis</b>  |       |                          |                      |                    |                     |  |                   |   |
| <b>Item</b>                  |       | <b>Monitoring result</b> |                      | <b>Reference</b>   |                     | <b>Measurement point</b>               |                   |   |
| Turbidity                    |       |                          |                      |                    |                     |  |                   |   |
| Oil                          |       |                          |                      |                    |                     |  |                   |   |

\*1: Maximum values obtained by baseline survey during dry season.

\*2: Japan's environmental standards for type-C river water (3rd class for fishery and 1st for industrial water)

**Soil Contamination**

| Monitoring Item        | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|------------------------|---|----------------------|-----------|
| Extent of oil in soils |   |                      | Daily     |

**Waste**

| Monitoring Item                     | Date | Measured value | Measurement Point | Note | Frequency |
|-------------------------------------|------|----------------|-------------------|------|-----------|
| Volume of soil (m <sup>3</sup> )    |      |                |                   |      | Daily     |
| Volume of trees cut (kg)            |      |                |                   |      | Daily     |
| Volume of garbage (m <sup>3</sup> ) |      |                |                   |      | Daily     |

**Noise**

| Item | Unit  | Measured value (mean) | Measured value (max) | Standard (country) | Standard (contract) <sup>*1</sup> | Referred Int'l standards <sup>*2</sup> | Measurement point | Frequency      |
|------|-------|-----------------------|----------------------|--------------------|-----------------------------------|--|-------------------|----------------|
| LAeq | dB(A) |                       |                      | 50                 | 58                                | 50                                     |                   | As appropriate |

\*1: Maximum value obtained by baseline survey during dry season.

\*2: WHO's Guideline value (outdoor) for residential area.

**3. Natural Environment****Fauna, Flora & Biodiversity**

| Monitoring Item                              | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|--|---|----------------------|-----------|
| Extent of disturbance of habitat and species |   |                      | Monthly   |

**Protection Area**

| Monitoring Item               | Monitoring Results during Report Period | Measures to be Taken | Frequency          |
|-------------------------------|---|----------------------|--------------------|
| Same as Water Quality & Waste |   |                      | Same Water Quality |

**Soil Erosion**

| Monitoring Item                | Monitoring Results during Report Period | Measures to be Taken | Frequency              |
|--------------------------------|---|----------------------|------------------------|
| Stability of bank (borrow pit) |   |                      | Monthly or when needed |

**Hydrological Situation**

| Monitoring Item      | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|----------------------|---|----------------------|-----------|
| Volume of river flow |   |                      | Weekly    |

**4. Social Environment****RAP Progress****Public Consultation**

| No. | Date | Venue | Contents of the consultation/ main comments and answers |
|-----|------|-------|---|
| 1   |      |       |   |
| 2   |      |       |   |

**Progress of RAP Activity**

| Resettlement Activities                                      | Planned Total | Unit        | Progress in Quantity |                       |                   | Progress in %         |                   | Expect Date of Completion | Responsible Organization |
|--|---------------|-------------|----------------------|-----------------------|-------------------|-----------------------|-------------------|---------------------------|--------------------------|
|  |               |             | During the quarter   | Till the last quarter | Up to the quarter | Till the last quarter | Up to the quarter |                           |                          |
| Preparation of RAP   |               |             |                      |                       |                   |                       |                   |                           | MAAIF/MWE                |
| Employment of consultants                                    |               | Man-month   |                      |                       |                   |                       |                   |                           | MAAIF/MWE                |
| Implementation of census survey (incl. socioeconomic survey) |               |             |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Approval of RAP  |               |             | Date of approval:    |                       |                   |                       |                   |                           | MAAIF/MWE                |
| Finalization of PAPs list                                    |               | No. of PAPs |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Progress of compensation payment                             |               | No. of HHs  |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Lot 1  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 2  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 3  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 4  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Progress of land acquisition (All lots)                      |               | ha          |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Lot 1  |               | ha          |                      |                       |                   |                       |                   |                           |                          |
| Lot 2  |               | ha          |                      |                       |                   |                       |                   |                           |                          |
| Lot 3  |               | ha          |                      |                       |                   |                       |                   |                           |                          |
| Lot 4  |               | ha          |                      |                       |                   |                       |                   |                           |                          |
| Progress of asset replacement (All lots)                     |               | No. of HHs  |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Lot 1  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 2  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 3  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 4  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Progress of relocation of people (All lots)                  |               | No. of HHs  |                      |                       |                   |                       |                   |                           | Consultants MAAIF/MWE    |
| Lot 1  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 2  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 3  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |
| Lot 4  |               | No. of HHs  |                      |                       |                   |                       |                   |                           |                          |

**Other Items**

| Monitoring Item                              | Monitoring Results during Report Period | Measures to be Taken | Frequency   |
|--|---|----------------------|-------------|
| Extent of damage to existing infrastructures |   |                      | Monthly     |
| Cause of conflict                            |   |                      | As properly |

|  |  |  |           |
|--|--|--|-----------|
| No. of infected patients among workers   |  |  | Quarterly |
| No. of instruments   |  |  | Quarterly |
| No. of accidents relating to construction                                      |  |  | Quarterly |
| No. of child labour  |  |  | Quarterly |
| No. of crimes by construction workers including sexual harassment toward women |  |  | Quarterly |

### Operation Phase

#### 1. Response/Action to Comments and Guidance from Government Authorities and the Public

| Monitoring Item  | Monitoring Results during Report Period |
|--|---|
| No. and contents of formal comments made by the public |   |
| No. and contents of responses from Gov. authorities    |   |

#### 2. Pollution

##### Water Quality

| Item                         | Unit              | Measured value (mean) | Measured value (max) | Standard (country) | Standard (contract) | Referred Int'l standards*2 | Measurement point | Frequency   |
|------------------------------|-------------------|-----------------------|----------------------|--------------------|---------------------|----------------------------|-------------------|---|
| <b>Quantitative Analysis</b> |                   |                       |                      |                    |                     |                            |                   |   |
| pH                           | -                 |                       |                      | 6.5-8.5            | 6.5-8.5             | 6.5-8.5                    |                   | Monthly (except TN & TP),<br>Biannually (TN & TP) |
| EC                           | uS/cm             |                       |                      | 25,000             | 25,000              | 110                        |                   |   |
| DO                           | mg/L              |                       |                      | -                  | 6.5 <sup>*1</sup>   | 5                          |                   |   |
| TDS                          | mg/L              |                       |                      | -                  | 62 <sup>*1</sup>    | -                          |                   |   |
| TN                           | mg/L              |                       |                      | -                  | 1.7 <sup>*1</sup>   | -                          |                   |   |
| TP                           | mg/L              |                       |                      | -                  | 0.3 <sup>*1</sup>   | -                          |                   |   |
| <b>Qualitative Analysis</b>  |                   |                       |                      |                    |                     |                            |                   |   |
| Item                         | Monitoring result |                       |                      | Reference          | Measurement point   |                            |                   |   |
| Turbidity                    |                   |                       |                      |                    |                     |                            |                   |   |
| Oil                          |                   |                       |                      |                    |                     |                            |                   |   |

\*1: Maximum values obtained by baseline survey during dry season.

\*2: Japan's environmental standards for type-C river water (3rd class for fishery and 1st for industrial water)

##### Soil Contamination

| Item | Unit  | Measured value (mean) | Measured value (max) | Standard (country) | Standard (contract) | Referred Int'l standards*2 | Measurement point | Frequency |
|------|-------|-----------------------|----------------------|--------------------|---------------------|----------------------------|-------------------|-----------|
| EC   | uS/cm |                       |                      |                    | 50                  |                            |                   | Monthly   |

##### Waste

| Monitoring Item                     | Date | Measured value | Measurement Point | Note | Frequency |
|-------------------------------------|------|----------------|-------------------|------|-----------|
| Volume of soil (m <sup>3</sup> )    |      |                |                   |      | Monthly   |
| Volume of trees cut (kg)            |      |                |                   |      | Monthly   |
| Volume of garbage (m <sup>3</sup> ) |      |                |                   |      | Monthly   |

#### 3. Natural Environment

##### Fauna, Flora & Biodiversity

| Monitoring Item                              | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|--|---|----------------------|-----------|
| Extent of disturbance of habitat and species |   |                      | Yearly    |

##### Protection Area

| Monitoring Item                 | Monitoring Results during Report Period | Measures to be Taken | Frequency                       |
|---------------------------------|---|----------------------|---------------------------------|
| Same as Water Quality and Waste |   |                      | Same as Water Quality and Waste |

##### Groundwater

| Item      | Unit  | Measured value (mean) | Measured value (max) | Standard (country) | Standard (contract) | Referred Int'l standards <sup>*2</sup> | Measurement point | Frequency   |
|-----------|-------|-----------------------|----------------------|--------------------|---------------------|--|-------------------|---|
| pH        | -     |                       |                      | 6.5-8.5            | 6.5-8.5             | 6.5-8.5                                |                   | Monthly (except TN & TP),<br>Biannually (TN & TP) |
| EC        | uS/cm |                       |                      | 25,000             | 25,000              | 110                                    |                   |   |
| DO        | mg/L  |                       |                      | -                  | 6.5 <sup>*1</sup>   | 5                                      |                   |   |
| TDS       | mg/L  |                       |                      | -                  | 62 <sup>*1</sup>    | -                                      |                   |   |
| Turbidity | -     |                       |                      | -                  | -                   | -                                      |                   |   |
| TN        | mg/L  |                       |                      | -                  | 1.7 <sup>*1</sup>   | -                                      |                   |   |
| TP        | mg/L  |                       |                      | -                  | 0.3 <sup>*1</sup>   | -                                      |                   |   |
| Oil       | -     |                       |                      | -                  | -                   | -                                      |                   |   |

\*1: Maximum values obtained by baseline survey during dry season.

\*2: Japan's environmental standards for type-C river water (3rd class for fishery and 1st for industrial water)

#### Hydrological Situation

| Monitoring Item      | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|----------------------|---|----------------------|-----------|
| Volume of river flow |   |                      | Yearly    |

#### 4. Social Environment

##### RAP Progress

| Monitoring Item                        | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|--|---|----------------------|-----------|
| Livelihood assistance (when necessary) |   |                      | Quarterly |
| Others                                 |   |                      |           |

##### Other Items

| Monitoring Item  | Monitoring Results during Report Period | Measures to be Taken | Frequency |
|--|---|----------------------|-----------|
| Progress of land use guideline   |   |                      | Quarterly |
| Extent of damage to existing infrastructures                             |   |                      | Quarterly |
| Cause of conflict  |   |                      | Quarterly |
| No. of infected patients   |   |                      | Quarterly |
| No. of instruments   |   |                      | Quarterly |
| No. of accidents happened  |   |                      | Quarterly |
| Income of the female-headed household                                    |   |                      | Quarterly |
| Number of female membership of the water association (to be established) |   |                      | Quarterly |
| Number of female participants to the community consultation meeting      |   |                      | Quarterly |

Source: JICA Study Team

#### 1.1.11 Consultation Meeting among Stakeholders

The project held plenty of sensitization meetings and workshops to stakeholders and people concerned in order to promote understanding of the project before the stakeholder meetings on the environment. After the JICA Study Team and counterparts (MAAIF and MWE) evaluated the stakeholders have understood the project and been positive, the stakeholder meetings on the environment were conducted. Table 1.1.28 indicates the outline of the 1st and 2nd meetings in March and May 2016 respectively.

Announcement of the stakeholder meetings was done by the following ways:

- 1) Oral communication from the selected persons who coordinate the project to local people; and
- 2) Posting announcement posters (written in languages used in each area) at places where people gather (e.g. district office, S/C office, meeting space, shop etc.).



**Table 1.1.28 Outline of Stakeholder Meetings in Atari Area**1st Stakeholder Meetings

| Date          | District & Venue                                   | Participants<br>(Number & woman %)   | Agenda  |
|---------------|--|--|---|
| 14 March 2016 | Kween<br>Kween District Head<br>Quarters           | PDCC, PACC and Local<br>Government<br>No. of Participants: 37<br>% of women: 22%<br>Language: Swahili, English   | <ul style="list-style-type: none"> <li>▪ Project Disclosure</li> <li>▪ Discussion of Potential Environmental and Social Impacts</li> <li>▪ Plan of possible alternatives</li> <li>▪ Disclosure of pending EIA surveys.</li> <li>▪ Collection of views from stakeholders</li> </ul>  |
| 15 March 2016 | Bulambuli<br>Bulambuli District Head<br>Quarters   | PDCC, PACC and Local<br>Government<br>No. of Participants: 49<br>% of women: 27%<br>Language: Swahili, Lugisu, English                                 |   |
| 17 March 2016 | Kween<br>Bwebere and Sikwa<br>Atari Primary School | Bwebere and Sikwa Community<br>(Farmers, landowners, tenants etc.)<br>No. of Participants: 69<br>% of women: 22%<br>Language: Swahili, Lugisu, English | <ul style="list-style-type: none"> <li>▪ Project Disclosure</li> <li>▪ Discussion of Potential Environmental and Social Impacts</li> <li>▪ Plan of possible alternatives</li> <li>▪ Disclosure of pending EIA surveys.</li> <li>▪ Collection of views from community met</li> </ul> |
| 18 March 2016 | Bulambuli<br>Bushibalayi Catholic<br>church        | Bukhalu Community (Farmers,<br>landowners, tenants etc.)<br>No. of Participants: 101<br>% of women: 13%<br>Language: Lugisu, English                   |   |

2nd Stakeholder Meetings

| Date        | District & Venue                                   | Participants<br>(Number & woman %)   | Agenda   |
|-------------|--|--|--|
| 23 May 2016 | Kween<br>Kween District Head<br>Quarters           | PDCC, PACC and Local<br>Government<br>No. of Participants: 30<br>% of women: 20%<br>Language: Kuksabini, English                                       | <ul style="list-style-type: none"> <li>▪ Project Background</li> <li>▪ Project Location</li> <li>▪ The ESIA objectives</li> <li>▪ Explanation of Alternatives</li> <li>▪ Summary of baseline Survey results</li> <li>▪ Summary of Impact Assessment</li> <li>▪ Project Environmental and Social Management Plan</li> </ul> |
| 24 May 2016 | Bulambuli District Head<br>Quarters                | PDCC, PACC and Local<br>Government<br>No. of Participants: 35<br>% of women: 20%<br>Language: Lugisu, English  |  |
| 26 May 2016 | Kween<br>Bwebere and Sikwa<br>Atari Primary School | Bwebere and Sikwa Community<br>(Farmers, landowners, tenants etc.)<br>No. of Participants: 171<br>% of women: 17%<br>Language: Swahili, Lugis, English |  |

Source: JICA Study Team

Table 1.1.29 shows major questions/comments by the participants and responses by the meeting host (study team, counterparts (MAAIF and MWE), LGUs) on the environment issues.

**Table 1.1.29 Major Questions/Comments and Responses in Stakeholder Meetings (Atari)**1st Stakeholder Meetings

| Date          | Topic       | Question/Comment   | Response   |
|---------------|-------------|--|--|
| 14 March 2016 | Air quality | During construction there will be dust. The project borders the main road and vehicles used will raise dust for communities that neighbour the project area.             | The contractor will be advised to drive at 30 kph to minimize dust. Also where possible roads will be watered to reduce the dust.  |
|               | Accident    | The project is near a school. Children are easily attracted to construction places and this can be hazardous to them. Children might get injured during the construction | Sensitization is carried out targeting both children and parents. The contractor is advised to put signage clearly marking areas where construction is in process and preventing children and adults |

| Date          | Topic        | Question/Comment  | Response  |
|---------------|--------------|---|---|
|               |              | phase if no precautions are taken to prevent them from venturing near the construction site.  | from venturing there.   |
|               | Disease      | There will be an influx of workers into the project area. This increases the risk of STDs and crime in the area.  | Sensitization of people in the area is carried out on spread of STDs and the contractor is advised to sensitize his workers to reduce the spread of STDs and reduce crimes. |
| 15 March 2016 | Farming      | A very common problem in areas where similar irrigation schemes are implemented is schistosomiasis because of snails. For example in Egypt, Endod fruits ( <i>Phytolacca dodecandra</i> ) are planted along the edges of the canals to kill the snails. Entomologists should check about snails and prevention measures put in place.   | Noted.  |
|               | Pesticide    | Chemical safety for pesticides should be carefully taken into consideration. Pesticides are farm inputs, so an integrated pest management program should be put in place.   | Noted. The project will not recommend the use of pesticides.  |
|               | Soil erosion | Water from the mountains carries a lot of soil, which contributes to siltation. How is the management of this siltation being done? If this soil is not dealt with, the scheme will not be sustainable. The community needs to be involved to ensure that the soil erosion / siltation is reduced. An integrated catchment management plan needs to be incorporated, as well as improved farming practices. | Noted   |
| 17 March 2016 | Buffer zone  | The communities were told that government requires a 30 m corridor be left away from the river yet majority of the people's land starts from the river. Will those having land within the 30 m required be compensated?   | If this land is needed for the buffer zone then yes compensation will be done in accordance with national and international regulations and guidelines.                     |
|               | Benefit      | Construction of the irrigation project would be a benefit to school going children. This can be used as a study site showing the activities carried out and as well as a tourism attraction for neighbouring communities and districts.   | Noted.  |
|               |              | Land that is prone to floods will be restored and will be used for agriculture. Floods are a common problem in the area and they prevent land from being used.  | Noted.  |
|               | Impact       | The area doesn't have enough drinking water in the area therefore this should be included in the project plan, after implementation of the project, tapped water should be extended to the area.  | Noted and the necessary authorities will be informed about this but this isn't the mandate of this project.   |

### 2nd Stakeholder Meetings

| Date        | Topic       | Question/Comment  | Response  |
|-------------|-------------|---|---|
| 23 May 2016 | Land        | Loss of grazing land should be made clear to the communities.   | There will be no loss of grazing land, instead one will have to make a choice to either continue using their land for grazing or use it for crop farming. |
|             | Buffer zone | During the detailed design, the buffer zone should be extended. How will people who live near the buffer zone be compensated for? | There will be an in-depth discussion on RAP when the actual RAP commences.  |
|             | Impact      | Negative impacts should be explained with mitigation measures.  | Noted, mitigation measures for the negative impacts have been explained and more so well elaborated in the ESIA report.                                   |
| 24 May      | Buffer zone | Will land within the buffer zone be   | The land within the buffer zone will be discussed   |

| Date        | Topic              | Question/Comment  | Response  |
|-------------|--------------------|---|---|
| 2016        |                    | compensated for?  | during the RAP. PACC members will be invited and informed about RAP and how it will be implemented.   |
|             | Employment         | Will there be employment for the locals during construction?  | There will be more unskilled labour for the locals but this will also be communicated when the project construction commences.  |
|             | Disease            | There should be measures to address issues of HIV/AIDS before construction starts.  | The contractor will be required to sensitize their workers about the risky behaviors and also equip them with condoms. Communities too will be sensitized about the dangers of engaging in risky sexual behaviors.  |
|             | Cultural resources | In case of destruction of cultural resources, will they be relocated to other areas?  | The developer will try as much as possible not to tamper with those resources.  |
| 26 May 2016 | Flood              | If one is not in project area, what plans does the project have for the people outside from project area in event floods come?  | At the intake, a spill way will be constructed; this will convey flood and any excess water back to the river channel. In addition, canals and roads will be equipped with drains to convey excess and used water back to the river channel. These structures are intended to prevent flooding. |
|             | Wildlife           | How will MWE, MAAIF, and JICA, conserve the animals and on whose land?  | The animals will continue to co-exist with the community, as the case now. In addition, the buffer zone will act as an offset to harbor wildlife.   |
|             | Health care        | Will JICA help improve health services in Sikwa? The population of Sikwa is too big with a small health facility.   | The project has a lot of benefits that will arise. When project is implemented and is running, the community will be able to construct the facilities with the help of government.  |
|             | Borehole           | Is there provision of project to construct Borehole?  | When project is implemented and is running, the community will be able to construct the facilities with the help of government.   |
|             | Cultural site      | Will project affect the cultural areas such as graves and if so will these be compensated?  | Cultural sites will not be destroyed. The project will try as much as possible to avoid the cultural sites and in the event that they can't be avoided, the owners will be consulted.   |
|             | River course       | Historically River Atari has changed course twice. The concern is that River Atari is boundary between Kween and Bulambuli and this should be maintained and therefore should be followed in order not to cause conflict. | Noted.  |

Source: JICA Study Team

Figure 1.1.11 indicates atmosphere of 1st and 2nd stakeholder meetings.

