

**MINISTRY OF AGRICULTURE,  
ANIMAL INDUSTRY AND FISHERIES  
THE REPUBLIC OF UGANDA**

**THE STUDY  
ON  
POVERTY ERADICATION THROUGH  
SUSTAINABLE IRRIGATION PROJECT  
IN  
EASTERN UGANDA**

**FINAL REPORT  
VOLUME-I: MAIN REPORT**

**March 2007**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**NIPPON KOEI CO., LTD.  
TAIYO CONSULTANTS CO., LTD.**

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## **Composition of Final Report**

Volume-I: Main Report

Volume-II: Pilot Project Report

## **PREFACE**

In response to a request from the Government of Uganda, the Government of Japan decided to conduct the Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda and entrusted to the study to the Japan International Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Makoto ISHIZUKA of Nippon Koei Co., Ltd. and consists of Taiyo Consultants Co., Ltd. between October 2003 and March 2007.

The team held discussions with the officials concerned of the Government of Uganda and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government Uganda for their close cooperation extended to the study.

March 2007

Ariyuki MATSUMOTO  
Vice President  
Japan International Cooperation Agency

March 2007

Mr. Ariyuki MATSUMOTO  
Vice President,  
Japan International Cooperation Agency (JICA)

### **LETTER OF TRANSMITTAL**

Dear Sir,

We are pleased to submit to you the Final Report of the Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda. This report presents the results of the study conducted over a 42-month period from October 2003 to March 2007.

The main objectives of the study were to: (i) formulate a development plan and an action plan for sustainable irrigation development in Eastern Uganda, (ii) implement pilot projects in the course of the study, and (iii) carry out capacity building of Ugandan counterpart personnel as well as of the communities concerned. In Phase 1 of the study, drafts of a development plan and an action plan were formulated after examining the present conditions in the study area. The pilot project plan was then formulated within the framework of these draft plans. Subsequently, in Phase 2, the pilot projects were implemented in each district at a total of 14 locations over a period of about 24 months. Accordingly, the development plan and action plan presented in this report were then formulated reflecting the lessons learned from the implementation of the pilot projects.

A participatory planning approach was applied to the study by involving officers from the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the Ministry of Water and Environment (MW&E), the National Environment Management Authority (NEMA), the National Agriculture Research Organisation (NARO), the National Agriculture Advisory Services (NAADS), Makerere University, local governments, and representative farmers in the study area. The sustainable irrigation development plans given in the development plan and action plan were therefore formulated through discussions with the above-mentioned stakeholders during the course of the study.

We wish to express our sincere appreciation to the staff members concerned from your Agency; the Ministry of Foreign Affairs; and the Ministry of Agriculture, Forestry and Fisheries for their continuous support throughout our activities in Japan. Our deepest gratitude also goes to the personnel concerned in the Embassy of Japan for Uganda, your office in Uganda, the JICA individual experts concerned, and the relevant agencies of the Republic of Uganda for their cooperation extended to us during our fieldwork in Uganda.

Finally, we hope that this report will assist MAAIF and other relevant agencies to advance sustainable irrigation development and contribute to eradicating poverty among the small-holders who cultivate paddy in Eastern Uganda.

Yours faithfully,

Makoto ISHIZUKA  
Team Leader of the Study Team for the Study  
on Poverty Eradication through Sustainable  
Irrigation Project in Eastern Uganda



Location Map



## PHASE I: FORMULATION OF DRAFT D/P AND A/P



**Paddy field proposed for rehabilitation in Budaka (Pallisa) district**



**Paddy field proposed for improvement in Buwunga (Bugiri) district**



**Upland area proposed for crop diversification through irrigation development in Kumi district**



**Water source for new irrigation development in seasonal wetland in Sironko district**



**Explanation of agricultural development and wise use of wetland by MAAIF**



**Explanation of environmental preservation activities and EIA procedures**



**Formulation of draft A/P by group work**



**Participant of A/P workshop**



# PHASE II: IMPLEMENTATION OF THE PILOT PROJECT(S) AND FINALISATION OF D/P AND A/P (1/2)



Lecture on land and water resources development programme



Canal construction by farmers



Technical training of extension staff and seed farmers at Doho rice scheme



Technical training of farmers at demonstration farm plot



Agreement exchange workshop for participatory construction works



Workshop for formulating CWMP



Sampling for soil fertility analysis



Preparation of zoning map for wetland



**PHASE II: IMPLEMENTATION OF THE PILOT PROJECT(S) AND FINALISATION OF D/P AND A/P (2/2)**



**O&M of canal by farmers**



**O&M of canal by farmers**



**O&M of canal by farmers**



**Paddy field before harvest**



**Farmers are happy with good harvest.**



**Farmers are happy with good harvest.**



## **Summary**

### **1. Introduction**

- 1.1 This Final Report has been prepared pursuant to Clause VI of the Scope of Work (S/W) for the Study on Poverty Eradication through a Sustainable Irrigation Project in Eastern Uganda (the Study) agreed upon between the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the Japan International Cooperation Agency (JICA) on the 24th of April, 2003.

#### **Objectives of the Study**

- 1.2 The objectives of the Study are:
- 1) To formulate a detailed Development Plan (D/P) for Eastern Uganda in accordance with the Plan for Modernisation of Agriculture (PMA), to promote sustainable irrigation development; Action Plan(s) (A/P(s)) on paddy irrigation project(s) in the D/P to be formulated;
  - 2) To implement pilot project(s) in the course of the Study; and
  - 3) To carry out capacity building of Ugandan counterpart personnel as well as of the communities concerned in the course of the Study; implementation of the technical guidelines for paddy cultivation should be part of capacity building.

Achievement of the objectives mentioned above will contribute to poverty eradication in the study area.

#### **Study Area**

- 1.3 The study area stated in the S/W consists of 13 districts; Iganga, Mayuge, Bugiri, Busia, Tororo, Mbale, Kamuli, Sironko, Pallisa, Kumi, Soroti, Katakwi and Kaberamaido in Eastern Uganda. In July 2005, however, three new districts were established by dividing Tororo, Kamuli, and Katakwi districts into two, respectively. They were Butaleja from Tororo, Kaliro from Kamuli, and Amuria from Katakwi. In November 2005, two new districts were again created by dividing Iganga and Mbale districts into two, respectively, Namutumba from Iganga and Manafa from Mbale district. Further in May 2006, Manafa, Pallisa, Kumi districts were divided into two and Bududa, Budaka, Bukedea districts were created, respectively. As a result, the number of districts in the study area is now 21 in total as of the end of October 2006.

#### **Method of the Study**

- 1.4 In the Study, it was planned that the draft D/P and A/P formulated in the Phase 1 Study would be revised based on the lessons learnt from implementation of the P/P. Following this policy of the Study, the P/P has been implemented in the Phase 2 Study spending about 23 months in the selected 14 P/P sites including the Doho Rice Scheme. In the P/P, all major components/programmes formulated in the draft D/P were implemented on a small-scale, and various lessons have been learnt that would be useful for the finalisation of the D/P and A/P. The D/P presented in this report is

thus formulated with some modifications made on the draft D/P based on the lessons learnt from the P/P.