1st SHMs (14-18 March 2016)





2nd SHMs (23-26 May 2016)



Source: JICA Study Team

**Figure 1.1.11 Atmosphere of Stakeholder Meetings**

## Chapter 2 Land Acquisition and Resettlement

### 2.1 Necessity for Land Acquisition and Resettlement

There is only a few structures in and around the proposed constructions sites and involuntary resettlement will not be caused. However, land expropriation will be caused due to flood protection dyke and irrigation facilities construction. The affected area by the irrigation facilities construction is 40.4ha, and buffer zone that is within the flood protection dyke toward to the Atari river is 30.3 ha. Moreover, the area to be expropriated for the washing basin and cattle trough will be 0.135ha. Furthermore, the model farm and facilities for farmers training and post-harvest such as training office, dry yard, storage house, etc. constructions will be implemented which will result in around 25.29 ha.

After final design, this ARAP is needed to update for revising the number of displaced persons, the extent of land acquired, the resettlement budget, and the timetable for implementing the resettlement plan.

### 2.2 Legislative Framework on Land Acquisition and Resettlement

This section summarizes the legislative framework for land acquisition and resettlement activities and provides a brief overview of the relevant national policies, legal and institutional framework to provide guidance to the planning for the ARAP, as set out in policies and legislation of the GoU and taking cognizance of the policies of JICA Guidelines / World Bank OP4.12 related to involuntary resettlement.

#### 2.2.1 Ugandan Policies, Laws, and Regulations

Table 2.2.1 indicates relevant Uganda policies, laws and regulations for land acquisition and resettlement which are applicable to the Project.

**Table 2.2.1 Relevant Uganda Policies, Laws and Regulations for Land Acquisition and Resettlement**

| Name of Policy, Laws, and Regulations              | Key Contents   |
|--|--|
| The Constitution of Uganda (1995);                 | <ul style="list-style-type: none"> <li>The constitution provides procedures of land the acquisition for public interest and of the “prompt payment of fair and adequate compensation” prior to taking possession of the land.</li> </ul>   |
| The National Land Policy (2013)                    | <ul style="list-style-type: none"> <li>This policy addresses the contemporary land issues and conflicts facing the Country.</li> </ul>   |
| The Land Act (1998)                                | <ul style="list-style-type: none"> <li>This act addresses land holding, management control, and dispute processing.</li> </ul>   |
| The Land Acquisition Act (1965)                    | <ul style="list-style-type: none"> <li>This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes</li> </ul>   |
| National Environment Management Policy (1994)      | <ul style="list-style-type: none"> <li>Uganda has no resettlement regulations or guidelines except as alluded to in the Land Act. This policy however broadly requires projects to assess potential social impacts caused by the project</li> </ul>  |
| National Development Plan 2015/16 –2019/20 (NDPII) | <ul style="list-style-type: none"> <li>NDP addresses structural bottlenecks in the economy in order to accelerate socio-economic transformation for prosperity and key among these is improvement of livelihood of farmers cultivating food crops in the lowland (wetland) area of the country through the development of sustainable irrigated agriculture for the rice production taking into account wise-use of wetland area.</li> </ul> |
| National Gender Policy (1997)                      | <ul style="list-style-type: none"> <li>This policy indicates gender considerations on equal opportunity in occasion of recruitment of construction labour, and on decision making during resettlement.</li> </ul>  |
| HIV/AIDS Policy (1992)                             | <ul style="list-style-type: none"> <li>This policy indicates requirements that contractors or their subcontractors, especially in regard to having an in-house HIV Policy, worker sensitization and the provision of free condoms.</li> </ul>  |

| Name of Policy, Laws, and Regulations       | Key Contents   |
|---|--|
| Local Government Act, Cap. 243 (2008)       | <ul style="list-style-type: none"> <li>• The Act empowers districts administrations to develop and implement district rates upon which compensation for crops and non-permanent structures is based.</li> </ul>                                      |
| Registration of Titles Act, Cap. 230 (2000) | <ul style="list-style-type: none"> <li>• This Act provides the guidance for registration of land ownership.</li> <li>• Note: PISD will not touch anything about community people's land registration.</li> </ul>                                     |
| Disabilities Act (2006)                     | <ul style="list-style-type: none"> <li>• This Act is relevant to the Project since it points out the requirement for support of any PAPs identified as PWDs to ensure that their right to adequate standard of living is not compromised.</li> </ul> |

As shown in Table 2.2.1 there are a number of legal frameworks that regulate the land and resettlement relations in Uganda. These frameworks define land rights, ownership, procedures, and requirements of transfer and acquisition of land between individuals and communities. They also provide procedures for the acquisition of land by the state or a public body for public projects. Among the most important legal instruments in this regard are the following:

- 1) The Constitution of Uganda (1995);
- 2) The National Land Policy 2013
- 3) The Land Act (1998);
- 4) The Land Acquisition Act (1965);

While all matters relating to land acquisition, compensation, and resettlement are managed within the provisions of the above legislation, the most decisive document in this regard is the Land Act of 1998, as amended.

### **(1)The Constitution of Uganda (1995)**

The Constitution vests all land of Uganda in the citizens of Uganda. However, the government or local government may acquire land in the public interest. Such acquisition is subject to the provisions of Article 26 (1) of the Constitution, which gives every person in Uganda a right to own property. The Constitution also prescribes the tenure regimes in accordance with which rights and interests in which land may be held namely; Customary, Freehold, Mailo and Leasehold. According to the Constitution, all land belongs to the people of Uganda and is held in trust by the Government. Government is authorized to acquire land for a public purpose and compensate affected persons in accordance with the law. It provides procedures to follow during the acquisition of land for public interest and provides for the “prompt payment of fair and adequate compensation” prior to taking possession of the land.

### **(2)National Land Policy (2013)**

This new land policy addresses the contemporary land issues and conflicts facing the Country. The vision of the policy is: “a transformed Ugandan society through optimal use and management of land resources for a prosperous and industrialized economy with a developed services sector” while the goal of the policy is: “to ensure an efficient, equitable, and optimal utilization and management of Uganda’s resources for poverty reduction, wealth creation, and overall socio-economic development.”

### **(3)The Land Act (1998)**

The 1998 Land Act addresses land holding, management control, and dispute processing. The Act creates a series of land administration institutions, namely, Uganda Land Commission (ULC), District Land Boards (DLB), Parish Land Committees (PLC), and District Land Tribunals (DLT). The Act also gives valuation principles for compensation, i.e. compensation rates to be yearly approved by DLBs. The basis for compensation is depreciated replacement costs for rural properties and market values for urban properties.

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Key features of the recognized forms of land tenure in Uganda are:

**Customary Tenure** - is governed by rules generally accepted as binding and authoritative by the class of persons to which it applies. Ownership rights are recognized by the community through inheritance, purchase, or by settling on a plot of land which was previously vacant. Under Ugandan customary legal systems, particularly in northern and eastern Uganda, land is usually communally owned by the clan but it can also be owned individually. Rights and responsibilities that derive from communal ownership are shared among various members of the clan according to traditional precepts.

**Leasehold Tenure** - is created either by contract or by operation of the law and is a form under which the landlord or lessor grants the tenant or lessee exclusive possession of the land, usually for a period defined and in return for a rent. The tenant has security of tenure and a proprietary interest in the land.

**Freehold Tenure** - derives its legality from the constitution and its incidents from the written law. It involves the holding of land in perpetuity or a term fixed by a condition and also enables the holder to exercise, subject to the law, full powers of ownership.

**Mailo Tenure** - has roots in the allotment of land pursuant to the 1900 Uganda Agreement and derives its legality from the constitution and its incidents from written law. It involves the holding of land in perpetuity and permits the separation of ownership of land from the ownership of developments on land made by a lawful or bona fide occupant. The system enables the holder to exercise all powers of ownership, subject to the rights of those persons occupying the land at the time of the creation of the Mailo title and their successors.

#### **(4) Land Acquisition Act (1965)**

This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Minister responsible for land may authorize any person to enter upon the land and survey the land, dig or bore the subsoil or any other thing necessary for ascertaining whether the land is suitable for a public purpose. The Government of Uganda is supposed to pay compensation to any person who suffers damage as a result of any action. Any dispute as to the compensation payable is to be referred to the Attorney General or court for decision. The Land Acquisition Act stops at payment of compensation. It is not a legal requirement to purchase alternative land for the affected people by the project. Once they are promptly and adequately compensated, then the obligations stop there. Each affected person entitled to be compensated; on receipt of his/her compensation is expected to move and has no further claim.

#### **2.2.2 Comparison between World Bank OP 4.12 and Land Law in Uganda**

World Bank policy requires “screening” of all projects proposed for Bank financing to help ensure that they take social concerns into account with respect to adverse impacts on project affected people (PAP’s) and to appropriately plan for and respond to these impacts, and thus improve decision making about resettlement, options, alternatives, participation of PAP’s and compensation. The World Bank’s safeguard policy on involuntary resettlement, OP 4.12 is to be complied with where involuntary resettlement, impacts on livelihoods, acquisition of land or restrictions to access to natural resources, may take place as a result of the project. It includes requirements that:

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
  - Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable persons physically displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
  - Displaced persons should be assisted in their efforts to improve their livelihoods and standards of
-

living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

Although the Ugandan Constitution requires that prompt, fair, and adequate compensation be paid prior to displacement, this is not on par with OP 4.12, as there is no requirement that states that the government should provide alternative land or assist with resettlement. Additionally it is unclear how to interpret “prompt, fair, and adequate” compensation. OP 4.12 states that displaced persons should be compensated at full replacement cost. Ugandan law does not make any specific accommodation for squatters or illegal settlers, and reimbursement is based on legal occupancy. There is also no provision in the law that the state should attempt to minimize involuntary resettlement.

### 2.2.3 JICA Safeguard Policies

The key principle of JICA policies on involuntary resettlement is summarized below.

- Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
- When population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.
- People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.
- Compensation must be based on the full replacement cost<sup>1</sup> as much as possible.
- Compensation and other kinds of assistance must be provided prior to displacement.
- For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.
- In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.
- Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.
- Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.

<sup>1</sup> Description of “replacement cost” is as follows.

|           |                             |   |
|-----------|-----------------------------|---|
| Land      | Agricultural Land           | The pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes.  |
|           | Land in Urban Areas         | The pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes.   |
| Structure | Houses and Other Structures | The market cost of the materials to build a replacement structure with an area and quality similar or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labour and contractors’ fees, plus the cost of any registration and transfer taxes. |



Above principles are complemented by World Bank OP 4.12, since it is stated in JICA Guideline that “JICA confirms that projects do not deviate significantly from the World Bank’s Safeguard Policies”. Additional key principle based on World Bank OP 4.12 is as follows.

- Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers or others who wish to take advantage of such benefits.
- Eligibility of benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.
- Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based
- Provide support for the transition period (between displacement and livelihood restoration.
- Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities if any etc.
- For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.

#### 2.2.4 Gap Analysis between JICA Guidelines/World Bank OP4.12 and Ugandan Laws

This section analyzes gaps between Ugandan laws and JICA ESCs guidelines/WB OP4.12 on resettlement making measures to fill up gaps. Table 2.2.2 shows the gap and Safeguard Measures Adopted in PISD

**Table 2.2.2 Gap Analysis between JICA Guidelines/WB OP4.12 and Ugandan Laws**

| No. | JICA Guidelines  | Laws of Uganda   | Gaps between JICA Guidelines / WB OP 4.12 Laws of Uganda   | Safeguard Measures Adopted in PISD  |
|-----|--|--|--|---|
|     | Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)   | The Constitution states that “no person shall be compulsorily deprived of property or any interests in or any right over property of any description except when taking land “for public use or in the interest of defense, public safety, public order, public morality, or public health.” Both Uganda’s Constitution 1995 and the Land Act 1998 give the government and local authorities power to compulsorily acquire land under Eminent Domain | Gap – Uganda has no specific guidelines on involuntary resettlement but even the two principle laws on land: the Constitution and Land Act do not mention specific provisions for avoidance or minimizing involuntary resettlement | All viable alternatives including the design options will be explored to avoid involuntary resettlement and loss of means of livelihood |
|     | When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL) | Ugandan Constitution requires that prompt, fair, and adequate compensation be paid prior to displacement.  | Gap – Measures to minimize impact are not provided for and it is unclear how to interpret “prompt, fair and adequate” compensation   | Effective measures to minimize impact and to compensate for losses will be provided during preparation of the ARAP                      |
|     | People who must be resettled involuntarily and   | There are no explicit provisions under   | Gap – No provision for livelihood  | The project will provide transition allowance.  |

| No. | JICA Guidelines  | Laws of Uganda  | Gaps between JICA Guidelines / WB OP 4.12 Laws of Uganda   | Safeguard Measures Adopted in PISD  |
|-----|--|---|--|---|
|     | people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL) | resettlement or relocation laws for livelihood assistance.  | assistance during resettlement process   | The program should have a strategy for enabling the PAPs restore their incomes to at least pre-project levels   |
|     | Compensation must be based on the full replacement cost as much as possible. (JICA GL)   | Permanent buildings valued based on replacement cost and on top of this a Disturbance Allowance of 15% or 30%) is provided if more than six or less than six months' notice to vacate compensated assets, respectively, is issued to project affected persons.<br><br>Non-permanent buildings will receive a cash compensation based on District Compensation Rates plus disturbance allowance of 15% or 30% (depending on notice period).<br><br>Tenants of structures: Repayment of unused rent, and six-month' notice to vacate structure. | No Gap-The project developer will ensure fair and prompt compensation for the PAPs.                      | Project will provide compensation based on full replacement value. This will include the payment of government valuation rates, a disturbance allowance and a top-up allowance (based on current inflation rate) to compensate for the rise in price of construction materials. |
|     | Compensation and other kind of assistance must be provided prior to displacement. (JICA GL)  | No person from whom land is to be acquired shall be required to vacate until they receive full compensation (the exception could be with absentee landlords/ property owners).  | Gap-The meaning of "other kinds of assistance" are not explicit in Uganda's law                          | Compensation and necessary assistance on a case-by-case basis will be provided prior to displacement.   |
|     | For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)  | Land acquisition act Sections 3 and 5 only provide for a declaration that land is needed for public purpose and a notice to persons having an interest to be published, respectively  | Gap-There is no equivalence on preparation of resettlement plans and making them available to the public | Preparation of resettlement plans will be undertaken in a consultative manner and final ARAP documents made available to the public   |
|     | In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)  | There are no explicit provisions for consultations and disclosure but there are guidelines issued by separate ministries (for example RAP Guide for roads).   | Potential gap exists in regard to stakeholder involvement and information disclosure                     | Consultations will be held with the affected people and their communities based on sufficient information made available to them in advance   |
|     | When consultations are held, explanations must be given in a form, manner, and language understandable to affected people. (JICA GL)   | There are no explicit provisions for consultations and disclosure but there are guidelines issued by separate ministries (for example RAP guide for roads).   | Gap-There are no explicit provisions for consultations and disclosure                                    | Information provided to PAPs during consultations will be a form, manner and language that they understand  |
|     | Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement  | The Land Acquisition Act, makes provision for an enquiry whereby project affected persons (PAPs) can make formal written claim and the  | Gap: While PAP participation is inherent in the ESIA/RAP process, it contains a number of                | PAP participation will be provided for and promoted throughout the ESIA/RAP preparation process   |

| No. | JICA Guidelines  | Laws of Uganda   | Gaps between JICA Guidelines / WB OP 4.12 Laws of Uganda   | Safeguard Measures Adopted in PISD   |
|-----|--|--|--|--|
|     | action plans. (JICA GL)  | assessment officer is obliged to conduct a hearing before making his award.  | differences with the requirements of JICA guidelines.  |  |
|     | Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)   | <p>The Land Act, 1998 had provided for land tribunals to resolve all land related issues. However, since their suspension in 2007, the High Court handles all land-related cases as provided for in the Land Acquisition Act.</p> <p>The Land Act also states that traditional authority mediators must retain their jurisdiction to deal with and settle land disputes.</p>   | Potential gap exists in terms of accessibility and affordability by PAPs if the High Court must handle land-related grievances   | <p>Establish appropriate and accessible grievance mechanisms.</p> <p>Grievance committees to be instituted but the procedure will not replace existing legal process in Uganda. Rather it seeks to resolve issues quickly so as to expedite receipt of entitlements and smooth resettlement without resorting to expensive and time-consuming legal action. If the grievance procedure fails to provide a settlement, complainants can still seek legal redress.</p> |
|     | Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6) | Land acquisition Act in Section 5 only provides for a notice to persons having an interest in private property to be published   | Gap: Although PAPs are required to be identified and served notices, there is no explicit provision for baseline census and socioeconomic surveys as part of a RAP process | The project will conform to WB OP 4.12 and best practises during the preparation of RAP.   |
|     | Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)  | <p>Ugandan law does not make specific provision for squatters or illegal settlers and compensation is given to only legal occupants. The Land Act treats lawful occupants and bona fide occupants as statutory tenants of the registered owner.</p> <p>Under Section 29 of the Land Act, "lawful occupant" means a person who entered the land with consent of the registered owner, and includes a purchaser; or a person who had occupied land as a customary tenant but whose tenancy was not disclosed or compensated for by the registered owner at the time of acquiring the leasehold certificate of title.</p> <p>"Bona fide occupant" means a</p> | Gap: Those without formal legal rights or claims to such lands are not entitled to be resettled or compensated   | Dialogue with policy makers will be initiated to explore the possibility of giving compensation to those without formal legal rights or claims to such lands in order to conform to WB OP 4.12.  |

| No. | JICA Guidelines  | Laws of Uganda  | Gaps between JICA Guidelines / WB OP 4.12 Laws of Uganda   | Safeguard Measures Adopted in PISD  |
|-----|--|---|--|---|
|     |  | <p>person who before the coming into force of the Constitution had occupied and utilised or developed any land unchallenged by the registered owner or agent of the registered owner for twelve years or more; or had been settled on land by the Government or an agent of the Government, which may include a local authority.</p> <p>For the avoidance of doubt, a person on land on the basis of a licence from the registered owner shall not be taken to be a lawful or bona fide occupant under this section.</p> <p>Any person who has purchased or otherwise acquired the interest of the person qualified to be a bona fide occupant under this section shall be taken to be a bona fide occupant for the purposes of this Act.</p> |  |   |
|     | Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)   | The law is not explicit about land-based resettlement strategies  | Gap- The law is not explicit about land-based resettlement strategies in the Ugandan law                         | Land-based resettlement strategies for displaced persons whose livelihoods are land-based will be strongly considered   |
|     | Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)  | There are no equivalent provisions on relocation assistance, transitional support, or the provision of civic infrastructure   | Gap- There are no provisions for transitional support in Uganda  | The project will provide transition allowance   |
|     | Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8) | There is no distinction made on the basis of gender, age, or ethnic origin in Ugandan law during compensation.  | Gap- There is no distinction made on the basis of gender, age or ethnic origin in Uganda law during compensation | The project will conform to the requirements of WB OP 4.12 and best practises during the preparation of the RAP in regards to the needs of the vulnerable groups. |
|     | For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)   | There is no explicit provision for abbreviated RAP in the Ugandan law.  | Gap- There is no explicit provision for abbreviated RAP in the Ugandan law                                       | The project will conduct ARAP study and implement the recommendations in conformity with JICA guidelines and WB OP 4.12.  |

### (1) Land Acquisition and Resettlement Policy for PISD

the policy for PISD land acquisition and resettlement is as follows:

- I. The Project Policy is aimed at filling-in any gaps in what local laws and regulations cannot provide in order to help ensure that PAPs are able to rehabilitate themselves to at least their

pre-project condition. This section discusses the principles of the Project Policy and the entitlements of the PAPs based on the type and degree of their losses. Where there are gaps between Ugandan legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practises and JICA's Policy.

- II. Land acquisition and involuntary resettlement will be **avoided** where feasible, or **minimized**, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
- III. Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
- IV. Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their:

Standard of living adversely affected;

Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;

Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or

Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

- V. All affected people will be eligible for compensation and rehabilitation assistance, **irrespective of tenure status**, social or economic standing, and any such factors that may discriminate against achievement of the objectives outlined above. Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives. All PAPs residing, working, doing business and/or cultivating land within the project impacted areas **as of the date of the latest census** and inventory of lost assets(IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.
- VI. PAPs that **lose only part of their physical assets** will not be left with a portion that will be inadequate to sustain their current standard of living. The minimum size of remaining land and structures will be agreed during the resettlement planning process.
- VII. People **temporarily affected** are to be considered PAPs and resettlement plans address the issue of temporary acquisition.
- VIII. Where a **host community** is affected by the development of a resettlement site in that community, the host community shall be involved in any resettlement planning and decision-making. All attempts shall be made to minimize the adverse impacts of resettlement upon host communities.
- IX. The **resettlement plans** will be designed in accordance with Ugandan's laws and regulations and JICA's Policy on Involuntary Resettlement.
- X. The Resettlement Plan will be **translated** into local languages and **disclosed** for the reference of PAPs as well as other interested groups.
- XI. Payment for land and/or non-land assets will be based on the principle of **replacement cost**.
- XII. Compensation for PAPs dependent on agricultural activities will be **land-based** wherever possible.

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Land-based strategies may include provision of replacement land, ensuring greater security of tenure, and upgrading livelihoods of people without legal land titles. If replacement land is not available, other strategies may be built around opportunities for re-training, skill development, wage employment, or self-employment, including access to credit. Solely cash compensation will be avoided as an option if possible, as this may not address losses that are not easily quantified, such as access to services and traditional rights, and may eventually lead to those populations being worse off than without the project.

- XIII. Replacement lands, if the preferred option of PAPs, should **be within the immediate vicinity** of the affected lands wherever possible and be of **comparable productive capacity and potential**<sup>1</sup>. As a second option, sites should be identified that minimize the social disruption of those affected; such lands should also have access to services and facilities similar to those available in the lands affected.
- XIV. Resettlement assistance will be provided not only for immediate loss, but also for a **transition period** needed to restore livelihood and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.
- XV. The resettlement plan must consider the needs of those most **vulnerable** to the adverse impacts of resettlement (including the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure they are considered in resettlement planning and mitigation measures identified. Assistance should be provided to help them improve their socio-economic status.
- XVI. PAPs will be **involved** in the process of developing and implementing resettlement plans.
- XVII. PAPs and their communities will be **consulted** about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to the extent possible be involved in the decisions that are made concerning their resettlement.
- XVIII. Adequate **budgetary support** will be fully committed and made available to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period. The funds for all resettlement activities will come from the Government.
- XIX. **Displacement does not occur before provision of compensation and of other assistance** required for relocation. Sufficient civic infrastructure must be provided in resettlement site prior to relocation. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, will be completed prior to any construction activities, except when a court of law orders so in expropriation cases. (Livelihood restoration measures must also be in place but not necessarily completed prior to construction activities, as these may be on-going activities.)
- XX. **Organization and administrative arrangements** for the effective preparation and implementation of the resettlement plan will be identified and in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities.
- XXI. Appropriate reporting (including auditing and redress functions), **monitoring and evaluation mechanisms**, will be identified and set in place as part of the resettlement management system. An external monitoring group will be hired by the project and will evaluate the resettlement process and final outcome. Such groups may include qualified NGOs, research institutions or universities.

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<sup>1</sup> Agricultural land for land of equal productive capacity means that the land provided as compensation should be able to produce the same or better yield the PAP was producing on his/her land prior to the project. The production should be in the planting season immediately following the land acquisition. It can be for a future period if transitional allowance equal to the household's previous yield is provided to the PAP household while waiting for the land to get back to the same productivity as the previous land.

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**Cut-off-date of Eligibility**

The cut-off-date of eligibility refers to the date prior to which the occupation or use of the project area makes residents/users of the same eligible to be categorized as PAPs and be eligible to Project entitlements. In the Project, Cut-off date will be the beginning date of the final confirmation of acquired land and assets survey. This date will be disclosed to each affected village by the relevant local governments and the villages will disclose to their populations. The establishment of the eligibility cut-off date is intended to prevent the influx of ineligible non-residents who might take advantage of Project entitlements.

**Principle of Replacement Cost**

All compensation for land and non-land assets owned by households/shop owners who meet the cut-off-date will be based on the principle of replacement cost. Replacement cost is the amount calculated before displacement which is needed to replace an affected asset without depreciation and without deduction for taxes and/or costs of transaction as follows:

- a. Productive Land (agricultural, aquaculture, garden and forest) based on actual current market prices that reflect recent land sales in the area, and in the absence of such recent sales, based on recent sales in comparable locations with comparable attributes, fees and taxes or in the absence of such sales, based on productive value;
- b. Residential land based on actual current market prices that reflect recent land sales, and in the absence of such recent land sales, based on prices of recent sales in comparable locations with comparable attributes; fees and taxes.
- c. Existing local government regulations for compensation calculations for building, crops and trees will be used where ever available.
- d. Houses and other related structures based on actual current market prices of affected materials;
- e. Annual crops equivalent to current market value of crops at the time of compensation;
- f. For perennial crops, cash compensation at replacement cost that should be in line with local government regulations, if available, is equivalent to current market value given the type and age at the time of compensation.
- g. For timber trees, cash compensation at replacement cost that should be in line with local government regulations, if available, will be equivalent to current market value for each type, age and relevant productive value at the time of compensation based on the diameter at breast height of each tree.

**2.3 Scope of Land Acquisition and Resettlement****2.3.1 Project Affected Persons (PAPs)**

As described in 1.2.1, the total numbers of people living inside the two target parishes, Sikwa and Buwebere, are 6,533. These populations are considered to be the target beneficiary of the Project. Among this population, as shown in Table 2.3.1, a total of 284 households or 2,556 persons are estimated as possible Project Affected Households (PAHs) or possible Project Affected Persons (PAPs). PAHs whose land situates on the area taken by the planned irrigation facility are 187, and PAHs who have the land within the BZ are 97. No structures are affected which will be needed to relocate.

Due to the limitation of site survey, types of land ownership (e.g. landowner or tenant or squatter) are not surveyed during F/S stage. These types will be surveyed at the Overall Design (O/D) stage.

**Table 2.3.1 PAHs and PAPs in the Project Area**

| District  | Sub county | Parish   | PAHs         |    |       | Estimated PAPs |     |       |
|-----------|------------|----------|--------------|----|-------|----------------|-----|-------|
|           |            |          | Project Area | BZ | Total | Project Area   | BZ  | Total |
| Kween     | Ngenge     | Sikwa    | 106          | 69 | 175   | 954            | 621 | 1,575 |
| Bulambuli | Bunambutye | Buwebere | 81           | 28 | 109   | 729            | 252 | 981   |
|           |            | Total    | 187          | 97 | 284   | 1,683          | 873 | 2,556 |

Source: JST survey BZ: Buffer Zone

### 2.3.2 Land and Assets Acquisition

According to actual site investigation using approximate ground location of the alignment based on the project preliminary design, a total of 233.48 acre of both of project area and BZ area will be acquired for the Project. Most of lands are farmland which is the main livelihood of people in this region. It is noted that most of land are customary land.

The land for temporary roads used for construction, access roads and stock yards will be included in the ARAP when they are identified. The contractor of construction, however, will implement the EIA and RAP for acquiring additional lands required in accordance with the Ugandan laws and the JICA Guidelines in case the contractor needs a new space during construction. It is usual for the contractor to choose an area with less or no impact.

**Table 2.3.2 Summary of Lands to be Acquired under Proposed Alignment**

| Sub-Project 1 | Approximated Amount of Land to be Acquired (acre) |              |              |              | Total         |
|---------------|---|--------------|--------------|--------------|---------------|
|               | Upland field                                      | Paddy field  | Grass field  | Others       |               |
| Project Area  | 54.62   | 33.12        | 59.84        | 12.50        | <b>160.09</b> |
| Buffer zone   | 34.35   | 31.63        | 6.42         | 1.00         | 73.39         |
| <b>Total</b>  | <b>88.97</b>                                      | <b>64.75</b> | <b>66.26</b> | <b>13.50</b> | <b>233.48</b> |

Source: JST survey

Due to the limitation of site survey, number of trees and graves that are possible assets that will need to be compensated are not counted during F/S stage. These assets will be counted and valued at the O/D stage.

### 2.3.3 Socio-economic Characteristics

This chapter presents a description of the social-economic characteristics of the project area formed through a combination of primary survey data, secondary data and stakeholder consultation. From the baseline survey the Atari River area respondents were 399 of the possible affected population. The data presented is representative of the field findings in line with population, livelihoods, existing healthcare services and prevalent diseases, economic activity, access to social services, access to water, and sources of energy and literacy levels of the people, and preference of the Project in the project area. Form of questionnaire is shown as in Attachment-3.

#### (1) Average Size of the Affected Households

Within the Irrigation project area in River Atari, a sample of 399 potentially affected households with a total of approximately 3,216 family members were interviewed. In the “project affected” areas, the social survey indicated that the average affected household in the districts of Bulambuli and Kween comprised of 9 and above persons living within a single household which is higher than the national average 5.02. Results from the project districts of Bulambuli (17.6%) and Kween (18.5%) show 9 and above persons living within a single household, 5-6 persons at (6.9%) and (13.5%) and 7-8 people at (8.1%) and



(12.5%) in Bulambuli and Kween districts respectively. This reveals a high level of dependency of the dwellers in the Atari River area on household resources such as food which also exacerbates the poverty levels in these households as shown in Table 2.3.3.

**Table 2.3.3 Average Number of People Living within the Household**

| Districts |       | Average Number of people living in households |            |            |            |             | Total |
|-----------|-------|---|------------|------------|------------|-------------|-------|
|           |       | 1-2 people                                    | 3-4 people | 5-6 people | 7-8 people | 9 and above |       |
| Bulambuli | Count | 2   | 22         | 27         | 32         | 69          | 152   |
|           | %     | 0.5   | 5.6        | 6.9        | 8.1        | 17.6        | 38.7  |
| Kween     | Count | 20  | 47         | 53         | 49         | 73          | 242   |
|           | %     | 5.1   | 11.9       | 13.5       | 12.5       | 18.5        | 61.5  |
| Total     | Count | 22  | 69         | 80         | 81         | 142         | 394   |
|           | %     | 5.6   | 17.5       | 20.3       | 20.6       | 36          | 100   |

Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 394

## (2) Gender Distribution of Household Heads

Results from the census survey in the project area established that there were more male respondents (79.1%) among affected households in comparison to females respondents (20.9%). Further analysis of gender distribution in “project affected” households indicated that this trend was consistent in both the districts of Bulambuli (male 31.5%) and (7.0% female) and Kween (male 47.6%) and (13.8%) Female. See Table 2.3.4.

**Table 2.3.4 Gender Distribution in the Households**

| District  | Gender distribution in project area |      |        | Total |
|-----------|-------------------------------------|------|--------|-------|
|           |                                     | Male | Female |       |
| Bulambuli | Count                               | 125  | 28     | 153   |
|           | %                                   | 31.5 | 7      | 38.5  |
| Kween     | Count                               | 190  | 55     | 245   |
|           | %                                   | 47.6 | 13.8   | 61.5  |
| Total     | Count                               | 315  | 83     | 398   |
|           | %                                   | 79.1 | 20.9   | 100   |

Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 398.

Analysis of marital status in the project area in Atari area in the districts of Bulambuli and Kween reveals that the majority of the PAPs were married (80.4%) and these comprised of (75.7%) male and female (4.7%). Results also, indicate that there are more female-headed households that were divorced (2.1%) and widowed (9.7 %) in comparison to the male-headed households which had 1.0% divorced and 0.3% widowed respondents. To a certain extent this represents a significant level of vulnerability, especially where the female household heads are divorced and widowed since they have little or no access to land, livestock, other assets, credit, education, health care and extension services in most rural communities.

**Table 2.3.5 Marital Status by Gender**

| Gender |       | Marital status of household head |         |                    |         | Total |
|--------|-------|----------------------------------|---------|--------------------|---------|-------|
|        |       | Single                           | Married | Divorced/separated | Widowed |       |
| Male   | Count | 12                               | 290     | 4                  | 1       | 307   |
|        | %     | 3.1                              | 75.7    | 1.0                | 0.3     | 80.2  |

| Gender |       | Marital status of household head |         |                    |         | Total |
|--------|-------|----------------------------------|---------|--------------------|---------|-------|
|        |       | Single                           | Married | Divorced/separated | Widowed |       |
| Female | Count | 13                               | 18      | 8                  | 37      | 76    |
|        | %     | 3.4                              | 4.7     | 2.1                | 9.7     | 19.6  |
| Total  | Count | 25                               | 308     | 12                 | 38      | 383   |
|        | %     | 6.5                              | 80.4    | 3.1                | 9.9     | 100.0 |

Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 383

### (3)Age Group

Age is one of the important factors in socio-economic analysis and mitigation of project impacts as it helps to measure the dependency ratio in affected households in a given project area. More so, age can be used as a proxy indicator to establish the need physiological status and healthcare needs of a given population. Primary data shows that the majority of household heads are (25.7%)36-45 years of age followed by, (23.4%) 46-55 and (21.4%) 56 and above years See Table 2.3.6. This signifies that there is a relatively high rate of dependency on the project affected households in the Atari area.

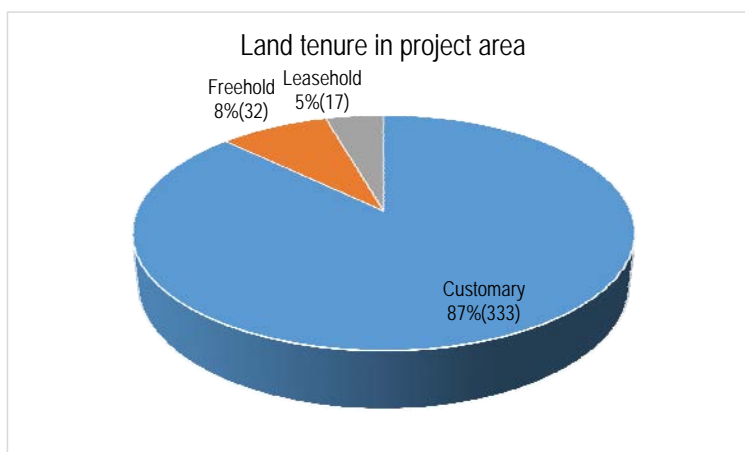
**Table 2.3.6 Age Group of Respondents**

| Gender |            | Age group of household heads |       |       |        |              | Total |
|--------|------------|------------------------------|-------|-------|--------|--------------|-------|
|        |            | 15-25                        | 26-35 | 36-45 | 46-55) | 56 and above |       |
| Male   | Count      | 35                           | 66    | 93    | 71     | 50           | 315   |
|        | % of Total | 8.8                          | 16.6  | 23.4  | 17.9   | 12.6         | 79.3  |
| Female | Count      | 3                            | 13    | 9     | 22     | 35           | 82    |
|        | % of Total | 0.8                          | 3.3   | 2.3   | 5.5    | 8.8          | 20.7  |
| Total  | Count      | 38                           | 79    | 102   | 93     | 85           | 397   |
|        | % of Total | 9.6                          | 19.9  | 25.7  | 23.4   | 21.4         | 100   |

Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 397.

### (4)Land Tenure

According to the socio-economic survey, within the project area in Bulambuli and Kween, the most predominant land tenure systems identified are customary. Customary land tenure was predominant 87% while freehold and leasehold are 8% and 5% respectively as described in Figure 2.3.1. However, according to the hearing survey to District officials conducted by JST, there should be fewer freehold tenure, and none of lease holder. Although District does not have correct figure of these tenure, according to the District officials, because most of community people do not have the correct knowledge about the differences of land tenure, they responded they were freeholder or leaseholder.



Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 382

**Figure 2.3.1 Land Tenure Systems by Proportion in Project Area**

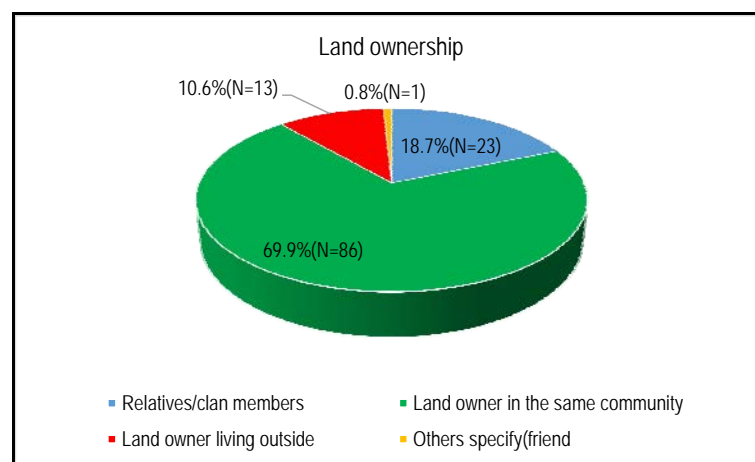
It is imperative to note that in most rural settings most of the women who owned land were either widow who inherited the land from their husbands or parents (6.9%) or outright purchases (10.9%) as shown in Table 2.3.7.