## **2. Background**

### **Agricultural Sector in Uganda**

- 2.1 Over the years, agriculture has remained a dominant sector in the Ugandan economy, contributing 32% to the total GDP in fiscal year 2005/06. The dominant sub-sector is food crop production (65%) followed by livestock (13%), cash crops (10%), fishery (6%) and forestry (5%). In terms of GDP growth, the sector has posted a downward trend to the profit of a potentially rising non-agriculture sector. This has translated into a food crop sub-sector in the decline and a cash crop sub-sector with a relatively high growth rate except in 2000/01 due to drought. In terms of export, agricultural products remain the mainstay of the Ugandan economy, providing a significant share of 71% of the annual export earnings in 2002 with a prosperous expansion of the fishery sub-sector and a drop of the coffee sub-sector. In terms of import, the main commodities are wheat and rice. Rice is one of the staple foods, especially for the urban population in Uganda. Uganda has imported rice valued at 18 million US\$ in the last 5 years, out of the total value of cereal import of 63 million US\$. In other words, rice import accounts for 29% of the total cereal import value.

### **Development Policies and Targets**

- 2.2 According to the Uganda National Household Survey 2002/2003, 39% of the population, corresponding to 9.6 million persons are unable to meet their basic needs and are living below the absolute poverty line. The percentage of people who are poor in the rural area stands at 43%. Eighty three (83) % of the rural households, i.e., 88% of the population, are mostly directly or indirectly engaged in agriculture. It means that roughly half of the rural people belong to the poverty group. Uganda set a national strategy to eradicate poverty through agricultural modernisation, employment creation and industrialisation. PEAP is Uganda's comprehensive development framework. In the 1990s, the GoU developed PEAP setting forth its strategy for eradicating absolute poverty by 2017. PMA is a part of PEAP and aims at making adjustments in institutions and policies so as to improve agriculture supporting service delivery for purposes of enabling the rural poor to attain a better standard of living. These changes are taking place in several priority areas including agricultural development and irrigation. PEAP and PMA indicated that the fair access and distribution of land is a critical factor in enabling the poor to improve their livelihoods through farming. Currently, the "Land Sector Strategic Plan 2001-2011: Utilizing Uganda's Land Resources for Sustainable Development (LSSP)" has been developed in view of actual implementation of the Land Act and improving the use of and access to land.

### 3. Study Area

#### Natural Conditions

- 3.1 The study area covers a gross area of approximately 37,020 km<sup>2</sup>, of which about 9,390 km<sup>2</sup> is open water (water surface). The total land area of the 21 districts is about 27,630 km<sup>2</sup> including some 2,500 km<sup>2</sup> of low-lying wetland. The area has an altitude ranging from 914 m to 1,800 m above mean sea level (a.s.l.). The land area can be divided into four geographical zones, i.e., Mountain Slope (middle part of Mt. Elgon; above 1,250 m a.s.l.), Higher Plateau (foot portion of the Mt. Elgon area; 1,150-1,250 m a.s.l.), Middle Plateau (1,000-1,150 m a.s.l.), and Lower Plateau (914-1,000 m). The land of each zone was dissected into many small tracts (remnant terraces) through erosive action as well as valley formation. The bottom of the valleys has then formed seasonal swamp in the upper and middle-reach sections, while there is permanent swamp in the lower-reach sections.
- 3.2 The monthly rainfall pattern shows that there are two wet seasons in a year from March to May and September to November. The first dry season starts from December to February and the second from July to August. The average annual rainfall at Jinja, Soroti and Tororo are 1,358 mm, 1,379 mm and 1,507 mm, respectively. In Jinja (according to the 1995-2003 record), the mean minimum temperature is 16.5 centigrade in July and the mean maximum temperature is 30.1 centigrade in February. The monthly average humidity varies from 28% in February to 80% in August at Tororo station and from 24% in February to 83% in August at Soroti.
- 3.3 Daily and monthly available river discharge data for Manafwa River, Namatara River, Sipi and Simu Rivers, Mopologoma River, Malaba River and Kapri River have been collected for the period from 1997 to 2003. The available monthly minimum discharge is estimated at about 0.7m<sup>3</sup>/sec/100km<sup>2</sup>, which can be utilized for the availability of water resource for irrigation.
- 3.4 Gleysols and Vertisols (black cotton soils) form the wetland soils extended along the upper and middle reaches of the present valley systems. The spread area of these soils is estimated at around 5% of the total land area. The soils are all highly useful for annual crop production, particularly paddy. Most of the land (65.8% or 1,817,450 ha) in the study area has been reclaimed and intensively used for crop production. The pastureland occupies 18.6%. The remaining land is categorized into permanent wetland covered with papyrus, reeds, etc., bush and woodland, and forest. The wetland in the eastern region of Uganda is highly utilized for cultivation. The wetland has been categorized into two characteristics, namely permanent and seasonal. The area of the permanent wetland is 2,590 km<sup>2</sup>, which is about 31% of total wetland. The seasonal wetland is 5,762 km<sup>2</sup>, which is the remaining 69% of the total wetland area. In the Biomass data, the wetland utilized for cultivation is explained as "Modified". On the contrary, Northern districts have not been utilized



for cultivation, especially in Soroti, Katakwi and Kaberamaido. According to NEMA's regulation for wetland utilisation, up to 25% of a seasonal wetland area can be allowed for use.

### **Socio-economy**

- 3.5 The study area is known as the most populous area in the country, accounting for 23% (6,418,600 persons) of the Ugandan population (27,480,000 persons) in 2006. According to the data from UBOS, the total population in the study area will be 9.6 million in 2017, which is nearly 1.5 times higher than that in 2006, although the growth rates differ significantly in different districts. Demographic trends and characteristics affect the type of farming, access to agriculture supporting services and productive resources such as land and farm labour.
- 3.6 Since the early 1990s, the government of Uganda has particularly focused on decentralisation by transferring the financial resources to the local governments. Currently, each district and sub-county formulates its own development plan with a financial plan. Under the "decentralisation policy" pursued by the GoU, the respective district governments are now being reinforced with staffing and functioning so as to achieve administrative and financial self-reliance and hence be able to perform regional socio-economic development successfully in their respective territories. Since 1997, the GoU's major development goal has been to reduce absolute poverty to a level of below 10% of the population living under one US\$ a day by 2017. The Eastern region has a lower percentage of poor than the North, but more than the Central and West. The challenge to poverty in the Eastern region holds an important position in the national poverty eradication activities.

### **Crop Production**

- 3.7 Essential annual crops, e.g., cereals, legumes, tubers and other oil-seeds, etc. are more or less grown in the entire study area. Recently, paddy has been appreciated as one of the cash crops, as its plantation is being extended to more than 70,000 ha. However, paddy yield is still low at 1.91 tons/ha due to a lack of appropriate knowledge on the cultivation.

### **Irrigation**

- 3.8 The Kibimba and Doho Rice Schemes are two large-scale schemes in the study area where paddy is extensively cultivated with respectively 1,060 ha and 2,220 ha (including 1,220 ha of out-growers' area) under irrigation. Besides these large-scale schemes, there are about 66,780 ha of small-scale paddy field areas. The total paddy field area is thus estimated to be about 70,060 ha in the study area.