**Table 2.3.7 Methods of Acquisition of Land Ownership by Gender**

| Gender |       | Method of land acquisition |                                |                |           |          | Total |
|--------|-------|----------------------------|--------------------------------|----------------|-----------|----------|-------|
|        |       | Bought                     | Inherited from parents/husband | Renting tenant | Co-tenant | Squatter |       |
| Male   | Count | 186                        | 85                             | 36             | 2         | 4        | 313   |
|        | %     | 47.3                       | 21.6                           | 9.2            | 0.5       | 0.9      | 79.6  |
| Female | Count | 43                         | 27                             | 9              | 1         |          | 80    |
|        | %     | 10.9                       | 6.9                            | 2.3            | 0.3       |          | 20.4  |
| Total  | Count | 229                        | 112                            | 45             | 3         | 4        | 393   |
|        | %     | 58.3                       | 28.5                           | 11.5           | 0.8       | 0.9      | 100   |

Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 393.

On the issues of those who rented land, respondents revealed that they rent their land from landowners within the community (69.9%) and 18.7% rent their land from relatives/clan members. The project area of Atari also had 10.6% of the respondents who were landowners but living outside the project area. Condition of rented land is shown in Figure 2.3.2.



Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 123

**Figure 2.3.2 Persons Renting Land**

## (5) Assets Owned

Welfare indicators are used to monitor poverty. In this report the welfare indicators are measured by ownership of different assets in working condition. Household assets are used among others to measure the economic welfare of a household. The study went further to establish the assets owned by the households in working condition. In Table 2.3.8 below survey results show that majority of households owned land (89.0%), house (94.3%), radio (67.1%) and domestic animals (61.9%). Few households owned cars (2.6%), motorcycles (7.8%) and TV sets (11%). A significant percentage (55.4%) owned mobile phone which reveals the proliferation of mobile communication technology in rural areas.

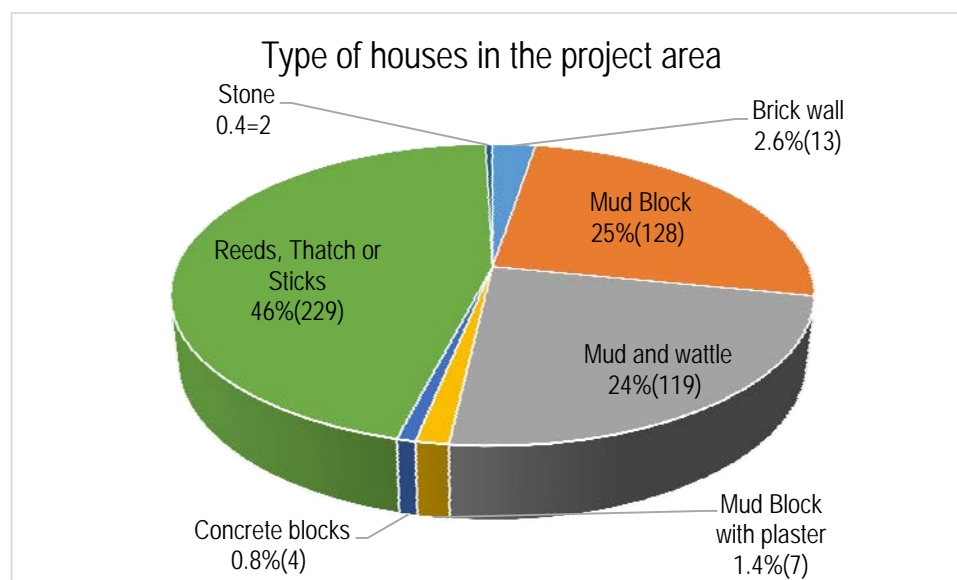
**Table 2.3.8 Proportion of Households Owning Assets**

| Type of Asset    | Proportions of Households Owning Assets | Number |
|------------------|---|--------|
| Land             | 89.0                                    | 341    |
| House            | 94.3                                    | 361    |
| Domestic animals | 61.9                                    | 237    |
| TV set           | 11.0                                    | 42     |
| Radio            | 67.1                                    | 257    |
| Car              | 2.6                                     | 10     |
| Motorcycle       | 7.8                                     | 30     |
| Bicycle          | 46.2                                    | 177    |
| Mobile phone     | 55.4                                    | 212    |
| Other (specify)  | 2.3                                     | 9      |

Source: Primary data

### (6) Type of House Structure

Most of the structures in the project area are built with reeds, thatch and sticks (46%) followed by mud and wattle (24) and mud block (25%). Structures made of mud block with plaster are mainly found in the trading centres. There were very few houses with brick walls as shown in Figure 2.3.3. Typical house in the area is shown in Photo 2.3.1.



Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 495 and this was because multiple responses to this question.

**Figure 2.3.3 Type of House Structure in the Project Area**



**Photo 2.3.1 Typical Houses in the Project Area**

### (7) Occupations

Like majority of areas in Uganda, the vast majority of people in the project areas are engaged in farming (77.8%) as the main source of livelihood for the household heads. This is followed by casual jobs (8.3%), formal employment (2.5%), and private informal retail trading as shown in Table 2.3.9. Other forms of occupation are mechanic and operating a small hotel business.

**Table 2.3.9 Occupations of Household Heads**

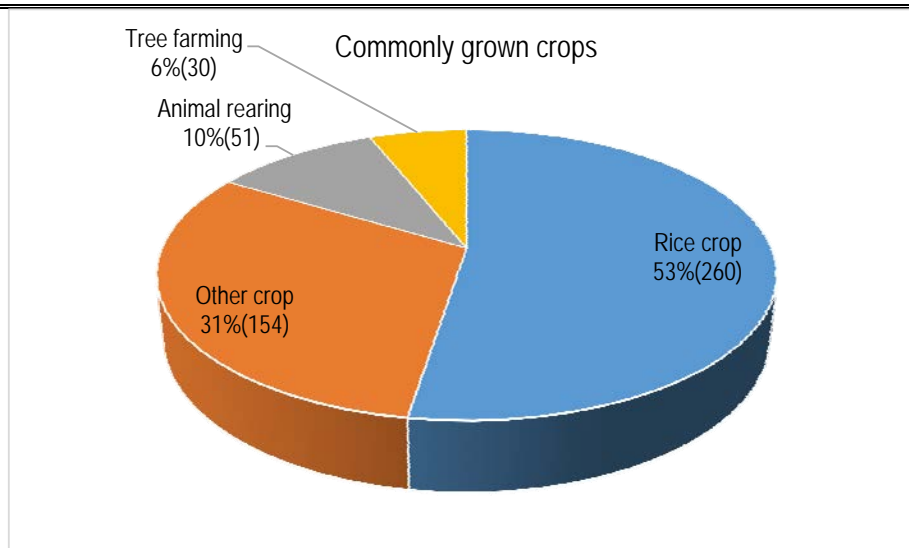
| Primary occupation                   | Percentage | Number |
|--------------------------------------|------------|--------|
| Farming                              | 77.8       | 374    |
| Formal Employment                    | 2.5        | 12     |
| Casual labour                        | 8.3        | 40     |
| Retail Trading                       | 7.3        | 35     |
| Service provision (salon, transport) | 0.6        | 3      |
| Student                              | 1.9        | 9      |
| Fishing                              | 0.4        | 2      |
| Brick making                         | 0.4        | 2      |
| Other                                | 0.8        | 4      |
| Total                                | 100        | 481    |

Source: Primary data

\* Among all 399 interviewed people, the respondent to this question was 481 and this was because multiple responses to this question.

### (8) Crops Grown in the Project Area

Results from the survey indicate that rice (53%) was the most commonly grown crop in the Atari project area in the districts of Kween and Bulambuli. A significant number (31%) also acknowledged growing other crops as shown in Figure 2.3.4. Respondents who reported growing other crops were found to have a variety of them ranging from food crops like maize(96.2%), beans(91.4%) sweet potatoes(34%), cassava(50.1%) and Bananas(59.0%), vegetables (89.2%). as shown in Table 2.3.10 below.



Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 495. This is because there were multiple responses to this question

**Figure 2.3.4 Primary Source of Livelihood**

**Table 2.3.10 Other Crops Grown Crops in the Project Area.**

| Other most commonly grown crops | Percentage | Number |
|---------------------------------|------------|--------|
| Beans                           | 91.4       | 339    |
| Maize                           | 96.2       | 357    |
| Irish Potato                    | 1.3        | 5      |
| Sweet potato                    | 34.0       | 126    |
| Banana                          | 59.0       | 219    |
| Cassava                         | 50.1       | 186    |
| Sorghum                         | 8.9        | 33     |
| Vegetables                      | 89.2       | 331    |

Source: Primary data

## (9)Livestock

Livestock farming is also practised within the project area but on a small-scale with most households not keeping many animals. The most common livestock are poultry (85.9%) goats (66.0%) cattle (59.8%), sheep (5.2%) and pigs (4.9%) as shown in Table 2.3.11. According to respondents, very little income is got from selling livestock and this is mainly because they are reared at a small-scale. Cattle keeping were mainly done on a zero grazing basis (in this case animals don't go out to pasture and they are fed with cut grass and peelings from bananas and sweet potatoes) and same applies to the other livestock which is normally kept in the backyards of the homesteads.

**Table 2.3.11 Livestock Reared**

| Type of livestock reared | Percentage | Number |
|--------------------------|------------|--------|
| Goats                    | 66.0       | 215    |
| Cattle                   | 59.8       | 195    |
| Poultry                  | 85.9       | 280    |
| Pigs                     | 4.9        | 16     |
| Sheep                    | 5.2        | 17     |

| Type of livestock reared | Percentage | Number |
|--------------------------|------------|--------|
| Rabbits                  | 0.9        | 3      |
| Others (specify)         | 2.8        | 9      |

Source: Primary data

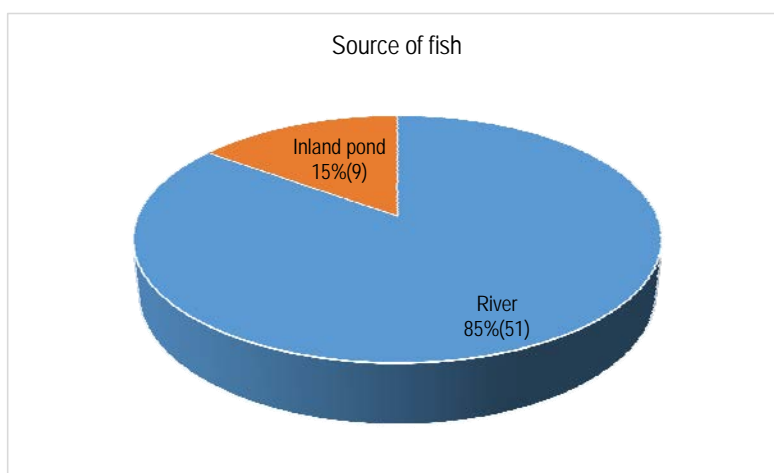
## (10) Other economic Activities

### 1) Boda-boda

Other secondary economic activities that are carried out in the project area are commuter motorcycle transport business locally known as “boda-boda” which has attracted many men and youth. This is made lucrative due to bad roads and absence of alternative public transport means.

### 2) Fishing

More still, fishing was listed as a secondary economic activity in the project area. This is carried out in open water sources and provides an important source of livelihood and food security for many people in the project. According to the field survey, most respondents (85%) indicated that they get most of the fish from the river while (15%) get their fish from inland pond in the project area as shown in Figure 2.3.5.



Source: Primary data: \* Among all 399 interviewed people, the respondent to this question was 60.

**Figure 2.3.5 Fishing as a secondary economic activity**

### 3) Tree Planting

**Table 2.3.12 Types of Trees Grown in the Project Area**

| Tree type  | Percentage | Number |
|------------|------------|--------|
| Pine       | 9.4        | 18     |
| Eucalyptus | 31.8       | 61     |
| Grevillea  | 18.8       | 36     |
| Guava      | 4.7        | 9      |
| Avocado    | 20.8       | 40     |
| Orange     | 46.4       | 89     |
| Others     | 42.2       | 81     |
| Total      | 174        | 334    |

Source: Primary data

Tree planting was also carried out in the project area and trees grown ranged from fruit trees (oranges

avocado and guava (46.4%, 30.8 and (4.7%) respectively and building tree such as eucalyptus (31.8%) Grevillea (18.8%) and pine (9.4%) as seen in Table 2.3.12.

### (11) Levels of Income

Information was collected from households on incomes from farming and other sources. Results from the field reveal that (25.1%) respondents earned between Ug. Shs. 500,001- 1000,000 from their respective occupations especially agriculture (Table 2.3.13). Of these (10.3%) of the project affected people households had monthly income levels of less than Ug. Shs. 100,000 per month. Fewer households (8.3%) had monthly incomes of more than US\$ 1,500,000 per month.

**Table 2.3.13 Average Monthly Income Levels of Potentially Affected Households**

| Average monthly income (Ug. Shs) | Percentage | Number |
|----------------------------------|------------|--------|
| Below 100,000                    | 10.3       | 41     |
| 100,001 – 200,000                | 16.2       | 65     |
| 200,001 – 300,000                | 9.4        | 38     |
| 300,001 – 400,000                | 7.7        | 30     |
| 400,001 – 500,000                | 12.2       | 49     |
| 500,001 – 1,000,000              | 25.1       | 100    |
| 1,000,001 – 1,500,000            | 10.8       | 43     |
| Over 1,500,000                   | 8.3        | 33     |

Source: Primary data

### (12) Ethnicity and Religion

Ethnic composition of potentially affected households in the project area was heterogeneous (Table 2.3.14) indicates that most people are Bamasaba (54.3%) and Sabiny (31.8%) Banyole (5.5%) and Itesots (5.2%). There were also small ethnic groups such as the Bagwere (1.2%) and Basoga (0.5%). Data above shows that the project area is also inhabited mainly by migratory tribes (1.6%) because of factors such as farming, marriage; these included the Banyankole, Nubians, Bagisu and Swahili.

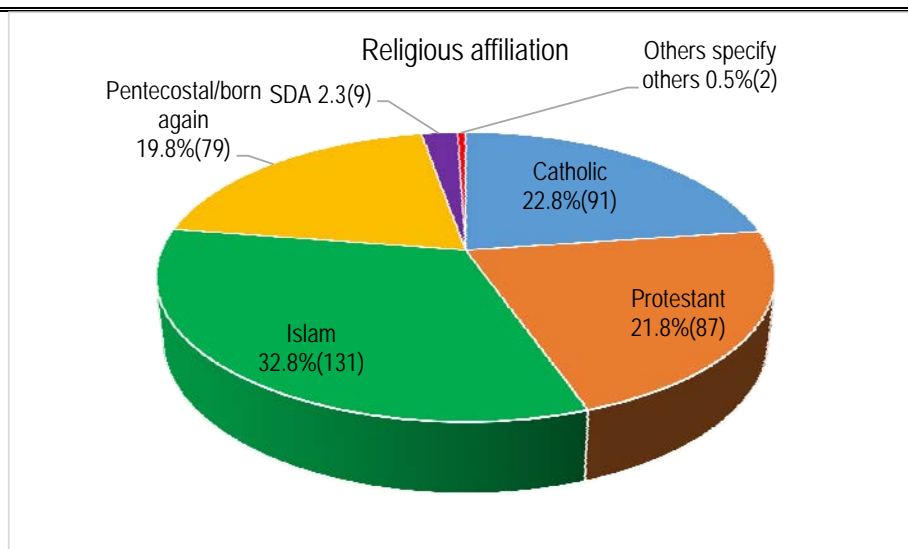
**Table 2.3.14 Ethnicity in the project area**

| Parish  |       | Ethnicity by parish |        |        |         |         |        | Total |               |
|---------|-------|---------------------|--------|--------|---------|---------|--------|-------|---------------|
|         |       | Bamasaba            | Sabiny | Itesot | Bagwere | Banyole | Basoga |       | Other specify |
| Bwebere | Count | 164                 | 4      | 5      |         | 1       |        | 2     | 175           |
|         | %     | 41                  | 0.8    | 1.2    |         | 0.2     |        | 0.5   | 43.7          |
| Sikwa   | Count | 53                  | 123    | 15     | 5       | 21      | 2      | 5     | 224           |
|         | %     | 13.4                | 31     | 4      | 1.2     | 5.3     | 0.5    | 1.2   | 56.3          |
| Total   | Count | 217                 | 127    | 20     | 5       | 22      | 2      | 7     | 399           |
|         | %     | 54.3                | 31.8   | 5.2    | 1.2     | 5.5     | 0.5    | 1.7   | 100           |

Source: Primary data

The project area in Atari has strong cultural and religious heritage expressed in beliefs, religious practises and attitudes. The biggest religious grouping in the project affected villages in Bulambuli, and Kween districts the biggest were Muslims (32.8%) followed by the Christian faith who were dominated by the Catholics (22.8%) Protestants (21.8%) Pentecost's (19.8%) and SDAs (0.5%) (Figure 2.3.6).





Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 390

**Figure 2.3.6 Religion in the Project Area**

### (13) Cultural Heritage Site

The survey exercise did not encounter any, cultural, historic or archaeological sites on the Atari River project area. The only cultural property encountered were nine graves of one family as shown in Photo 2.3.2



**Photo 2.3.2 A mark stone of a grave**

### (14) Health

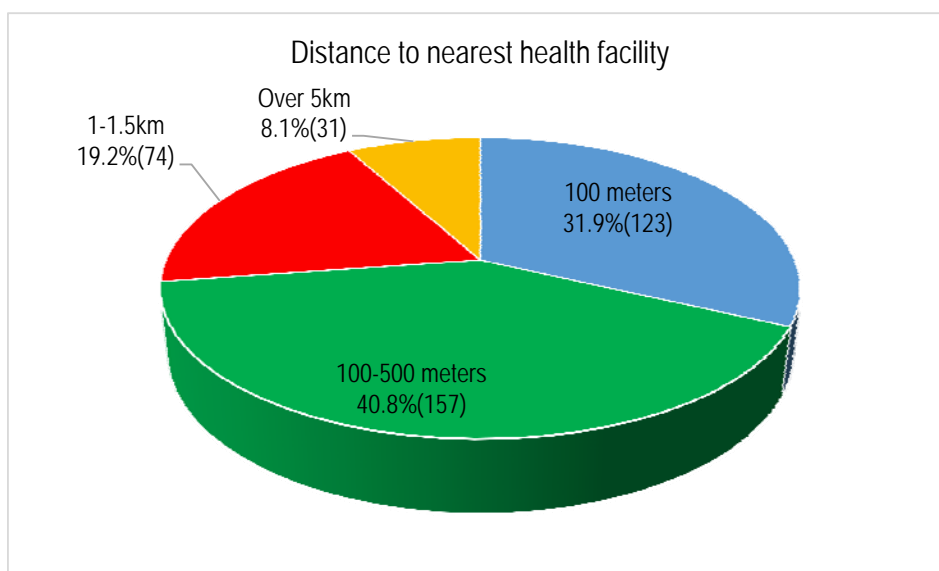
Health has a unique classification of health centres, from Health Centre I (HC I) to Health Center IV (HC IV), with HC I being the lowest level. Higher –level health facilities tend to serve larger populations and are more autonomous. Typically HC IIIs are constructed at Sub-county levels and HC IV at County level. In the project districts of Bulambuli, and Kween most of the people lived in close proximity with Health centre II (80.8%) as shown in Table 2.3.15. However, some used Privately run clinic/Drug shop (25.8%) to access medical services because government health centres were reported to have poor healthcare services and lacked drugs and medical personnel.

**Table 2.3.15 Nearest Health Facility**

| Type of Health Facility        | Percentage | Number |
|--------------------------------|------------|--------|
| Referral Hospital              | 2.8        | 11     |
| Privately run Hospital         | 0.3        | 1      |
| Health centre III              | 6.6        | 26     |
| Health centre II               | 80.8       | 320    |
| Community Health Centre        | 1.3        | 5      |
| Privately run clinic/Drug shop | 25.8       | 102    |

Source: Primary data

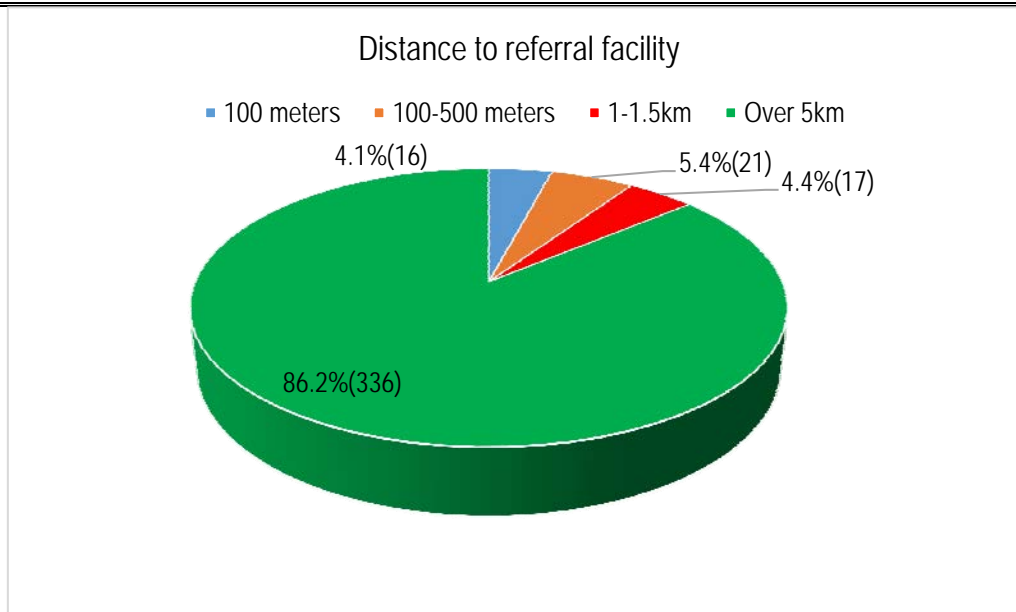
Distance to a health facility has a strong influence on accessing healthcare which in turn affects the outcome of health complications. Access to services such as health, along with types of illnesses is also a measure of poverty and wealth levels in a community or specific area. According to the Ministry of Health the recommended maximum distance to the nearest health facility is 5 km. In the project area healthcare services were within the recommended distance of 100m-500m (40.8%). However, 8.1% people are living over 5km from the nearest health facility as shown in Figure 2.3.7



Source: Primary data: Among all 399 interviewed people, the respondent to this question was 385.

**Figure 2.3.7 Distance to Nearest Health Facility**

Further still analysis of access of referral facilities in the project area revealed that (86.2%) were living over 5km from them. Only a total of (5.4%) lived within 100m to 1.5km distance from the referral facility as shown in Figure 2.3.8.



Source: Primary data: \* Among all 399 interviewed people, the respondent to this question was 390

**Figure 2.3.8 Distance to the Nearest Referral Facility**

Prevalent diseases reported by potentially affected households were malaria (98.0%), respiratory diseases like cough, asthma and flu cough (85.7%), water related diseases (67.1%) and venereal diseases such as Syphilis, HIV/AIDS (18%) and. Malaria as shown in Table 2.3.16, skin infections and respiratory infection were mainly common among children.

**Table 2.3.16 Most Common Diseases Reported in the Affected Household**

| Most common diseases          | Percentage | Number |
|-------------------------------|------------|--------|
| Malaria                       | 98.0       | 387    |
| Cough                         | 85.1       | 336    |
| Water related diseases        | 67.1       | 265    |
| Sexually transmitted diseases | 18.0       | 71     |
| Intestine Infection           | 20.3       | 80     |
| Ulcers                        | 35.4       | 140    |
| Skin diseases                 | 21.8       | 86     |
| Other diseases (specify)      | 12.2       | 48     |

Source: Primary data

### (15)Level of Education

Education is a major socio-economic aspect which influences nearly every aspect of human life especially social change and economic production. Basic education improves the capacity of people to diversify assets and activities, access information on agriculture and other forms of livelihoods which are essential elements in sustaining their lives. Field results of education level of potentially affected households reveal that the majority of respondents had attained primary education (57.3%), 22% had attained ordinary level education and only (11.9%) had never gone to school as indicated in Table 1.1.1Table 2.3.17.

It is important to take into consideration this low level of literacy in the project area as it can affect the project implementation. Additionally, the way information is presented for informative and/or discussion purposes should be geared towards more visual/oral means rather than written communications.

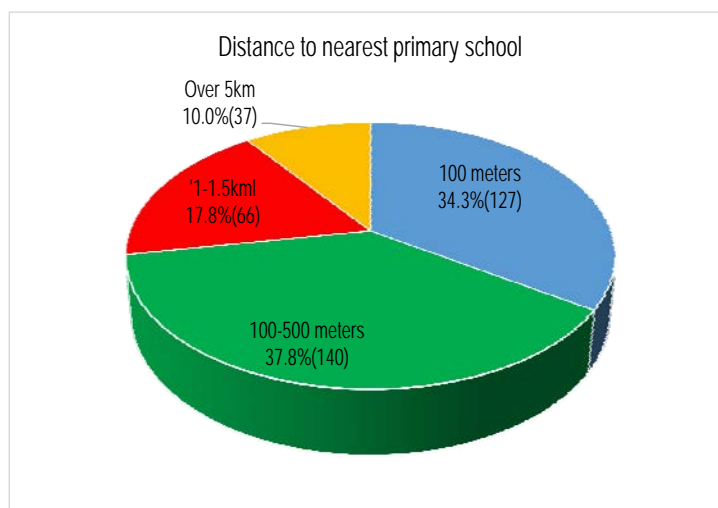
**Table 2.3.17 Education Levels of Household Heads**

| Level of education | Age   | Years of Education | Percentage | Number |
|--------------------|-------|--------------------|------------|--------|
| None               | -     | -                  | 11.9       | 47     |
| Junior             | 3-5   | 3                  | 0.5        | 2      |
| Primary Education  | 6-12  | 7                  | 57.3       | 227    |
| Ordinary level     | 13-16 | 4                  | 22.0       | 87     |
| Advanced level     | 17-18 | 2                  | 3.8        | 15     |
| Vocational         | 19-21 | 3                  | 2.3        | 9      |
| University/college | 19-21 | 3                  | 2.3        | 9      |

Source: Primary data

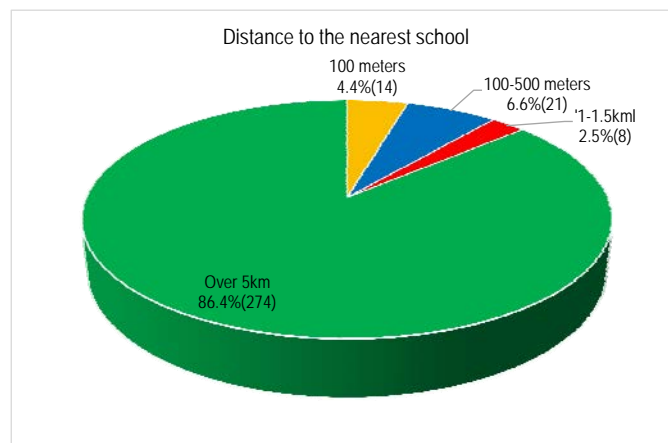
**(16) Access to Education Services**

Data from the field survey also show that majority of project affected people live close to primary schools within the area. Many of the respondents live within 100m (34.3%), 100-500m (37.8%) 1-1.5km (17.8%), and over 5km (10) from the primary schools as shown in Figure 2.3.9. However, most households are very far from secondary schools 86.4% which are over 5km as shown in Figure 11. This may resultantly negatively affect secondary school enrolment and attendance in the project area.



Source: Primary data: \* Among all 399 interviewed people, the respondent to this question was 370

**Figure 2.3.9 Distance to Nearest Primary School**



Source: Primary data \* Among all 399 interviewed people, the respondent to this question was 317

**Figure 2.3.10 Distance to the Secondary School**

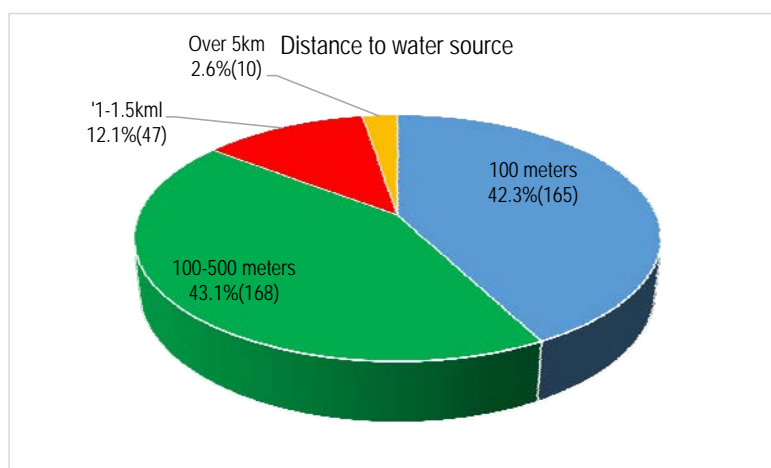
**(17) Sources of Water in Project Area**

In the entire project affected areas there was a combination of both ground and surface water sources. Within the project affected households, the commonest sources of water for domestic use include communal boreholes (65.1%) followed by river/lakes (24.2%) and rain water (9.9%) as indicated in Table 2.3.18. Very few respondents reported using the piped water (0.3%). In relation to distance from water source, the majority (43.1%) of potentially affected people reported living within 100m-500m of the nearest water source and 42.3% living within 100m distance from water sources in the project area as shown in Figure 2.3.11.

**Table 2.3.18 Type of Water Source**

| Sources of water     | Percentage | Number |
|----------------------|------------|--------|
| Communal borehole,   | 65.1       | 376    |
| Protected spring     | 0.3        | 2      |
| Unprotected spring   | 0.2        | 1      |
| River/lake           | 24.2       | 140    |
| Piped water in house | 0.3        | 2      |
| Rain water           | 9.9        | 57     |

Source: Primary data



Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 390

**Figure 2.3.11 Distance to Water Source****(18) Energy Sources**

In the project affected areas of Bulambuli, and Kween primary data reveals that there is limited access to grid electricity hence prevalence of biofuels as the main energy sources. In the project area firewood was the main source of cooking energy (95.4%) which is from three sources, eucalyptus, reeds and sticks from scrub and charcoal (33.3%). On sources of energy for lighting, kerosene (89.8%) was the main source of energy in the surveyed households followed by use of firewood in form of reeds (16.6%). However, some households were connected to grid electricity in the trading centres (6.9%); there were also biogas (0.3%) and LPG gas lanterns (0.3%) and charcoal (0.3%) used by the affected households. Fuel sources in affected household in project area are shown in Table 2.3.19 below. Further inquiries in the project area also revealed that the responsibility of collecting and processing fuel wood lies with the women and children.

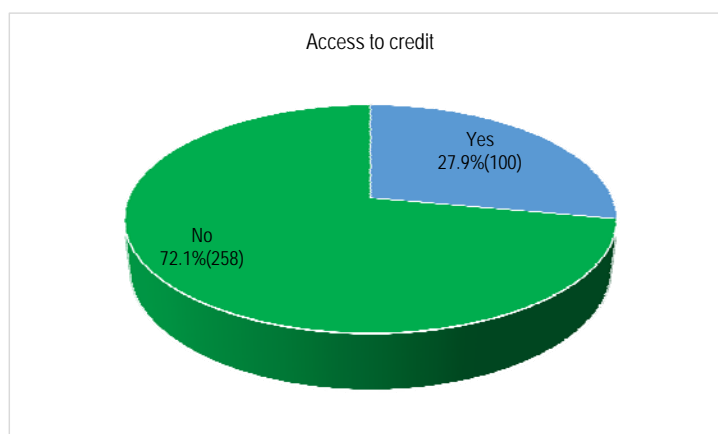
**Table 2.3.19 Sources of Energy**

| Source          | Percentage Usage | Number |
|-----------------|------------------|--------|
| <b>Lighting</b> |                  |        |
| Firewood        | 17.3             | 68     |
| Gas             | 0.3              | 1      |
| Charcoal        | 9.4              | 37     |
| Solar           | 7.6              | 30     |
| Kerosene        | 89.8             | 354    |
| Electricity     | 6.9              | 27     |
| Other           | 1.0              | 4      |
| Biogas          | 0.3              | 1      |
| <b>Cooking</b>  |                  |        |
| Firewood        | 95.4             | 375    |
| Gas             | 0.5              | 2      |
| Charcoal        | 33.3             | 131    |
| Solar           | 1.0              | 4      |
| Kerosene        | 18.6             | 73     |
| Electricity     | 0.5              | 2      |

Source: Primary data

### (19) Access to Credit

Most respondents acknowledged not being able to access credit services (72.5%). Only (27.9%) are able to access credit as shown in Figure 2.3.12.



Source: Primary data\* Among all 399 interviewed people, the respondent to this question was 358

**Figure 2.3.12 Access to Credit****Table 2.3.20 Sources of Credit**

| Source of credit              | Percentage | Number |
|-------------------------------|------------|--------|
| Commercial banks              | 25.7       | 35     |
| Micro finance institutions    | 2.2        | 3      |
| Moneylenders                  | 12.5       | 17     |
| Input supply                  | 8.8        | 12     |
| Self-help group               | 18.4       | 25     |
| Internal (family and friends) | 11.        | 15     |
| Government                    | 5.9        | 8      |
| SACCO                         | 9.6        | 13     |
| Other (specify)               | 4.4        | 6      |
| Not available                 | 1.5        | 2      |

Source: Primary data

Respondents mentioned that sources to credit facilities were mainly village commercial banks (25.7%), Self-help groups (18.4%), SACCOs (11.8%), and money lenders (12.5%) and “soft loan” mainly from family circles (11%) as indicated in Table 2.3.20 above. On the reasons for accessing credit majority of the respondents revealed acquiring credit mainly for agricultural labour employment (66.7%) and seed purchases (32.4%). Farm inputs such as fertilizers (17.6%) Agro-chemicals (12.7%), farm machinery (12.7%) and Aquaculture (23.5%) were also procured using loans acquired by the respondents as shown in Table 2.3.21 below.

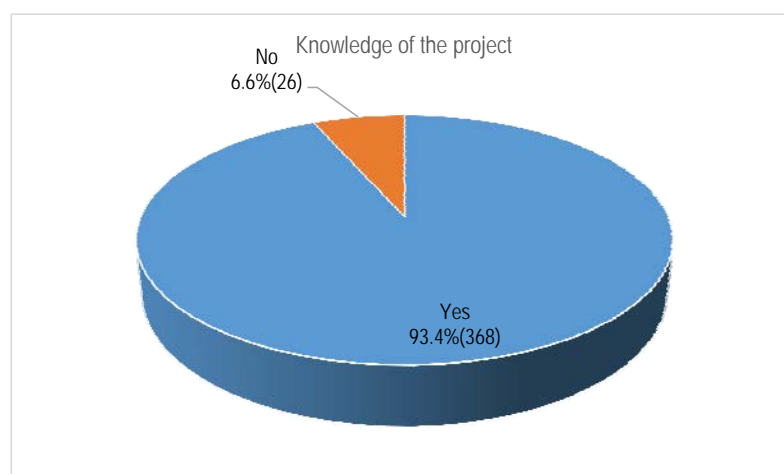
**Table 2.3.21 Needs for Acquiring Credit.**

| Reason for Accessing Credit    | Percentage | Number |
|--------------------------------|------------|--------|
| Agricultural labour employment | 66.7       | 68     |
| Seeds purchase                 | 32.4       | 33     |
| Fertilizer                     | 17.6       | 18     |
| Agro-chemicals                 | 12.7       | 13     |
| Farm machinery                 | 12.7       | 13     |
| Irrigation equipment           | 8.8        | 9      |
| Livestock rearing              | 10.8       | 11     |
| Aquaculture                    | 23.5       | 24     |
| Trading agricultural produce   | 9.8        | 10     |
| Other (specify)                | 18.6       | 19     |

Source: Primary data

## (20) Knowledge of the Project

Project disclosure and sensitization plays a critical role in communicating project objectives and likely impacts to the affected populations. In relation to the above, majority of the respondents (93.4% in the project area acknowledged having information about the PISD project. This serves as proof that the sensitization within the communities was done effectively as shown in Figure 2.3.13.

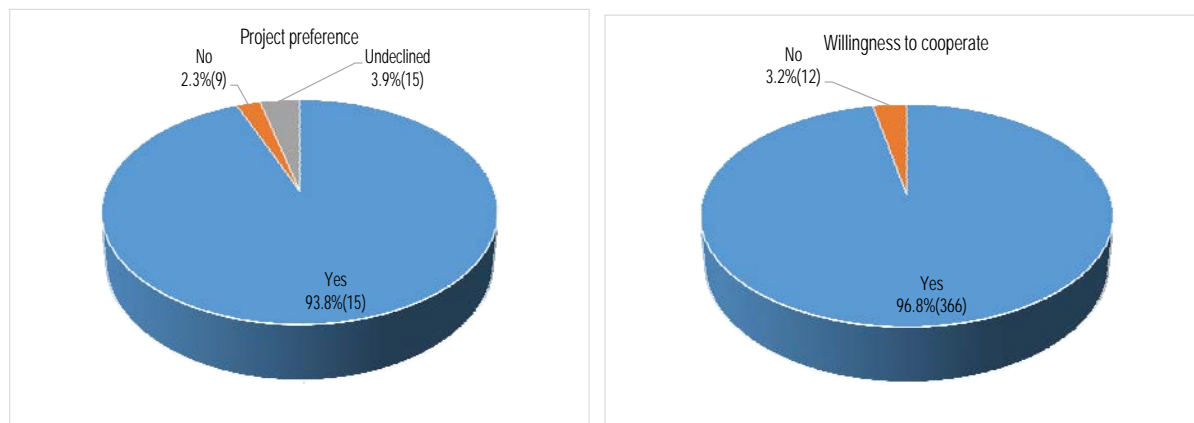


Source: Primary data :Among all 399 interviewed people, the respondent to this question was 394

**Figure 2.3.13 Knowledge of the Project**

## (21) Project Preference

When asked about their preference for the PISD project, vast majority of the respondents (93.8%) were in favour of the project. This means that at the stage of implementation the developers will have very little encumbrances while executing project objectives. This is further shown by their willingness (96.8%) to cooperation with all project activities.