### **Animal Husbandry**

- 3.9 The livestock sub-sector, in which cattle, sheep, goats and pigs are included, is an important cash earning resource of the farm household. Other than livestock, poultry

is also available even though unit breeding is small for household consumption. It is notable that turkey breeding is being popularized as a cash-earning source in the Northern districts, e.g., Pallisa, Kumi, and Soroti.

- 3.10 It is notable that use of ox-power has been popular among local farmers, particularly on farm work, e.g., ploughing, weeding and transportation. Generally, the trained oxen are bred by cattle breeding farmers, and leased to farmers as required. The use of an oxen plough is now popularly practiced in Pallisa, Kumi and lower plateau area of Kamuli districts.

### **Agricultural Support Services**

- 3.11 To promote the agricultural modernisation programme, MAAIF has organized seven national agricultural research institutes into NARO, and launched the programme. To perform the agricultural research activities, technical and financial support services are being extended by the international organisations, e.g., FAO and World Bank as well as many other donors. Regarding “lowland rice (paddy)”, the agricultural research institutes in Uganda have just started research activities on a small scale.
- 3.12 Under the current decentralisation policy, agricultural extension officers have been transferred from MAAIF to district governments for improvement and reinforcement of the extension service systems. To assist the smallholder farmers and peasants, an institutional credit system has been recently scheduled and implemented in part. The micro-credit programme is now under activation/reinforcement through joint operation of the fund sources and/or collaboration with the on-going NARO, NAADS programme, etc. A number of NGOs and CBOs are in operation in health, agriculture, education, micro-finance and others. Farmers are encouraged to organize themselves into small groups under NAADS initiative in order to receive the relevant agriculture supporting services.
- 3.13 NAADS is a government programme formulated with the overall aim to reform the delivery of agricultural advisory services to farmers. As a part of the PMA, NAADS strives to contribute to the transformation of subsistence farming to commercial agriculture. NAADS was commenced in 2001/02 and, as of 2005/06, is being implemented in 346 sub-counties in 49 districts, which include Soroti, Tororo, Busia, Iganga, Mbale, Kamuli, Bugiri, Kumi and Kaberamaido within the study area.
- 3.14 Many international donors have been actively supporting the programmes in order to overcome the constraints. As for irrigation projects, only one project named “small-scale irrigation - special programme for support of food security” has been implemented by FAO, which focused on upland development. So far, no study or project has been carried out for lowland paddy development in the study area.

### **Rural Infrastructure**

- 3.15 The road networks in the Eastern region are in better condition than in the other regions. The most common water sources in the study area are boreholes, which 60%

of sampled households in the study area rely on for water. Dug wells provide water for 23% of the households in the study area. Other sources include fetched water from swamps (6%), rivers (4%), and piped gravity systems (2%), which were only found among the sampled households in Mbale and Kumi.

- 3.16 According to the Human Development Report 2002, the health indices showed that people in the study area had a higher rate of population without access to safe water and health facilities than the total average of Eastern and Northern regions. The population without access to a health facility in the Eastern region has been reported to be 26% while it is 29% in the study area. The farm household survey indicated that 89% of the households had their own toilet facility at their homestead. After the launch of UPE, the GoU has encouraged each village to establish one primary school. As a result, 92% of the population has access to primary schools in the village or within the parish. On the other hand, secondary education institutions are less accessible by the majority of rural households.

### **Environment**

- 3.17 Wetlands in the study area are undergoing significant changes in their land use, from the original vegetation of grasslands and woodlands to agricultural lands. In recent years, farmers are encroaching on the wetlands with a significant speed. For paddy production purposes alone, it is said that 3,000 ha to 5,000 ha of wetlands are being converted annually in the study area. Major causes of such encroachment are: (i) lack of agricultural land, and (ii) unclear wetland conservation policy particularly at farmers' level. Population pressure on the agricultural land and limited job opportunities available in other sectors accelerate the land fragmentation and encroachment on the wetlands. The customary land tenure system and unclear user right of the wetlands make the control of wetland use more complicated. In order to give clear guidance to the farmers in the use of wetlands in a sustainable manner, the MWLE developed guidelines for smallholder paddy cultivation, etc. However, the aim of these guidelines has not been properly informed to the farmers, and many farmers have fears that the government might dispossess them of their paddy land because the officers in the local government emphasize that encroachment upon wetlands is illegal.

## **4. Assessment of Agricultural Development Potential and Constraints**

### **Potential for Agricultural Development**

- 4.1 High population growth will force an increase in food production. High production demands especially, will increase rapidly, not only for the supply of staple food but also for cash crop production because upland crop production will not have so much potential. There will be higher potential in paddy cultivation in the wetland than for other crops due to availability of water resource. According to the environmental regulations regarding the use of the seasonal wetland area, less than 25% of the total

wetland in the section can be allowed for cultivation. Therefore, in the area where the presently cultivated area has not reached its limitation, the grassland area in the seasonal wetland can be newly cultivated for paddy production. The permanent wetland area would not be touched for agricultural use, and the existing paddy fields in the permanent wetland area would be left as they are. With these considerations in mind, the potential paddy field cultivation area has been estimated. From the results of the estimation, the areas involving diversification from other crops would be 31,110 ha and new development areas from the existing grassland in the seasonal wetland would be 72,830 ha. Hence, the total new development area is estimated at 103,940 ha. Accordingly, the total potential development area for paddy production is estimated at about 172,940 ha including the existing paddy field areas of 69,000 ha (in which 1,060 ha of the Kibimba Scheme is excluded).

- 4.2 With regard to upland crops, since the landholding size has become small with the process of the current land fragmentation, the cropping intensity has been attaining over 1.35 (or 135% relative to the total farm land) on a total average. This means that the farmers cultivate their own farm plot intensively. Accordingly, such over-cropping causes degradation of soil fertility to a serious extent. This means that there is no, or a very marginal, possibility for further intensification of cropping in most parts of the Southern districts, even though the regional and/or household demand for food crop production would be increased in the future. In contrast, the present crop intensity of the Northern districts is still low at less than 1.0 (or less than 100% of the total farm land). Accordingly, such districts as Kaberamaido, Katakwi, a part of Pallisa, Kamuli, etc. have certain room for further intensification of crop production, e.g., 50 to 60% increment to the present conditions. This means that the crop production could be increased by more than 50% even without development of new farm plots in these areas.
- 4.3 Paddy fields are being developed so far in about 70,000ha in the entire study area. Out of the total paddy field area, only about 6,400 ha (including Doho and Kibimba Rice Schemes) have been consolidated to advanced conditions, and used for paddy cultivation almost twice a year. The greater remaining area is still not properly developed yet, but is used seasonally, once a year under rain-fed or flooding water-fed conditions. If these paddy fields are improved to an advanced level, it will be possible to grow paddy twice a year, even using a high-yielding variety of medium maturing paddy (around 120 days).
- 4.4 With regard to the yield of upland crops, to refresh/restore the soil fertility to an economically reasonable level and then to continue crop production successfully, it is essential to apply organic manure and/or compost that is prepared by use of the by-product of crop production, wild pasture, etc. Without application of this organic manure, it could not be expected to achieve a significant effect on soil/crop fertilisation, even when using a certain amount of chemical fertilizers, due to the small element holding/carrying capacity of these soils of coarse texture and poor



humus content. Either way, it is foreseeable that an increment of the upland crop production would be marginal in cases of food crops to which farmers might not use so much fertilizer because of non-existent or limited cash earning effect. Meanwhile, in the case of cash crops, it could be expected to achieve an increment of some 35 to 50% of the present production level if soil/crop fertilisation is properly practiced.

- 4.5 As for paddy production, except for the commercialised large rice farm in Kibimba, the majority of farmers use less farm inputs for paddy cultivation at present. However, blessed with the natural supply of nutritional elements and a relatively good distribution of rain, the farmers obtain 1.5 to 2.3 tons/ha of paddy and 1.83 tons/ha on average. In the case of the Doho Rice scheme, some farmers who have been fairly advanced in utilisation of farm inputs obtained 2.8 to 3.0 tons/ha of paddy with a dosage of 40 to 60 kg/ha of urea and 50 kg/ha of DAP, giving 2.85 tons/ha on average in the entire Doho area.

In the P/P activities, it is through the crop experimental work that it has been appreciated that paddy is responding well to the soil/crop fertilisation practice, and hence, the yield has been recorded as high as 8 to 12 tons/ha of paddy. Under fully irrigated conditions, farmers have recorded 6 to 8 tons/ha and 6.3 tons/ha on average, even in commercial operation of paddy production in the individual farm plots. The total average of the paddy yield coming from the entire Pilot Project activities (the 3<sup>rd</sup> cropping) has then been estimated to be 5.8 tons/ha as of the end of September 2006. This means that farmers could obtain 4 to 5 tons/ha of paddy yield on average if the paddy field is consolidated for facilitating water control/management and by applying appropriate farming practices. Besides, it could also be foreseeable to obtain 6 to 7 tons/ha of paddy whenever farmers are skilled enough for irrigated farming operations as well as irrigation management. To the above end, some 5 of the recommended paddy varieties (i.e., NM-1, NM-2, NM-3, NM-5 and NERICA-5) that have a high-yielding ability, are resistant to pests and diseases, and tolerant to grain-shattering were being made available through the P/P activities, and those extension seeds are being multiplied in the Doho Rice Scheme for propagation to the entire study area.

- 4.6 Of course, the possibility of livestock development still remains as small-scale grazing using the pasture combined with by-products from crop production. To utilize the natural pasture resources and promote development of animal production to support households as well as the regional economy, the local administration should make a particular effort to enable cattle to graze freely in the pastureland. To materialize soil/crop fertilisation efficiently, it is strongly suggested that every farmer breeds a few cattle in the house yard using the pasture combined with by-products of the crop production. Some of the cattle should then be trained as draft cows for ploughing, and other traction work. Cow dung and urine are very useful for processing good compost. Precisely those resources should be piled up in the compost-piling-yard together with such crop residues as paddy/millet straw, husks of

beans, maize stems, etc. as well as weeds and wild grasses for processing the compost.

- 4.7 If agro-processing facilities are established in the respective district areas to process the total production as a whole, this could create employment opportunities for more than 30,000 to 40,000 able persons. The processing activity would accordingly contribute to the regional socio-economy. The by-product to be obtained through the processing work would provide useful resources for developing new production businesses and generating additional income.

#### **Constraints to Agricultural Development**

- 4.8 Though the study area has no physiographical constraints on agricultural production activities, except the mountain slope of Mt. Elgon, where the agricultural land use is limited to only narrow terraces, irregular precipitation during the second rainy season from August to December, coupled with the extremely low moisture holding capacity of most of the soils in the study area, except the wetlands, makes it risky to grow annual crops during the second rainy season. The upland soils are mostly coarse in texture (loamy to sand) and are easily eroded by surface run-off of rainwater, even though the land has a gentle slope at less than 1%, which causes not only structural degradation of the arable soils but also brings about a great deal of harm to the ecological system of the swamps. Due to the lack of essential nutrient elements such as calcium, magnesium, potash, phosphate, nitrogen, etc., the micro-elements, e.g., boron, zinc, copper, etc., humus and clayey elements, continuous cultivation on these poor/infertile soils, without careful maintenance and/or fertilisation for many long years, has caused degradation of soil fertility/productivity to a critical extent.
- 4.9 The current fragmentation of farmland due to heavy population pressure appears as one of the most critical constraints in the study area. The landholding size per farm household has already dropped to less than 1.2 ha (or 3 acres) per household on average in the case of the Southern districts. The small landholding size coupled with existence of infertile soils causes much difficulty in maintaining the farmers' livelihoods, from the viewpoints of both household economy and food security. Consequently, due to over-cropping without careful fertilisation, the soil fertility has been further degraded to a marginal extent. In the case of the Northern districts, however, the said constraint is so far not serious, though a negative impact is latent in the present arrangements for farm families. Furthermore, the common land tenure in the study area, customary tenure, has the characteristic of dividing land among the male household members, which means making the size of land each one gets smaller each time the land changes ownership. The other factor that is associated with the common land tenure system, is the legislation that does not allow the authority to intervene in land use without the consent of the owners. This has made the process of negotiation between the farmers and the district officers difficult as the farmers do not perceive the land ownership as the government does.

- 4.10 Demographic change due to HIV/AIDS may negatively affect farm labour. The loss of population of the most productive age group, which accounts for a large part of the household headcount, means that the capacity for production, such as financial capital, land and knowledge, is reduced significantly. Water-borne diseases such as “Bilharzias” and “Amoebic Dysentery” are reportedly influencing extensively though symptoms of these diseases have not been observed as serious at present. In addition, paddy growers complain seriously about leeches attacking during on-field work. The high adult illiteracy rate in the region may also hinder many of the farmers from accessing and understanding agricultural technologies and related information.
- 4.11 As every attendee at the Preliminary EIA Workshop identified, a lack of capital, shortage of land, non-appropriate extension services, lack of marketing information on agricultural commodities, as well as poor accessibility to the market, etc. are the critical constraints that are impacting on agricultural production activities. Up to the present, the agricultural production has been diversified through introduction of varieties of crops. However, the majority of such diversification programmes are at a standstill prior to further stepping up to an advanced stage or having a development effect. The local administration should first pay careful attention to the said situations, and then focus on the best way forward for future development.

## 5. Development Plan (D/P)

### Potential and Constraints to Sustainable Irrigation Development

- 5.1 The potential for irrigation development is quite large in terms of availability of both land and water resources. The total potential area for the development is estimated to be 172,940 ha, which is about 2.5 times as much as the existing paddy fields. The new area for paddy development has been estimated making reference to the wetland conservation guideline, in which agricultural development is limited to a maximum of 25% in each wetland section. Availability of the water resources has also been taken into account as one of the critical factors for proceeding with the targeted irrigation development in a sustainable manner. Regarding paddy production, as experienced in the P/Ps, its cropping intensity can be increased using available water resource wisely, and its unit yield can be also increased up to a level of 5 - 6 tons/ha in the smallholders' paddy fields if proper cultivation technologies are applied.