Source: Primary data\* Among all 399 interviewed people, the respondent to this question of willingness to co-operate was 378 and only 9 responded to the project preference.

**Figure 2.3.14 Shows Percentage of Project Preference**

## (22)Vulnerable Groups

PISD project implementation will interrupt the normal ways of life of the people in the project area and there might be loss of livelihood, social network, accessible education, and transport and health services. Particular emphasis should be made on the vulnerable groups who include the elderly, women, child headed household, sick and disabled. It is important that vulnerable people are identified and profiled for each project. It is important that vulnerable people are identified and profiled in more detail during O/D stage. This will help to have solutions to be formulated and mitigation measures put in place to ensure that they are able to live a good life even after the project disruption. According to the socio-economic survey, among 399 respondents, there are 109 vulnerable people out of estimated 3,216 people.

Table 2.3.22 describes the percentages of nature of vulnerability in Atari project area.

**Table 2.3.22 Nature of Vulnerability**

| Nature of Vulnerability | Frequency | Valid Percentage |
|-------------------------|-----------|------------------|
| Physical Impairment     | 22        | 20.3             |
| Hearing Disorder        | 5         | 4.8              |
| Blindness               | 6         | 5.6              |
| Old age                 | 6         | 5.6              |
| Mental Disorder         | 2         | 2.0              |
| none                    | 68        | 62.1             |
| Total                   | 109       | 100              |

Source: Primary data Source: \* Note: Among the 399 respondents, 109 responded were vulnerable.

## 2.4 Compensation and Assistance to the Affected Persons

### 2.4.1 Eligibility

A Project Affected Person (PAP) is one who, as a consequence of the project, sustains losses as a result of impact on a) land, b) structure, c) immovable asset and/or d) livelihood/incomes. The PAPs will be identified through census and detailed land survey in O/D stage.

During the construction of Irrigation System, people will emerge who suffer damage to their property caused by construction works such as damage to cultivated fields, trees and, infrastructure such as fences.



For this people the same compensation principles outlined in this ARAP will apply.

Further, according to WB OP4.12, a customary landowner who does not have a certificate can be recognized as a landowner who has legal rights of land.

Eligibility Criteria for PISD is shown in Table 2.4.1 Eligibility Criteria.

**Table 2.4.1 Eligibility Criteria**

| Category of affected persons   | Assets  | Type of compensation   |
|--|---|--|
| Those who <b>have formal legal rights</b> to land (including <b>customary and traditional rights</b> recognized under the laws of the country)   | Physical and non-physical assets such as <ul style="list-style-type: none"> <li>• residential structures</li> <li>• economic trees</li> <li>• crops</li> <li>• land</li> <li>• commercial/business properties</li> <li>• tenancy</li> <li>• income earning opportunities</li> </ul> | <ul style="list-style-type: none"> <li>• Compensation at full replacement cost for losses of assets.</li> <li>• Assistance transitional support.</li> <li>• support for restoration of livelihood</li> </ul> |
| Those who <b>do not have formal legal rights</b> to land at the time the census begins but <b>have a claim</b> to such land or assets; provided that such <u>claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan.</u> | Physical and non-physical assets such as <ul style="list-style-type: none"> <li>• residential structures</li> <li>• economic trees</li> <li>• crops</li> <li>• land</li> <li>• commercial/business properties</li> <li>• tenancy</li> <li>• income earning opportunities</li> </ul> | <ul style="list-style-type: none"> <li>• Compensation at full replacement cost for losses of assets.</li> <li>• Assistance transitional support.</li> <li>• Support for restoration of livelihood</li> </ul> |
| Those who have no recognizable legal right or claim to the land they are occupying ( <b>squatters and encroachers</b> )  | Physical and non-physical assets such as <ul style="list-style-type: none"> <li>• residential structures</li> <li>• crops</li> <li>• commercial/business properties</li> <li>• income earning opportunities</li> </ul>  | <ul style="list-style-type: none"> <li>• Compensation at full replacement cost for losses of assets</li> <li>• Assistance transitional support.</li> <li>• Support for restoration of livelihood</li> </ul>  |

#### 2.4.2 Livelihood Restoration Measures

The nature of displacement is such that at times cash compensation and other short-term mitigation measures may not be effective to ensure that affected persons get back to their original status or better in terms of their earnings and productivity.

The therefore designing an income and livelihood restoration plan is essential. The main objective of income and livelihood restoration strategy is the restoration of living standard and pre-displacement level at minimum and includes strategies which would improve future income and living standard. Table 2.4.2 shows the livelihood restoration plan for the PAPs

**Table 2.4.2 Livelihood Restoration Plan for the PAPs**

| Type of assistance  | Eligibility  | Recommended measures   |
|---|--|--|
| Cash assistance to support income loss  | All affected people whether directly or indirectly impacted will be eligible for assistance for loss of employment/work days as a result of dislocation or relocation  | <ul style="list-style-type: none"> <li>Affected unskilled farm labourers will be paid a sum disturbance allowance of 30% of value of assets lost to the project in addition to their compensation money.</li> </ul>                          |
| Assistance to re-establish business/ enterprise   | All owners of business will receive cash compensation and cash grant for loss of business premises plus shifting and moving allowance.   | <ul style="list-style-type: none"> <li>Replacement value of structure at current market price plus salvage materials</li> </ul>  |
| Special assistance for vulnerable groups  | All affected who have been recognized as vulnerable  | <ul style="list-style-type: none"> <li>One time special assistance for each vulnerable household affected by the project</li> </ul>  |
| Employment of local people during project construction, access roads, camp and quarry sites | All qualified affected people and their dependants (Including women). A local consultant who will be identified by the client will prepare a list of all affected people who will be suitable for hiring as construction workers. The client bears the cost for this hire. | <ul style="list-style-type: none"> <li>Local people who have been impacted by the project will get greater preference in jobs related to the project construction.</li> <li>Vocational training on various skills like carpentry,</li> </ul> |
| Engagement of PAPs in farming.  | All qualified affected people.   | <ul style="list-style-type: none"> <li>Provide farming PAPs with pigs, goats and poultry farming skills to boost on their source of livelihood.</li> </ul>   |

### 2.4.3 Entitlement Matrix

Entitlement matrix is a major integrated part of any resettlement plan. It describes compensation for loss of properties and related assistance for each category of affected PAP. The Entitlement matrix for a PAP is presented in table below.

**Table 2.4.3 Entitlement Matrix**

| Asset acquired    | Type of Impact   | Entitled Person     | Compensation Entitlement   | Other Entitlement Measures for Vulnerable Groups and Families |
|-------------------|--|---------------------|--|---|
| Agricultural land | No Displacement:<br>- Cash compensation for affected land equivalent to market value. The remaining land remains economically viable | Farmer/ Land owner  | Cash Compensation for affected land equivalent to market value   |   |
|                   |  | Tenant /Leaseholder | Cash compensation for the harvest of affected land equivalent to the average market value over three years or the compensation rates as established by the District Land Boards in collaboration with the Chief Government Valuer whichever is the higher. |   |
|                   |  | Squatter            | Cash compensation for the harvest of affected land equivalent to the average market value over three years or  |   |

| Asset acquired | Type of Impact   | Entitled Person     | Compensation Entitlement   | Other Entitlement Measures for Vulnerable Groups and Families   |
|----------------|--|---------------------|--|---|
|                |  |                     | the compensation rates as established by the District Land Boards in collaboration with the Chief Government Valuer whichever is the higher.   |   |
|                | Displacement: - If more than 20% of the land holding is lost or less than 20% of the land lost but remaining land not economically viable. | Farmer /Land owner  | <p>Land for land replacement where feasible or compensation in cash for the entire land holding according to PAPs choice. Land for land replacement will be in terms a new parcel of land of equivalent size and productivity with a secure tenure status without encumbrances at an available location which is acceptable by the PAP.</p> <p>In addition relocation assistance to be paid (costs of shifting + assistance in re-establishing perennial crops including economic trees up to a maximum of 12 months while short-term crops mature).</p> | <p>For households who will lose all their land, or for those who can't continue current activities on remaining land: Cash compensation based on government rates (equal to replacement value) OR replacement land of similar size, quality and tenure OR assistance from the project to identify new site</p> <p>Security of tenure: where land for land options are chosen by households, similar tenure will be provided</p> <p>Relocation assistance in cash or services on a case-by-case basis as is sought</p> |
|                |  | Tenant /Leaseholder | <p>Cash compensation equivalent to the average market value over three years for the mature and harvested crops at the compensation rates as established by the District Land Boards in collaboration with the Chief Government Valuer whichever is the higher, Or market value for the remaining period of the tenancy /lease agreement.</p> <p>In addition relocation assistance to be paid (costs of shifting + Allowance).</p>   |   |
|                |  | Squatter            | <p>Cash compensation equivalent to the average market value over three years for the mature and harvested crops at the compensation rates as established by the District Land Boards in collaboration with the Chief Government Valuer</p>   |   |

| Asset acquired  | Type of Impact   | Entitled Person                | Compensation Entitlement  | Other Entitlement Measures for Vulnerable Groups and Families |
|-----------------|--|--------------------------------|---|---|
|                 |  |                                | whichever is the higher, Or market value for the remaining period of the tenancy /lease agreement.  |   |
|                 |  | Agricultural worker            | Cash compensation equivalent to the local average of six (6) months salary + relocation assistance to be paid (costs of shifting + Allowance) + Assistance in getting alternative employment  |   |
| Commercial Land | No Displacement:<br>- Land used for business partially affected  | Land owner / Business owner    | Cash compensation for affected land, and opportunity cost compensation equivalent to 5% of net annual income based on tax records for previous year or equivalent business or suitable estimates in absence of records.   |   |
|                 |  | Business owner is lease Holder | Opportunity cost compensation equivalent to 10% of net annual income based on tax records for previous year or equivalent business or suitable estimates in absence of records.   |   |
|                 | <b>Displacement:</b> - Premise used for business severely affected remaining area not sufficient for continued use | Land owner/ Business owner     | Land for land replacement where feasible or compensation in cash for the entire land holding according to PAPs choice. Land for land replacement will be in terms a new parcel of land of equivalent size and market potential with a secure tenure status without encumbrances at an available location which is acceptable by the PAP.<br><br>In addition relocation assistance to be paid (costs of shifting + Allowance) Opportunity cost compensation equivalent to two months net income based on tax records for previous year or equivalent business or suitable estimates in absence of records. |   |
|                 |  | Business owner is lease Holder | Opportunity cost compensation equivalent to two months net income based on tax records for previous year or equivalent business or suitable estimates in absence of records.<br>Relocation assistance in rental/lease alternative land, property for a maximum of six months to re-establish business.  |   |
| Residential     | <b>No</b>  | Land owner                     | Cash Compensation for affected  |   |

| Asset acquired                    | Type of Impact   | Entitled Person       | Compensation Entitlement   | Other Entitlement Measures for Vulnerable Groups and Families  |
|-----------------------------------|--|-----------------------|--|--|
| land                              | <b>Displacement:</b> - Land used for residence partially affected, limited loss and remaining land remains viable for present use  | Rental / Lease holder | land.<br>Cash compensation equivalent to 10% of lease / rental fee for the remaining period of rental lease agreement.   |  |
|                                   | <b>Displacement:</b> - Premise used for residence severely affected remaining area not sufficient for continued use or becomes smaller than minimally acceptable under the Town and country planning Act | Land owner            | Land for land replacement where feasible or compensation in cash for the entire land holding according to PAPs choice. Land for land replacement will be of minimum plot of acceptable size under the Town And Country Planning Act whichever is larger in the community or a nearby resettlement area with adequate physical and social infrastructure systems as well as a secure tenure status without encumbrances at an available location which is acceptable by the PAP.<br><br>In addition relocation assistance to be paid (costs of shifting + allowance). |  |
| Permanent building and Structures | <b>No Displacement:</b> - Structure partially affected, but remaining structure remains viable for continued use   | Land Owner            | Cash compensation for affected building and other fixed assets<br>Cash assistance to cover costs of restoration of remaining structure   |  |
|                                   |  | Rental / Lease Holder | Cash compensation for affected assets (verifiable improvements to the property by the tenant -e.g. fence).<br>Disturbance compensation to the tenant equivalent to two month's rental costs.   |  |
|                                   | <b>Displacement:</b> - Entire structure affected or partially affected but remaining structure not suitable for continued use  | Land Owner            | Cash compensation for entire structure and other fixed assets without depreciation or alternative structure of equal or better size and quality in an available location which is acceptable to PAP. Right to salvage materials without deduction from compensation.<br><br>In addition relocation assistance to be paid (costs of shifting + allowance) + Rehabilitation assistance if required.  | Construction of replacement permanent structure<br><br>For those moving to a new settlement, or non-adjacent land, transport and labour assistance to move households or business goods.<br><br>For those moving to adjacent land, labour to move household of |

| Asset acquired      | Type of Impact   | Entitled Person   | Compensation Entitlement  | Other Entitlement Measures for Vulnerable Groups and Families   |
|---------------------|--|---|---|---|
|                     |  |   |   | <p>business good, determined on a case by case basis</p> <p>Building materials maybe salvaged from old housing (transport at their own cost)</p>  |
|                     |  | Rental Holder /Lease Holder                                     | <p>Cash compensation for affected assets (verifiable improvements to the property by the tenant -e.g. fence)</p> <p>In addition relocation assistance to be paid (costs of shifting + allowance equivalent to four months rental costs) + Assistance to help find alternative rental arrangements + Rehabilitation assistance if required.</p>  | <p>Cash for fixed assets (if any, based on approved district rates)</p> <p>Assistance to find alternative rental property (business or residence)</p> <p>Arrange formal lease with similar conditions to previous lease, and provide formal tenancy agreement.</p>  |
|                     |  | Squatter /Informal dwellers                                     | <p>Cash compensation for affected structure without depreciation + Right to salvage materials without deduction from compensation.</p> <p>In addition relocation assistance to be paid (costs of shifting + allowance) + Rehabilitation assistance if required.</p> <p>Alternatively assisted to find accommodation in rental Housing or in a squatter settlement scheme if available.</p> <p>Assistance with Job placement/skills training.</p>                |   |
| Temporary structure | Loss of temporary structure (e.g. agricultural structure, latrines, fence etc) | Land Owner<br>Rental/Lease Holder<br>Squatter/Informal dwellers | <p>Compensation at government rates, disturbance allowance and top up equal to inflation for increase in cost of construction materials (equal to replacement cost).</p> <p>Assistance in the procurement of construction materials.</p> <p>Building materials maybe salvaged from old housing (transport at their own cost).</p> <p>For those moving to a new settlement, or non-adjacent land, transport assistance to move households or business goods.</p> | <p>Construction of replacement structure</p> <p>For those moving to a new settlement, or non-adjacent land, transport and labour assistance to move households or business goods</p> <p>For those moving to adjacent land, labour to move household of business good, on a case by case basis</p> <p>Building materials maybe salvaged from</p> |

| Asset acquired            | Type of Impact  | Entitled Person   | Compensation Entitlement   | Other Entitlement Measures for Vulnerable Groups and Families |
|---------------------------|---|---|--|---|
|                           |   |   |  | old housing (transport at their own cost)                     |
| Perennial crops           | Loss of perennial crops affected by land acquisition or temporary acquisition or easement | PAP (whether Land owner, tenant or squatter)                              | Cash compensation of perennial crops at district rates (replacement value).<br><br>Transitional allowance of 5% of value of crops per household which loses perennial crops to cover for income loss.                    |   |
| Annual (seasonal) crops   | Loss of seasonal crops affected by land acquisition or temporary acquisition or easement  | PAP (whether owner, tenant or squatter)                                   | Timing of project to enable the harvesting of annual (seasonal) crops.   |   |
| Trees                     | Trees lost  | Land owner  | Cash compensation based on type age and productive value of affected trees + 10% premium.  |   |
| Burial and cultural sites | Displacement of physical cultural resources including graves, shrines, or cultural sites  | Responsible families<br><br>State/local government Institutions (various) | Compensation of land based on market value and assets as per approved district rates, provide transport assistance,<br>Provide financial assistance for rituals/ceremonies involved in relocation of cultural resources. |   |
| Temporary Acquisition     | Temporary acquisition   | PAP (whether Land owner, tenant or squatter)                              | Cash Compensation for any assets affected e.g. boundary wall demolished, trees removed.  |   |

## 2.5 Grievance Redress Mechanism

The fundamental perceptive of this mechanism is to resolve any resettlement-related grievances locally in consultation with the aggrieved persons to facilitate smooth implementation of the social and environmental action plans.

A grievance redress mechanism is developed to ensure that:

- a) All complaints related to resettlement, compensation and others assistances are appropriately dealt with;
- b) Easily access for those who have complaints related to resettlement and others assistance; and
- c) Adequate measures are taken to resolve raised issues.

Grievance related to any aspect of the project shall be handled through a consultative manner appropriately, easily and speedy. The Grievance Committee fits the main entity to take care of the issue.

A possible scheme for grievance redress mechanism is illustrated in Figure 2.5.1 and its process is as follows:

- 1) PAPs can lodge claims or complaints on resettlement and compensation to the Parish RAP Committee directly.

- 2) The chairperson of the Grievance Committee assigns a member in charge from PACC members in accordance with the nature of the lodged complaint in order to interview with the PAP concerned who made the issue;
- 3) The Parish RAP Committee discusses based on the evidences obtained and makes an approach way and the first decision. The PACC member appointed starts to negotiate with the PAP in consultation with the Sub-county Chief;
- 4) In case an agreement is not achieved between the concerned PAP and the Parish RAP Committee within 10 days from the day of complaint lodged, the case is to be forwarded to the District RAP Committee. the District RAP Committee reviews documents and discusses with the PAP until an agreement is obtained; and
- 5) In case an agreement is not achieved between the concerned PAP and the District RAP Committee within 10 days in this stage, the case is to be forwarded to the Grievance Committee. the Grievance Committee reviews documents and discusses with the PAP until an agreement is obtained; and
- 6) If, however, the agreement is not reached within 10 days in this stage, the case is to be sent to the court for legal steps.

The mechanism is usually established just after the public consultation meeting by re-investigating the ARAP contents during the O/D stage. A plaintiff (PAP) will not need to bear the cost in case the case could be finalized within the mechanism. The management cost is enough within the total ARAP implementation cost. However, the plaintiff is to bear the relevant cost which the domestic legal system defines in case a suit at law would be filed.