Nevertheless, there are several hurdles that should be overcome for the development. Among the constraints on agricultural development explained above, the constraints of the lowland paddy sub-sector are summarized as follows:

Unorganized Development of Wetlands: The regulations and guidelines of government are not functioning effectively on the ground as about 3,000-5000 ha/year are being developed under the customary land tenure system.

Weak Institutional System in the Agricultural Supporting Services: NAADS has hardly provided any assistance for paddy farming. NARO has limited information on

lowland paddy production technology and almost no extension staff members specialized in paddy production technology are available at the district or central levels.

Lack of Production Technology: The implemented traditional irrigation systems have low unit yield and unstable production owing to such weak institutional systems.

Weak Farmer Organisations: Very few farmer organisations have been established so far and they have a low level of management capacity.

Traditional Land Tenure System: Most of the paddy fields are under the customary land tenure system and owned by big landowners. The actual practice of the customary land tenure system shows discrepancies with the Land Act.

### **Basic Concepts**

- 5.2 The conceptual framework underlying the D/P is in line with the overarching government policy of PEAP and PMA. Sustainability is one of the most essential elements of the D/P. The word can be defined in two ways: (i) “environmentally sustainable”, involving ways of designing and implementing projects that do not harm the natural environment and (ii) “development that can be managed in the long-term by organisations and small-scale farmers who participate in the Project”. In addition, the D/P is to be formulated to contribute to overall agricultural development in the study area.

### **Approaches to Sustainable Irrigation Development**

- 5.3 The D/P incorporates two approaches: (i) the common approach and (ii) area specific approaches taking into account the common points among districts and the specificities of each one. The former considers the institutional problems while the latter is to deal with area-specific problems and potential. Taking into account this aspect, the project implementation is scheduled following three progressive bases consisting of the short, mid and long-term. “Pilot Schemes” shall first be implemented as model development serving the function of technical demonstration for the subsequent implementation of the proposed Project. Implementation of these pilot schemes should be monitored and assessed regularly. Based on the results of this monitoring and assessment, technical guidelines should be prepared as an essential reference for implementing the development programme. The foreseen developments would be environmentally sustainable and would aim at a community based, small-scale development through a participatory approach.

### **Sustainable Irrigation Development Plan**

- 5.4 The target year of the D/P is 2017, which is the same as that of PEAP. The D/P is planned for a total of 10 years and comprises three terms: short-term (2008-2010), mid-term (2011-2013) and long-term (2014-2017) development periods. In the short-term, the building up of the institutions for the lowland paddy sub-sector



development would be carried out through the establishment of pilot schemes in each district. The DIOs, extension service officers and farmers shall be intensively trained in the established pilot schemes. The number of pilot schemes to be established during this period would be three in each district, or a total developed area of about 630 ha in three years. In the mid-term, the trained officers would continue their support and services to farmers for irrigation development and modernization of cultivation technology. The number of small-scale irrigation schemes annually developed would be about 6 in each district, or a total developed area of 4,000 ha during this period. In the long-term plan, the number of small-scale irrigation schemes would be increased with intensive technical support from the increased number of DIOs and extension officers. In each district, about 18 schemes would be developed annually, or a total developed area of about 15,370 ha during the 4-year period.

In parallel with the said schedule, integration of small-scale irrigation schemes would also be carried out by implementing small reservoir development. The Doho Integrated Development Project construction work will be completed in the long-term plan period.

With the above scenario, the total developed area would be about 20,000 ha by 2017, which can be set as the target. The target rice production is then set assuming that 10,000 ha are rehabilitated or improved, and another 10,000 ha are newly developed following the government regulations and guidelines. This would correspond to a paddy target production of 294,300 tons (in terms of milled rice) by 2017.

- 5.5 To ensure sustainable development, the following achievements will be essential: (i) land and water resource development with a steady supply of irrigation water, (ii) technical advancement in paddy production practices, (iii) organisation and activation of the farmers as well as institutional capacity building in the co-operative activities along with the institutional improvement and reinforcement of the project executing authority/agency, and (iv) environmental conservation.

#### **Implementation Plan for the D/P: Land and Water Resources Development Component**

- 5.6 In the short-term development plan, the districts categorized in Group-1 and Group-2 are prioritized in the rehabilitation and improvement of existing paddy fields. In these districts, the development of wetland to agricultural land has already exceeded NEMA's criteria. Hence, it is necessary to increase the yield by maintaining the irrigation facilities and improving the production technology. On the other hand, in the districts categorized in Group-2 and Group-3, the paddy fields have been rapidly developed without any control by the government. Therefore, it is a key factor to promote the wise use of wetland, which the government encourages, with the participation of the farmers. Separately from the DIOs training, also in the short-term plan, a total of 6 MAAIF engineers who have potential as qualified irrigation

engineers, will be trained abroad in irrigation technology in higher institutional organisations.

For the Doho Rice Scheme, a Feasibility Study (F/S) for the Doho Integrated Development Project will be undertaken covering both the original scheme area and the surrounding area. In this study, a proper water distribution plan with limited water resource and the sustainability of the rehabilitated irrigation facilities, including re-organisation of WUAs, will be the main theme.

- 5.7 In the mid and long-term development plans, the rehabilitation and improvement of existing paddy fields as well as new developments will be carried out, and the number of pilot schemes which are implemented in the short-term development plan will be increased as small-scale irrigation schemes for the expansion of irrigation areas.

#### **Implementation Plan for the D/P: Production Technology Development Component**

- 5.8 In the short-term development plan, the necessary institutional arrangements will be established by utilizing a part of the Doho Rice Scheme, and building the capacity of officers that can carry out lowland paddy production research adopting “a farmer participatory approach to the research work” which NARO promotes. Extension officers from each district, NAADS service providers and NGO staff members are targeted for the capacity building programme. At the same time, a seed multiplication system will be established to promote the selected high quality seeds and an adequate partnership between NARO, NAADS, seed enterprises and seed growers. The technical extension services will be activated through establishment of TDFP in each pilot scheme.
- 5.9 The mid and long-term plans for the production technology development component aims at improving the system for self-reliance and thus for extending such technologies to other areas. Hence, the improvement programme for research activities and farming practices will be carried out continuously under such a system.

#### **Implementation Plan for the D/P: Organisation and Institution Development Component**

- 5.10 In the short-term plan, the officer’s training will be conducted for 2 days every year. The participants will be the district officers (DAO or NAADS coordinator, DEO, DWO, DCO and DCBO). The guidance will give them an opportunity to get exposed to the issues concerning wetland management, paddy cultivation and irrigation development. Training of the farmers will also be conducted by trained officers at the sub-county level. During the training, one sub-county officer will also join so that she/he can closely follow up on the progress.
- 5.11 In the mid-term, the officer’s training will continue for three years. The participants will include 2 officers at district or sub-county level and NAADS service providers

from Kumi, Bukedea, Soroti, Iganga, Namutumba, Butaleja, Tororo, Pallisa, and Budaka. These districts have a large number of schemes to be developed in the long-term plan and expect a shortage of facilitators. In both mid and long-term plans, the farmer training will be conducted in the sub-county by the trained officers and NAADS service providers. During mid-term, 10 farmers' scheme representatives will be trained at one series of training and 15 during the long-term. Sub-county technical staff will also participate in the sessions for further follow up of the farmers' organisational capacity development.