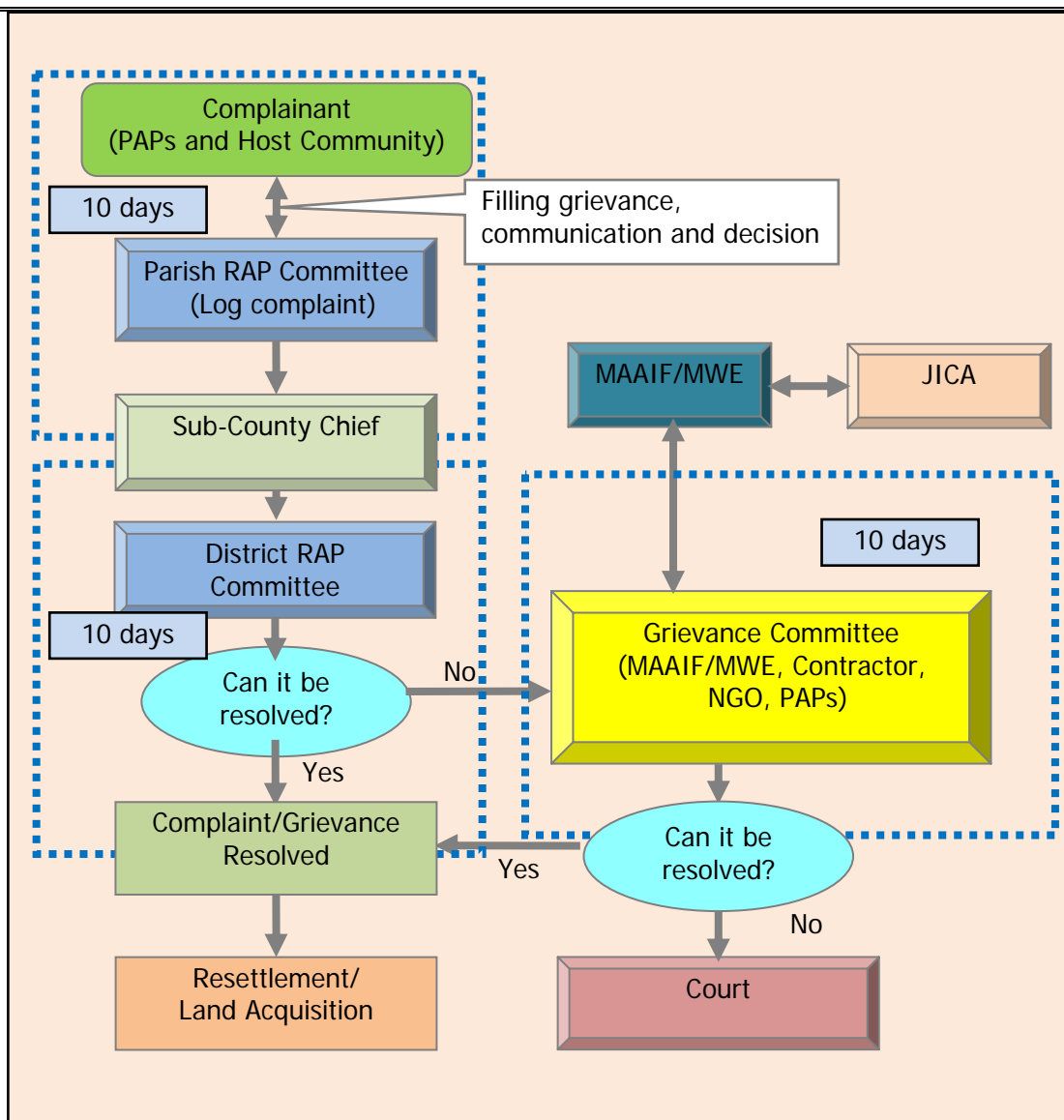


Figure 2.5.1 Grievance management mechanism

## 2.6 Implementation Framework

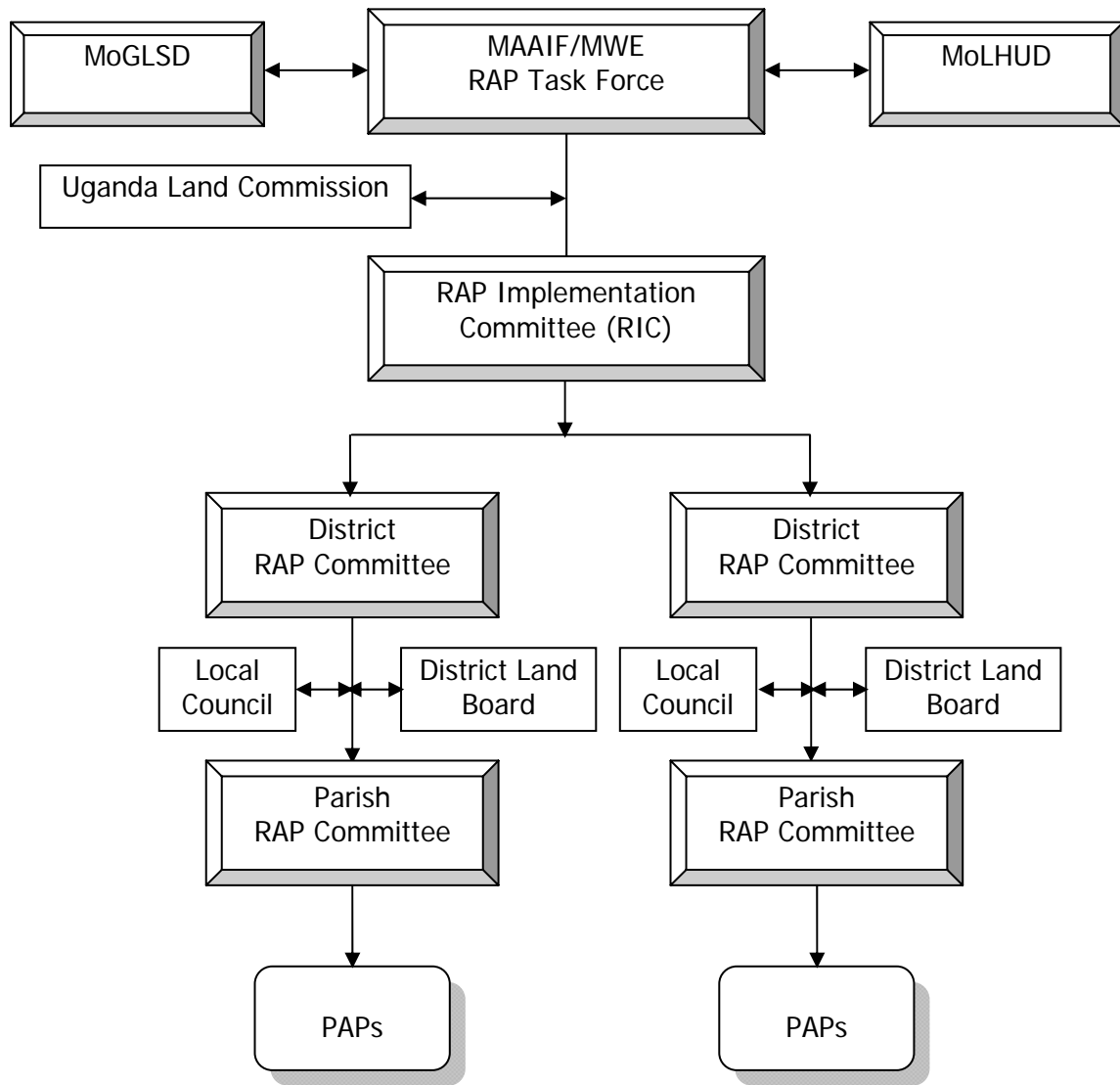
MAAIF and MWE are the core responsible body for the resettlement action plan as the driving force of the project. Besides MAAIF and MWE, Ministry of Lands, Housing and Urban Development (MoLHUD) and Uganda Land Commission shall be involved in order for managing land issues and compensation. Ministry of Gender, Labour & Social Development (MoGLSD) also shall be involved to give advice and cooperate about support for vulnerable PAP. District, Sub-county and Parish levels must be constituents as well. Institutions and their roles and responsibility for ARAP Implementation are shown in Table 2.6.1 RAP Implementation Framework.

Table 2.6.1 RAP Implementation Framework

| Institution                          | Responsibility/Roles   |
|--------------------------------------|--|
| <b>MAAIF/MWE</b><br>- RAP Task Force | The executing agency responsible for implementing the RAP<br>- To prepare the budget for compensation and other RAP activities<br>- To control the flow of RAP activities<br>- To conduct the internal monitoring of RAP implementation<br>- To ensure the objectives of all stakeholders are harmonized |

| Institution  | Responsibility/Roles  |
|--|---|
|  | and achieved successfully<br>– To contract and supervise RAP implement consultants  |
| <b>Ministry of Lands, Housing and Urban Development (MoLHUD)</b><br>– RAP Task Force   | – To give advice on land acquisition and assets valuation<br>– To approve valuation and compensation reports by the Chief Government Valuer (CGV)   |
| <b>Ministry of Gender, Labour &amp; Social Development (MoGLSD)</b><br>– RAP Task Force  | – To give advice and cooperate about support for vulnerable PAP   |
| <b>Uganda Land Commission</b>  | – To manage the land covered by the Irrigation infrastructures on behalf of the Government of Uganda.   |
| <b>RAP Implementation Committee (RIC)</b><br>• Members from RAP TF<br>• Members from District RAP Committee<br>• PDCC chairman<br>• PACC chairman  | In cooperation with the related organizations and stakeholders,<br>– To drive RAP implementation activities<br>– To establish District RAP Committee<br>– To implement land acquisition<br>– To administrate the schedule and progress of compensation and livelihood assistance<br>– To provide technical training of compensation activity to District and Parish RAP Committee members<br>– To contact for grievance redress |
| <b>District RAP Committees</b><br>• Members from District Land Board<br>• PDCC members<br>• PACC chairman<br>• District Councilors<br>• Local Council III Chairperson<br>• Sub-county Chief<br>• One member of Area Land Committee from each Parish<br>• PAP representatives (woman and man)<br>• NGO representative in the area | Responsible for implementation of RAP<br>– To establish Parish RAP Committee<br>– To confirm PAPs, acquired land, and assets<br>– To participate in mobilization of PAPs<br>– To control schedule of compensation payment activities<br>– To mediate the alternative land for PAPs<br>– To administrate the grievance management mechanism  |
| Local Councils   | – To give advice and cooperate to RAP implementation  |
| <b>Parish RAP Committee</b><br>• PACC members<br>• members from Area Land Committee<br>• Local Council I Chairpersons<br>• trusted elders<br>• PAP representatives (man and woman)   | These people have more knowledge of the communities<br>– To sensitize community on land acquisition<br>– To support identifying PAPs<br>– To mobilize PAPs to participate in RAP disclosure and compensation payment<br>– To handle grievance redress   |
| <b>District Land Board</b><br>• Bukedia District<br>• Bulambuli District<br>• Kween District   | Responsible for development of compensation rates and will be involved during RAP implementation, monitoring and grievance management.  |
| <b>Project Affected Person (PAP)</b>   | – To participate land and asset survey<br>– To submit necessary data of land acquisition<br>– To participate land acquisition   |
| <b>Local Consultant</b>  | Conducting actual RAP activities, such as;<br>– To conduct the final determination of acquired land and assets<br>– To value land and assets<br>– To manage compensation payment and resettlement<br>– To manage grievance redress mechanism<br>– To assist RAP completion audit  |
| <b>The External Monitoring Agency</b><br>(Local consultant / NGO)  | Responsible for review and assessment of implementation process of RAP, such as;<br>– To review the efficacy of internal monitoring,<br>– To design and conduct periodic third party monitoring<br>– To feedback to MAAIF/MWE on RAP policy improvement<br>– To enhance of implementation process   |

For the RAP implementation, a consortium chaired by MAAIF/MWE shall be formed, so called the Resettlement Implementation Committee (RIC), to go ahead with the activities of RAP in harmony with stakeholders. The institutional framework is shown in Figure 2.6.1 RAP Institutional Framework. Structure of RIC shall be based on the RAP Task Force that was established during F/S phase for the preparation of RAP implementation. RAP Task Force consists of mainly members from MAAIF/MWE, who have become familiar with community people and land issues in the project area very well during F/S phase. Therefore, it is recommended that RIC will be formed with members from existing RAP Task Force for the smooth operation of RAP implementation.



**Figure 2.6.1 RAP Institutional Framework**

## 2.7 Implementation Schedule

The ARAP implementation schedule is proposed over a period of 1 and half years followed by 2 years of monitoring. The RIC will be formed shortly after approval of ARAP by the Chief Government Valuer and funding entity. Compensation payments and resettlement assistance are expected to start at about the same time and extend over 18 months after which construction would commence.

Figure 2.7.1 provides a schedule of ARAP activities in relation to the timetable of project implementation. Below is the explanation for the time frame of the ARAP implementation.

After the ARAP has been approved by the Chief Government Valuer in the first month, the second month will have activities of the ARAP disclosure and display for three months to avail ample time for the PAPs to view their compensation prices. Verification of vulnerable PAPs as part of the ARAP implementation will also be carried out and compensation will commence thereafter.

PAPs with grievances will have their issues addressed and this will be handled concurrently with compensation process. Two months will be put in place to compensate the PAPs and 5 months set to address complaints for PAPs.

| Month Activity  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| E/N & G/A   |    |    |    |    |    |    |    |    |    | XX |    |    |    |    |    |    |    |    |    |    |    |
| ARAP Approval   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ARAP approval by Chief Government Valuer (and JICA)               | XX |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ARAP disclosure & display of valuation lists                      |    | XX | XX | XX |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Verification of vulnerable PAPs by MAAIF/MWE                      |    |    |    |    | XX | XX | XX |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ARAP Implementation   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Procurement of ARAP implementation consultant                     |    |    |    |    |    |    | XX | XX | XX |    |    |    |    |    |    |    |    |    |    |    |    |
| Formation and mobilization of RIC                                 |    |    |    |    |    |    |    | XX | XX | XX |    |    |    |    |    |    |    |    |    |    |    |
| Compensation payment  |    |    |    |    |    |    |    |    |    |    | XX | XX | XX | XX | XX | XX | XX | XX | XX |    |    |
| Grievance management  |    |    |    |    |    |    |    |    |    |    | XX | XX | XX | XX | XX | XX | XX | XX | XX | XX |    |
| Notice to vacate compensated assets and relocation & resettlement |    |    |    |    |    |    |    |    |    |    | XX |    | XX | XX | XX | XX | XX | XX | XX | XX |    |
| ARAP Completion audit   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | XX |    |
| Commencement of Construction work                                 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | X  |
| Monitoring & Evaluation   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Figure 2.7.1 Resettlement Schedule

## 2.8 Cost and Budget

The estimated ARAP implementation budget for the Project is summarized in Table 2.8.1. Within categories of compensation, cost for land acquisition, compensation for structures and crops are included. However compensation for trees will be estimated during O/D phase with results of the detailed survey.

MAAIF/MWE is responsible for providing adequate funds for land acquisition and resettlement related to the project. It is important to note that these figures need to be updated during the ARAP in the O/D phase.

**Table 2.8.1 ARAP Implementation Budget**

| Item   | Cost Estimated (UGX) | Cost Estimated (USD) | Note   |
|--|----------------------|----------------------|--|
| Land acquisition detailed survey (incl. piling)  | 282,644,035          | 85,650               | To determine PAHs and valuation of assets            |
| Compensation cost for Land, Structures and crops | 1,413,220,173        | 428,249              |  |
| 15% Disturbance Allowance                        | 211,983,026          | 64,237               |  |
| Provision for Restoration                        | 211,983,026          | 64,237               |  |
| Special assistance to vulnerable household       | 141,322,017          | 42,825               | For PAHs with female-headed, disabled, elderly, etc. |
| ARAP implementation consultant                   | 565,288,069          | 171,299              |  |
| Monitoring & evaluation                          | 353,305,043          | 107,062              | External monitoring consultant or NGO                |
| Total  | 3,179,745,390        | 963,559              |  |
| Contingency @ 15% of Total cost                  | 476,961,809          | 144,534              |  |
| Grand total                                      | 3,656,707,199        | 1,108,093            |  |

Note: 1 USD = 3,300 UGX (As of 7 July. 2016)

## 2.9 Monitoring Activity

Monitoring activity normally consists of internal and external monitoring, respectively. The main purpose of the monitoring activity is to ensure that all PAPs who will lose their respective houses, land or other livelihood assets will be provided with sufficient compensation and assistance according to the policies and procedures which is described in ARAP.

### 2.9.1 Internal Monitoring

MAAIF/MWE alternatively referred to as Internal Monitoring Agent (IMA) shall be responsible for internal monitoring. It will be undertaken with the assistance from RIC. The main tasks of the IMA include:

- Regular supervision and monitoring the RAP implementation as designed and planned in coordination with RIC;
- Ensuring the timely and complete disbursement of compensation and assistance to each PAH in accordance with agreements between RIC and PAHs; and
- Recording all grievances raised by PAPs and ensuring that all complaints are promptly addressed.

## 2.9.2 External Monitoring

External monitoring will be conducted periodically by an independent local/international External Monitoring Agent (EMA) for review and assessment regarding achievement of the plan. The external monitoring will be carried out on a quarterly basis and further evaluations will also be undertaken. The main activities of external monitoring include:

- Reviewing and verification internal monitoring results;
- Identifying any discrepancy between assistance provided and its actual implementation;
- Assessing the effectiveness, impact and sustainability of resettlement activities, particularly with regards to livelihood and restoration and/ or enhancement of living standards; and
- Providing recommendations, if necessary regarding the resettlement activities to achieve the principles and objectives of JICA guideline, and relevant laws.

Monitoring indicators will be created for PAPs as a whole, for key stakeholders, and for special categories of affected vulnerable groups such as women, children, the elderly and the poor. Key performance indicators for monitoring are commonly divided into five (5) categories:

- 1) Input indicators – will measure the resources (financial, physical and human) allocated for the attainment of the resettlement objectives, such as livelihood restoration goals.
- 2) Output indicators – will measure the services/goods and activities produced by the inputs. Examples will include compensation disbursements for acquired assets.
- 3) Outcome indicators – will measure the extent to which the outputs will be accessible and used, as well as how they will be used. They will also measure levels of satisfaction with services and activities produced by the inputs. Examples will include the ways in which recipients used compensation. Although they are not measures of livelihood restoration in themselves, they will key determinants of well-being.
- 4) Impact indicators – will measure the key dimensions of impacts to establish whether the goals of the Resettlement Plan will be achieved. Examples will include restoration and diversification of income levels and the sustainability of income-generating activities, as dimensions of livelihood restoration and well-being.
- 5) Process indicators – will measure and assess implementation processes. Examples will be the functioning of liaison/participation structures, the levels of representation of different social categories/interest groups, and the processes by which conflicts and disputes are resolved.

These indicators can also be disaggregated to ensure that social variables are properly accounted for. Table 2.9.1 provides details of different indicators and variables to be monitored.