### **Implementation Plan for the D/P: Environment Conservation Component**

- 5.12 It is proposed to regroup several small-scale irrigation schemes in one 500 ha watershed unit and formulate one Project Brief, one wetland management plan and one monitoring system for this watershed unit. The table below shows that instead of 2,000 Project Briefs that could have been written when small-scale irrigation schemes are considered individually, only 50 would be formulated at the end of the plan saving high costs and manpower. A similar observation can be drawn concerning the wetland management plans (CWMP) as only 50 would be formulated on a possible 2,000.

**Summary of Environmental Activities for 21 Districts of D/P**

| Items          | Short-term | Mid-term | Long-term | Total |
|----------------|------------|----------|-----------|-------|
| Project Brief  | 21         | 20       | 9         | 50    |
| CWMP*          | 17         | 11       | 0         | 28    |
| EIA**          | 0          | 11       | 11        | 22    |
| Water Sampling | 189        | 321      | 519       | 1,029 |
| Soil Sampling  | 84         | 106      | 182       | 372   |

\*\*EIA will include 1 CWMP not counted in the CWMP\* above

- 5.13 The outputs for the making of the Project Brief by the local environmental specialist with DAO and from the community based wetland environment conservation strengthening programme will be spread and applied to the new irrigation development in the mid and long-term plans. The wetland environment will be constantly monitored using the system that is established in the short-term plan. An EIA is to be undertaken in every watershed where a dam construction is planned.

### **Cost Estimate for D/P**

- 5.14 The cost for implementation of the D/P is summarized in the following table.

**Cost for Development Plan**

(Unit: '000 Ush)

| Development Components                         | D/P Cost    |
|--|-------------|
| Small-Scale Irrigation Scheme Development      |             |
| - Land and Water Resources Development         | 113,071,080 |
| - Production Technology Development            | 7,985,825   |
| - Organisational and Institutional Development | 806,296     |
| - Environmental Conservation                   | 2,049,136   |
| - Management Consultants                       | 12,391,234  |
| Sub-total                                      | 136,303,571 |
| Doho Integrated Development Project            |             |
| - Feasibility Study                            | 2,865,650   |
| - Construction and others                      | 27,750,000  |
| Sub-total                                      | 30,615,650  |
| Total  | 166,919,221 |

**Evaluation of D/P**

- 5.15 EIRRs of the D/P and the Doho Integrated Development Project have been computed at 22.3% and 29.7%, respectively, both of which are higher than 12% of the opportunity cost.
- 5.16 The result of farm budget analysis shows that beneficiary farmers can well afford the costs required for O&M of irrigation facilities in both cases, i.e., with and without small reservoir construction.

**6. Action Plan (A/P)****A/P to Cope with Area-specific Constraints**

- 6.1 The basic concept of the land and water resources development that is taken into account in the formulation of the A/P is as follows:
- 1) Human resources development for irrigation engineering,
  - 2) Planning and irrigation engineer OJT,
  - 3) Pilot schemes implementation plan,
  - 4) F/S for small reservoir development, and
  - 5) Organisation management, O&M of pilot schemes.
- 6.2 Based on district categorisation for the original 13 districts, which have been separated into 21 districts as of the end of October 2006, the same categorisation of the original district has been adopted for the new districts where the land and water resources component is divided into the following four groups:
- 1) Group-1: Rehabilitation of the existing paddy fields
  - 2) Group-2: Improvement of the existing paddy fields
  - 3) Group-3: Diversification of production through conversion of other existing crops in the seasonal wetland to paddy
  - 4) Group-4: New paddy field development.
- 6.3 In accordance with the selected A/P areas in 21 districts, the following pilot schemes

for each watershed area have been planned for implementation. The average size of the pilot schemes is estimated at 10 ha. The number of pilot schemes has been estimated on the basis of the water availability from the watershed and limitation of wetland development in the regulations. In order to distribute the implementation of pilot schemes during the A/P period to the wider area of the 21 districts, one scheme per year for a 3 year period has been proposed, to be implemented as shown in the following table. The pilot scheme planning and implementation should be utilised for on job training for irrigation engineers in the districts.

**Categorisation of 21 Districts and A/P Implementation**

| Category                     | Original District<br>(13 districts) | New District<br>(21 districts) | A/P Construction |
|------------------------------|-------------------------------------|--------------------------------|------------------|
| Group-1<br>(Rehabilitation)  | Iganga                              | Namutumba                      | 3                |
|                              |                                     | Iganga                         | 3                |
|                              | Tororo                              | Butaleja                       | 3                |
|                              |                                     | Tororo                         | 3                |
|                              | Pallisa                             | Budaka                         | 3                |
|                              |                                     | Pallisa                        | 3                |
| Group-2<br>(Improvement)     | Mayuge                              | Mayuge                         | 3                |
|                              | Bugiri                              | Bugiri                         | 3                |
|                              | Busia                               | Busia                          | 3                |
|                              | Mbale                               | Manafa                         | 3                |
|                              |                                     | Mbale                          | 3                |
|                              |                                     | Bududa                         | 3                |
|                              | Kamuli                              | Kaliro                         | 3                |
|                              |                                     | Kamuli                         | 3                |
| Group-3<br>(Diversification) | Sironko                             | Sironko                        | 3                |
|                              | Kumi                                | Kumi                           | 3                |
|                              |                                     | Bukedea                        | 3                |
| Group-4<br>(New Development) | Soroti                              | Soroti                         | 3                |
|                              | Katakwi                             | Amuria                         | 3                |
|                              |                                     | Katakwi                        | 3                |
|                              | Kaberamaido                         | Kaberamaido                    | 3                |

- 6.4 Wetland cultivation is one of the activities regulated by NEMA. To carry out such an activity, a permit from NEMA is required, and NEMA requests the submission of the Project Brief for evaluation. The Project Brief needs to give clear scientific details of the Project and explain one's intention presenting comprehensive countermeasures on likely impacts of the Project on the natural and social wetland environment. As DAO may not have the necessary experience and materials to make the Project Brief, such a job shall be entrusted to a local environmental specialist who should work together with DAO in its formulation.
- 6.5 Future developments to be proposed for other areas of the wetland will be in line with what is proposed for the P/P. These developments should monitor the environment in order to take timely actions to prevent degradation of the wetland environment. The Project promotes conducting water quality analysis 3 times/year and soil quality analysis ideally twice every other year. The location of sampling for water will be at the inlet and outlet of the watershed. The location for taking soil samples will be at upstream, midstream and downstream stretches on both sides of

the river flow.

- 6.6 Action to be required in the environment conservation component is as follows:
- 1) Formulation of a Project Brief to seek a permit from NEMA,
  - 2) Establishment of the function of “wetland conservation association” in a farmers group, including the formulation of the Community Wetland Management Plan (CWMP),
  - 3) Authorisation of users’ rights for water in irrigated paddy cultivation in the wetland, and
  - 4) Sound monitoring of wetland resources, including water and soil.

The above action 2) related to the establishment of the function of “wetland conservation association” will be undertaken within those proposed in the organisational and institutional development component, while the formulation of a CWMP will be allocated to the environment conservation component.

#### **A/P to Cope with Overall Constraints**

- 6.7 The A/P to cope with overall constraints covers all 21 districts regardless of the results of grouping of districts. The actions to be taken in the production technology development component are as follows:

- 1) Establishment of Paddy Research-cum-Technical Demonstration Farm Plots (RRTDFP);
- 2) Commercial seed multiplication and distribution;
- 3) Establishment of Technical Demonstration Farm Plots (TDFP);
- 4) Technical training and capacity building of extension service staff;
- 5) Training and capacity building of the key farmers; and
- 6) Supply of adequate farming tools and equipment.

- 6.8 Actions required in the organisational and institutional development component are as follows:

- 1) Provide training on procedures for obtaining appropriate registration status and functions to become a PRGA and its authorisation;
- 2) Technical training and capacity building of representative farmers in general as well as financial administration of the PRGA;
- 3) Technical guidance and workshop to create a synergy between district technical staff and service providers regarding wetland management, paddy cultivation and sustainable irrigation development; and
- 4) Create a Task Force for wetland management to coordinate district officers and service providers of various disciplines.

- 6.9 F/S for the Doho Integrated Development Project will be carried out and the most suitable rehabilitation and improvement plans will be formulated covering both the original Doho Rice Scheme and out-growers’ area. For project formulation it will be necessary to introduce a technical assistance programme and required experts will be as follows:



- 1) Irrigation Engineer/Planning,
- 2) Hydrologist/Environment,
- 3) Agronomist/Soil,
- 4) Sociologist and Economist,
- 5) Architect for Design of building for Irrigation & Drainage Centre,
- 6) Locally, a Design Engineer, Surveyor and Cost Estimate are necessary.

Important investigations and survey items will be as follows:

- 1) Aerial photograph and Topographic survey,
- 2) Inventory survey on the existing irrigation and drainage, including a canal network survey,
- 3) Semi-detailed soil survey,
- 4) Meteorological and hydrological data collection,
- 5) Geological and soil mechanical investigation,
- 6) Agricultural and farm economic survey,
- 7) Survey of the institutional supporting services in respect to the agricultural activities as well as the concerned water right,
- 8) Socio-economic survey including cadastral and tenants survey,
- 9) Environmental impact assessment,
- 10) Layout plan of Irrigation and Drainage Centre.

In addition, during the F/S stage, DIOs from 21 districts and staff from MAAIF will be trained through on-the-job training, and also a plan for the establishment of an “Irrigation and drainage centre” will be formulated taking its desirable scale and financial sustainability into account.

#### **Cost Estimate for A/P**

- 6.10 The cost for implementation of the A/P for 63 pilot schemes is estimated at Ush. 10,080 million. The cost for the F/S for the Doho Integrated Development Project is separately estimated at Ush. 2,866 million. The total cost for the A/P is thus estimated to be Ush. 12,946 million.

## **7. Conclusion and Recommendations**

### **Conclusion**

- 7.1 The implementation of the proposed Project through farmer participation is technically sound and economically feasible as verified in the P/Ps implemented in 14 locations. The Project will contribute greatly to the National target of poverty eradication through stabilisation and improvement of the smallholders paddy production sub-sector. In addition, from an environmental viewpoint, the Project will function effectively in leading smallholders to wise use of wetland as also verified in the P/P.

## Recommendations

- 7.2 It is recommended to MAAIF to take the initiative as the leading Ministry for implementing the Project in close coordination and collaboration with the concerned authorities and agencies. However, there is a need to resolve the following hurdles as early as possible:
- 1) To organise a “Coordinating Committee” to operate a comprehensive monitoring and evaluation, and management of the Project and its implementation. The committee members shall be the representative officials of key stakeholders and agencies, i.e., MAAIF as the chair organisation, NARO, NAADS, NEMA, MW&E, WID, DWD, and concerned local government officials;
  - 2) To formulate and issue practical policy for wetland development and conservation. The important issues that have to be taken into consideration in the formulation are presented in detail in Section 4.6.2 of the Pilot Project Report (Volume II) and are summarized as follows:
    - Unclear policy on buffer zones in the existing irrigation schemes as well as in the new developments to be carried out,
    - Expensive wetland water permits and annual water charges for small-scale farmers,
    - Unaffordable cost of carrying out CWMP to most farmers, and
    - Farmers’ fear of government intervention.Regarding the above, it is crucial to demarcate possible development areas (arable land) for agricultural production in collaboration with NEMA and WID;
  - 3) To establish an Irrigation Department in MAAIF. This new department needs to be responsible for enacting laws in irrigation development including the smallholders sector, formulating irrigation development plans including human resource development, technical support to district governments, supervision of irrigation development works, etc.;
  - 4) To support concerned local governments to organise a Task Force (TF) for wetland development and conservation at the district level. The institutionalisation of this TF is also needed under MAAIF initiative. At the same time, the institutionalisation of PIE is also necessary at the district level as DIO in order to promote sustainable irrigation development in each district;
  - 5) To give priority to paddy production in PMA and improve on access to the NAADS programme.
- 7.3 It is recommended that NARO enhance the paddy research in the Doho Rice Scheme, and regularise the research work more intensively in order to find out the varieties to be recommended for paddy production. The varieties adaptability test introduced by the Study should be repeated. It is recommended that more varieties be tested. Candidate varieties are made available in the international rice research institutes, i.e., IRRI and WARDA as well as in the advanced rice producing countries in Asia and Africa.

- 7.4 NEMA, in collaboration with MAAIF, WID and the concerned local governments, must correct the contradictory messages on wetland use that have been spread by some local leaders, civic and technical people, and hence, satisfy/relieve farmers from anxiety in the wise use of wetlands. It is proposed that NEMA, in collaboration with WID and MAAIF shall, as early as possible, demarcate the priority areas for reserves and/or conservation of the natural wetland environments as well as arable wetland (mainly seasonal wetland) acceptable for agricultural production. Demarcation of such particular areas is essential and crucial in order to promote a conservation movement on wetlands in parallel with a practical land use for economic activities. The existing inventory map on wetland and its relevant information must be useful for the land demarcation.
- 7.5 NAADS shall in the current programme take up paddy production as one of the promising crops for the scheduled programme, and first extend practical programme services, preferably to the respective P/P areas, to accelerate the modernisation of paddy farming.
- 7.6 The local governments of the respective districts are recommended, as the implementing agencies of the Project, to have the responsibility of leading the development work and then managing the performance of O&M work following the completion of the Project. To smoothly and efficiently conduct this work in the field, the concerned district offices should reinforce their working function, including staff assignment and capacity building and training of the assigned staff. In this regard, PIE shall be institutionalised as the DIO responsible for the sustainable irrigation development in each district. To deal with this preparatory work, the local governments shall prepare allocated budgets; using a part of the LGDF from the LGDP.