**Table 2.9.1 Monitoring Indicators and Variables**

| Aspect  | Indicator  | Variable  |
|---|--|---|
| Land  | Affected Land  | - Area of farm land acquired for project;<br>- Area of communal land acquired for the project;<br>- Area of private land acquired; and<br>- Area of Government land acquired.                                 |
| Buildings/<br>Structures                                    | Affected Buildings   | - Number, type and size of private buildings affected;<br>- Number, type and size of community buildings affected; and<br>- Number, type, and size of government buildings affected.                          |
|   | Other Structures<br>Affected   | - Number, type and size of other private structures affected; and<br>- Number, type, and size of other community structures affected.   |
| Trees   | Affected Trees   | - Number and type of trees affected.  |
| Compensation,<br>Re- establishment<br>and<br>Rehabilitation | Compensation and<br>Re-establishment of<br>Affected Owners/<br>Individuals | - Number of homesteads affected (buildings, land, trees, crops);<br>- Number of owners compensated by type of loss;<br>- Amount compensated by type and owner;<br>- Number of replacement houses constructed; |

| Aspect                   | Indicator                        | Variable  |
|--------------------------|----------------------------------|---|
|                          |                                  | <ul style="list-style-type: none"> <li>- Size, construction, durability and environmental suitability of replacement houses;</li> <li>- Possession of latrines;</li> <li>- Water supply access; and</li> <li>- Number of replacement businesses constructed.</li> </ul>   |
|                          | Re-establishment Owned Resources | <ul style="list-style-type: none"> <li>- Number of community buildings replaced;</li> <li>- Number, type of plants lost;</li> <li>- Number of seedlings supplied by type; and</li> <li>- Number of trees planted.</li> </ul>  |
| Hazards and Disturbances | Introduction of Nuisance Factors | <ul style="list-style-type: none"> <li>- Number of homesteads affected by hazards and disturbances from construction (noise levels, blasting, increased traffic levels).</li> </ul>   |
| Social/<br>Demographic   | Changes to Homestead Structure   | <ul style="list-style-type: none"> <li>- Homestead size;</li> <li>- Gender distribution;</li> <li>- Marital status;</li> <li>- Relationship to homestead head; and</li> <li>- Status of vulnerable homesteads.</li> </ul>   |
|                          | Population Migration             | <ul style="list-style-type: none"> <li>- Residential status of homestead members; and</li> <li>- Movement in and out of the homestead (place and residence of homestead members).</li> </ul>  |
|                          | Changes to Access                | <ul style="list-style-type: none"> <li>- Distance/travel time to nearest water source, communication facility, school, energy source, church, shop, and village.</li> </ul>   |
|                          | Changes to Health Status         | <ul style="list-style-type: none"> <li>- Number of people with disease, by type (STDs, diarrhea, malaria, ARI, immunizable disease);</li> <li>- Mortality rates;</li> <li>- Access to health care services (distance to nearest facility, cost of services, quality of services);</li> <li>- Utilization of health care services;</li> <li>- Disease prevention strategies;</li> <li>- Extent of educational programs; and</li> <li>- Latrine provision at schools (school child population per VIP on site).</li> </ul>                  |
|                          | Changes to Educational Status    | <ul style="list-style-type: none"> <li>- Literacy and educational attainment of homestead members;</li> <li>- School attendance rates (age, gender); and</li> <li>- Number, type of educational establishments.</li> </ul>  |
|                          | Changes to Status of Women       | <ul style="list-style-type: none"> <li>- Participation in training programs;</li> <li>- Use of credit facilities;</li> <li>- Landholding status; and</li> <li>- Participation in jobs and other activities resulting from the project</li> </ul>  |
|                          | Homestead Earning Capacity       | <ul style="list-style-type: none"> <li>- Ownership of capital assets;</li> <li>- Landholding size, area cultivated and production volume/value, by crop;</li> <li>- Landholding status (tenure);</li> <li>- Employment status of economically active members;</li> <li>- Earnings/income by source, separating compensation payments;</li> <li>- Changes to income-earning activities (agriculture) – pre- and post disturbance; and</li> <li>- Access to income-generating natural resource base (wood, grass, sand, stones).</li> </ul> |
|                          | Changes in Social Organization   | <ul style="list-style-type: none"> <li>- Organizational membership of homestead members; and</li> <li>- Leadership positions held by homestead members</li> </ul>   |
|                          | Population Influx                | <ul style="list-style-type: none"> <li>- Growth in number and size of settlements, formal and informal; and</li> <li>- Growth in market areas.</li> </ul>   |
| Consultation             | Consultation Program Operation   | <ul style="list-style-type: none"> <li>- Number of local committees established;</li> <li>- Number and dates of local committee meetings;</li> <li>- Type of issues raised at local committees meetings;</li> <li>- Involvement of local committees in RAP development planning; and</li> <li>- Number of participating NGOs.</li> </ul>  |
|                          | Information                      | <ul style="list-style-type: none"> <li>- Number, position, staffing of Information Centers;</li> </ul>  |

| Aspect     | Indicator                     | Variable   |
|------------|-------------------------------|--|
|            | Dissemination                 | <ul style="list-style-type: none"> <li>- Staffing, equipment, documentation of Information Centers;</li> <li>- Activities of Information Centers;</li> <li>- Number of people accessing Information Centers; and</li> <li>- Information requests, issues raised at Information Centers.</li> </ul> |
|            | Grievance Redress             | <ul style="list-style-type: none"> <li>- Number of grievances registered, by type;</li> <li>- Number of grievances resolved; and</li> <li>- Number of cases referred to court.</li> </ul>  |
| Training   | Operation of Training Program | <ul style="list-style-type: none"> <li>- Number of local committee members trained; and</li> <li>- Number of affected population trained in Project-related training courses.</li> </ul>   |
| Management | Staffing                      | <ul style="list-style-type: none"> <li>- Number of implementing agencies by function;</li> <li>- Number of GOM ministry officials available by function; and</li> <li>- Number of office and field equipment, by type.</li> </ul>  |
|            | Procedures in Operation       | <ul style="list-style-type: none"> <li>- Census and asset verification/quantification procedures in place;</li> <li>- Effectiveness of compensation delivery system; and</li> <li>- Number of land transfers effected.</li> </ul>  |

Examples of RAP monitoring form and TOR for External Monitoring are shown in Attachment-2.

### 2.10 Consultation and Public Participation

PAPs must be fully informed at the earliest possible time. They should be closely consulted and encouraged to participate in any decision-making pertinent to resettlement. Project disclosure and consultation at an early stage provides a good venue for PAPs to express their opinions, apprehensions, and even objections. It opens grounds for discussion and question and answer session, most of which can be incorporated into the final design and resettlement plan. This will minimize, if not totally avoid, delay in implementation caused by unforeseen stand-offs.

Stake holder meetings (SHMs) and public consultation meetings (PCMs) were held in March 14 and 17, and May 25 and 28, 2016 respectively. SHM aimed to explain the EIA/DARAP to District government officials such as CAO, DISO, RDC, DAO, CDO, DEO, and so on who should be involved into the Project for the smooth implementation, and to make safety sure for the PCM that would be held in local venues in following days. PACC members were also invited for the purpose of informing community people of the progress of the meeting.

PCM also aimed at explanation of EIA/DARAP and invited all community people. For the announcement of the meeting, radio broadcasting and noticing posters were used as shown in Table 2.10.1 and

Table 2.10.2 and in Attachment-4. For the convenience for the community people, local languages together with English were used for these announcing media and in the meeting. As for the radio announcement, it was not used for the second meetings held in May. Because according to the community people, communication from PACC members were effective enough to convey the information of the meeting.

Adding to these meetings, a SHM with MoGLSD was held in March 14, 2016 to explain PISD project and MoGLSD gave useful inputs regarding health and safety during the construction implementation. Minutes of meeting is shown in Attachment-6.

There was no great dissent from community people about the Project. Generally community people were favorable toward the Project and they showed their opinion that they wanted to be selected as the project site.



**Table 2.10.1 Schedule of Radio Announcement**

| District | Radio station   | Language                    | Duration  |
|----------|-----------------|-----------------------------|---|
| Kween    | KTT             | Swahili                     | 3 days; 14-16 March<br>Morning 2 days<br>Evening 3 days |
| Bulambli | Elgon FM        | Lumasaba and Swahili        | 3 days; 15-17 March<br>Morning 2 days<br>Evening 3 days |
| Bukedea  | OPG, Step Radio | Lumasaba, Swahili and Iteso | 3 days; 16-18 March<br>Morning 2 days<br>Evening 3 days |

**Table 2.10.2 Number of Distribution and Languages of the Noticing Poster**

| Language      | Distributed Place                      |
|---------------|--|
| Lumasaba (20) | Bukedea (5), Kween (3), Bulambuli (12) |
| Swahili (8)   | Bukedea (2), Kween (5), Bulambuli (1)  |
| Iteso (4)     | Bukedea (4)                            |
| English (7)   | Bukedea (2), Kween (2), Bulambuli (3)  |

Summary of these meetings are as followings and minutes of meeting are shown in Attachment-5.

**(1)SHM (Kween District)**

Date: 14 March 2016

Venue: Church next to the District Office

Time: 11:30~ 16:00

Language: Swahili, English,

Participant:

| Stakeholders          | Number | Descriptions  |
|-----------------------|--------|---|
| Other District Staffs | 4      | CAO, Asst. CAO, Deputy DSO (representative RDC), DPC,               |
| PDCC                  | 4      | District Planner (2), District forestry Officer, District Engineer, |
| PACC                  | 16     |   |
| C/P Task force        | 3      | Mr. Patrick(MWE), Mr. Eno(MWE), Ms. Shila(MWE),                     |
| L/C (AWE)             | 3      |   |
| JICA Study Team       | 2      | Ms. Sumi, Mr. Roy   |

Agendas:

- Opening remarks
- Prayer
- Introduction
- Remarks by Assistant CAO, Mr. Patric (MWE), Sumi (JST)
- Presentation by AWE
- Discussion
- Closure remarks by Assistant CAO, CAO, deputy DSO

Issues raised by PACC:

| Issues/Concerns  | Responses                                 |
|--|---|
| • Security during implementation, because there will be many unknown people for the construction. Possibility of a new police station. | • Security was assured by deputy DSO.     |
| • Possibility new schools, bore holes, health centres if the Project comes.  | •   |
| • Flooding in Cheromni   | • Cheromni is the outside of the Project. |

**(2)SHM (Bulambuli District)**

Date: 15 March 2016

Venue: District Office under the mango tree

Time: 10:30 ~ 13:45

Language: Swahili, Kuksabini, English,

Participant:

| Stakeholders          | Number | Descriptions  |
|-----------------------|--------|---|
| Other District Staffs | 8      | CAO, RDC, DSO, Commercial Officer, Head of Production Officer, representative LC5, Wealth Creation Officer, DEO |
| PDCC                  | 1      | DAO   |
| PACC                  | 32     | Buwebele 14, Bunamaliro 7, Bunambutye 11  |
| C/P Task force        | 3      | Mr. Patrick(MWE), Mr. Eno(MWE), Ms. Shila(MWE),   |
| L/C (AWE)             | 3      |   |
| JICA Study Team       | 2      | Mr. Negishi, Ms. Sumi, Mr. Roy  |

Agendas:

- Opening remarks
- Prayer
- Introduction
- Remarks by CAO, Mr. Patric (MWE), Negishi (JST)
- Presentation by AWE
- Discussion
- Closure remarks by Assistant CAO, CAO, deputy DSO

Issues raised by PACC:

| Issues/Concerns  | Responses   |
|--|---|
| • River course change  | • Dyke will be built to protect the river course (by DEO) |
| • The distance of buffer zone from the river (they've heard it's 30 m from Deo during meeting of CRMP) |   |

**(3)PCM (Kween District)**

Date: 17 March 2016

Venue: Atari Primary School

Time: 10:50~ 15:00

Language: Swahili, Lugisu, English,

Participant:

| Stakeholders                     | Number | Descriptions   |
|----------------------------------|--------|--|
| Other District, Sub-county staff | 5      | DPC, Deputy DPC, Representative of Kween District, Sub-county Chief of Ngenge, Agriculture Extension Officer |
| PDCC                             | 2      | DAO, District Development Officer  |
| PACC                             | 29     |  |
| Community                        | 200    |  |
| C/P Task force                   | 2      | Mr. Silas(MAAIF), Mr. Enou(MWE)  |
| L/C (AWE)                        | 3      |  |
| JICA Study Team                  | 4      | Negishi, Shemsu, Sumi, Roy   |

Agendas:

- Opening remarks
- Prayer

- Introduction
- Remarks by LC1 of Buwebele, Sikwa, Mr. Silas (MAAIF)
- Presentation by AWE
- Discussion

Issues raised by the Community:

| Issues/Concerns  | Responses  |
|--|--|
| <ul style="list-style-type: none"> <li>• Remarks from Sub- county chief of Ngenge; the Project will take long time to be implemented. So do not jump to the conclusion. It will result to problems.</li> </ul> |  |
| <ul style="list-style-type: none"> <li>• Considerations for farmers of outside the project area.</li> </ul>  | <ul style="list-style-type: none"> <li>• If the amount of the water resource allows, the project can provide the water to out growers. (by Mr. Silas)</li> </ul>                       |
| <ul style="list-style-type: none"> <li>• Possibility of installing domestic water</li> </ul>   | <ul style="list-style-type: none"> <li>• This project is for irrigation water.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Flooding</li> </ul>   | <ul style="list-style-type: none"> <li>• The dyke will prevent the flooding.</li> </ul>  |
| <ul style="list-style-type: none"> <li>• Potion of the irrigating land</li> </ul>  | <ul style="list-style-type: none"> <li>• The project will consider the equality of the irrigation water to prevent the conflict of both side of the river. (by Mr. Negishi)</li> </ul> |



**Photo 2.10.1 Atmosphere of Stakeholder Meetings (March)**

#### (4)SHM (Kween District)

Date: 23 May 2016

Venue: School building next to the District Office

Time: 11:20~ 15:40

Language: Kuksabini, English,

Participant:

| Stakeholders          | Number | Descriptions   |
|-----------------------|--------|--|
| Other District Staffs | 3      | CAO, RDC, DAO,   |
| PDCC                  | 6      | District Planner , District forestry Officer, District Engineer, Production Officer, Physical Planner (Urban), CDO |
| PACC                  | 13     |  |
| C/P Task force        | 1      | Mugabe (MWE)   |
| L/C (AWE)             | 8      |  |
| JICA Study Team       | 2      | Hatano, Sumi, Roy  |

## Agendas:

- Prayer
- Introduction
- Opening remarks by CAO, Chairman of PDCC
- Presentation by AWE and JST
- Discussion
- Closure remarks by RDC, Mr. Mugabe (MWE)

## Issues raised by PACC:

| Issues/Concerns   | Responses   |
|---|---|
| Scientific terms of plants or animals are difficult for community people.                             | Local names will be used at the public consultation meeting.  |
| Technical terms such as ICUN are incomprehensive.   | More easy words will be used at the PCM.  |
| For analysis of water or animal, not only international standard but Ugandan standard should be used. | Noted.  |
| What will happen to farmers who have land only within the protection dyke?                            | DARAP are being prepared. GoU will consider those farmers in the DARAP.                               |
| What will happen to the grazing land?   | If the landowner converts his land to farmland, the cattle owner has to find grazing land by himself. |

**(5)SHM (Bulambuli District)**

Date: 24 May 2016

Venue: District Climate Change Adaptation Hall

Time: 10:30 ~ 14:05

Language: Lugisu, English,

## Participant:

| Stakeholders          | Number | Descriptions   |
|-----------------------|--------|--|
| Other District Staffs | 3      | Deputy CAO, Veterinary officer, Extension Service officer, |
| PDCC                  | 2      | DAO, assistant CDO   |
| PACC                  | 32     | Buwebele 14, Bunamaliro 7, Bunambutye 11                   |
| C/P Task force        | 1      | Mugabe (MWE)   |
| L/C (AWE)             | 8      |  |
| JICA Study Team       | 2      | Hatano, Sumi, Roy, David                                   |

## Agendas:

- Prayer
- Introduction
- Opening remarks by Veterinary officer, DAO, Mr. Mugabe (MWE)
- Presentation by AWE and JST
- Discussion
- Closure remarks by Mr. Mugabe (MWE)

## Issues raised by PACC:

| Issues/Concerns  | Responses   |
|--|---|
| What will happen to farmers who have land only within the protection dyke? | DARAP are being prepared. GoU will consider those farmers in the DARAP. |
| What will happen to cattle keepers? Whose land                             | Basically people are grazing their cattle at                            |

|  |  |
|--|--|
| will be grazing land?  | surrounding other people's land now. If the landowner converts his land to farmland, the cattle owner has to find grazing land by himself. |
| The width of buffer zone from the centre line of the river is rather wide.     | The most suitable width considering controlling floods and preserving eco-system will be decided.  |
| How will the flood become to the neighbouring land outside the project site?   | Drainage, intake facility, and canal will control the flood. There will be no harm to the neighbouring outside land.                       |
| What will happen to graves?  | DARAP are being prepared. GoU will consider graves and spiritually important place.  |
| Dyke should be extended to upstream beyond the project site to prevent floods. | Noted.   |

**(6)PCM (Kween District)**

Date: 26 May 2016

Venue: Atari Primary School

Time: 10:50~ 13:55

Language: Swahili, Lugis, English,

Participant:

| Stakeholders                     | Number | Descriptions   |
|----------------------------------|--------|--|
| Other District, Sub-county staff | 6      | Kween: Physical Planner, Sub-county Chief of Ngenge, Sikwa Parish chief<br>Bulambuli: Agriculture Extension Officer, CDO of Sub-county Bunambutye, Bwelbere Parish chief |
| PDCC                             | 2      | DAO, Coordinator of Operation Wealth Creation,   |
| PACC                             | 29     | Kween: 13, Buwebele 15   |
| Community                        | 150    |  |
| C/P Task force                   | 2      | Patrick, Mugabe, Enou, (MWE)   |
| L/C (AWE)                        | 8      |  |
| JICA Study Team                  | 4      | Negishi, Hatano, Sumi, Roy, David, Norah   |



Agendas:

- Prayer
- Introduction
- Opening remarks
- Presentation by AWE and JST
- Discussion
- Closure

Issues raised by the Community:

| Issues/Concerns  | Responses   |
|--|---|
| The project should employ community people as the construction worker.         | There are two types of workers, skilled and unskilled. Skilled workers may be employed from outside the community, but if there are skilled workers in the community, they will be employed. For the unskilled worker, community people will be prioritized to be employed. |
| Dyke should be extended to upstream beyond the project site to prevent floods. | Noted.<br>It's better to write your request to Ministry through District.<br>Controlling floods in downstream will lead to controlling it in upstream as well.  |

|  |   |
|--|---|
| Measures HIV/AIDS?   | MAAIF/MWE will deal with it as the mitigation measure for the possible negative impact. i.e. Sensitization for construction workers and community people, and providing condoms.  |
| When the project starts, will Health Centre, bore halls and schools will be improved?  | As a result of the project, development will lead population increase, and population increase will lead government's services. Further, development will lead increase of income. When income increases, community people can improve these public facilities by yourselves.<br>Community people also can write your request to Ministry through District. |
| Environmental impact to wild animals?  | The project will be designed to mitigate the negative impact on animals. Buffer zone will protect animals and aqua species along the river.   |
| What will happen to graves?  | DARAP are being prepared. GoU will consider graves and spiritually important place.   |
| What will happen to vulnerable group?  | DARAP will consider them.   |
| About the Atari River course changing: Atari river course should be reversed to the original course considering that the line of original course is the boundary of two Districts. | Project is planning to change the river course to the its original course considering controlling floods and silting, not considering the District boundary. District boundary is the political matter and the project will not touch about the boundary.   |

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| Stakeholder Meeting (23 May 2016, Kween District)                                   | Public Consultation Meeting (26 May 2016, Sikwa Parish)                              |

**Photo 2.10.2 Atmosphere of Stakeholder Meetings (May)**