THE STUDY  
ON  
POVERTY ERADICATION THROUGH SUSTAINABLE IRRIGATION PROJECT  
IN EASTERN UGANDA

**FINAL REPORT**

**VOLUME-I: MAIN REPORT**

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## ABBREVIATION

|        |  |
|--------|--|
| AC     | : Advisory Committee   |
| AEATRI | : Agricultural Engineering & Appropriate Technology Research Institute                 |
| AfDB   | : African Development Bank   |
| A/P    | : Action Plan  |
| ARDC   | : Agriculture Research and Development Centre  |
| ARI    | : Agricultural Research Institute  |
| CAO    | : Chief Administrative Officer   |
| CBD    | : Convention on Biological Diversity   |
| CBO    | : Community Based Organisation   |
| CDO    | : Community Development Officer  |
| CEC    | : Cation Exchange Capacity   |
| CEFP   | : Crop Experimental Farm Plots   |
| COD    | : Chemical Oxygen Demand   |
| COP    | : Conference of the Parties to the Ramsar Convention on Wetlands                       |
| CWMP   | : Community Wetland Management Plan  |
| DANIDA | : Danish International Development Agency  |
| DAO    | : District Agriculture Officer   |
| DAP    | : Diammonium Phosphate   |
| DCDO   | : District Community Development Officer   |
| DEC    | : District Environment Council   |
| DEO    | : District Environment Officer   |
| DFID   | : Department of International Development, United Kingdom.                             |
| Df/R   | : Draft Final Report   |
| DIO    | : District Irrigation Officer  |
| DWD    | : Directorate of Water Development   |
| DWO    | : District Wetland Officer   |
| D/P    | : Development Plan   |
| EC     | : Electrical Conductivity  |
| EIA    | : Environment Impact Assessment  |
| EIRR   | : Economic Internal Rate of Return   |
| EIS    | : Environmental Impact Statement   |
| EIR    | : Environmental Impact Review  |
| FAO    | : Food and Agriculture Organisation of United Nations                                  |
| F/S    | : Feasibility Study  |
| FPDFP  | : Farmers Participatory Demonstration Farm Plot  |
| F/R    | : Final Report   |
| GDP    | : Gross Domestic Products  |
| GIS    | : Geographic Information System  |
| GoU    | : Government of Uganda   |
| HIPC   | : Heavily Indebted Poor Countries  |
| HDI    | : Human Development Index  |
| Ic/R   | : Inception Report   |
| IRRI   | : International Rice Research Institute  |
| IFAD   | : International Fund for Agricultural Development                                      |
| IITA   | : International Institute of Tropical Agriculture                                      |
| IR     | : Rice varieties developed at International Rice Research Institute in the Philippines |
| It/R   | : Interim Report   |
| IUCN   | : International Union for Conservation of Nature                                       |

|        |   |  |
|--------|---|--|
| JICA   | : | Japan International Cooperation Agency                                 |
| KARI   | : | Kawaude Agricultural Research Institute                                |
| LC     | : | Local Council  |
| LEC    | : | Local Environment Council  |
| LIRI   | : | Livestock Research Institute   |
| LGDF   | : | Local Government Development Fund                                      |
| LGDP   | : | Local Government Development Programme                                 |
| MAAIF  | : | Ministry of Agriculture, Animal Industry and Fisheries                 |
| MFPEDE | : | Ministry of Finance Planning Economic Development                      |
| MOF    | : | Ministry of Finance  |
| MTEF   | : | Mid Term Economic Framework  |
| MW&E   | : | Ministry of Water and Environment                                      |
| NAADS  | : | National Agriculture Advisory Services                                 |
| NARO   | : | National Agriculture Research Organisation                             |
| NCRI   | : | National Crops Resources Institute (Namulonge)                         |
| NBI    | : | Nile Basin Initiative  |
| NBS    | : | National Biomass Study   |
| NEMA   | : | National Environment Management Authority                              |
| NGO    | : | Non-Governmental Organisation  |
| NPV    | : | Net Present Value  |
| NPW    | : | National Wetlands Conservation and Management Programme                |
| NUSAF  | : | Northern Uganda Social Action Fund                                     |
| NWSC   | : | National Water and Sewerage Corporation                                |
| NWP    | : | National Wetlands Programme  |
| O&M    | : | Operation and Maintenance  |
| OJT    | : | On-the-Job Training  |
| PDM    | : | Project Design Matrix  |
| PEAP   | : | Poverty Eradication Action Plan  |
| PIE    | : | Potential Irrigation Engineer  |
| PMA    | : | Plan for Modernization of Agriculture                                  |
| P/P    | : | Pilot Project  |
| RIS    | : | Information Sheet on Ramsar Wetlands                                   |
| P/R    | : | Progress Report  |
| PRA    | : | Participatory Rural Appraisal  |
| PRGA   | : | Primary Rice Growers' Association                                      |
| RRTDFP | : | Rice Research-cum-Technical Demonstration Farm Plots                   |
| S/W    | : | Scope of Work  |
| SIDA   | : | Swedish International Development Agency                               |
| SPES   | : | Small Scale Irrigation –special Programme for Support of Food Security |
| TDFP   | : | Technical Demonstration Farm Plots                                     |
| TOT    | : | Trainer of Trainee   |
| TWG    | : | Technical Working Group  |
| UBOS   | : | Uganda Bureau of Statistics  |
| UCA    | : | Uganda Co-operative Alliance   |
| UNDP   | : | United Nations Development Programme                                   |
| UNFEE  | : | Uganda National Farmers' Federation                                    |
| UPE    | : | Universal Primary Education  |
| USAID  | : | United States Agency for International Development                     |
| WA     | : | Wetland Association  |
| WARDA  | : | West African Rice Development Association                              |
| WID    | : | Wetlands Inspection Division   |
| WUA    | : | Water Users' Association   |

## MEASUREMENT UNITS

### Extent

cm<sup>2</sup> = Square-centimeters (1.0 cm x 1.0 cm)

m<sup>2</sup> = Square-meters (1.0 m x 1.0 m)

km<sup>2</sup> = Square-kilometers (1.0 km x 1.0 km)

ha = Hectares (10,000 m<sup>2</sup>)

ac = Acres (4,046.8 m<sup>2</sup> or 0.40468 ha.)

### Volume

cm<sup>3</sup> = Cubic-centimeters

(1.0 cm x 1.0 cm x 1.0 cm  
or 1.0 m-lit.)

m<sup>3</sup> = Cubic-meters

(1.0 m x 1.0 m x 1.0 m  
or 1.0 k-lit.)

lit 1 = Liter (1,000 cm<sup>3</sup>)

### Length

mm = Millimeters

cm = Centimeters (cm = 10 mm)

m = Meters (m = 100 cm)

km = Kilometers (km = 1,000 m)

### Weight

gr = Grams

kg = Kilograms (1,000 gr.)

ton = Metric ton (1,000 kg)

### Currency

US\$ 1.0 = ¥ 117.6 = Ush 1,838.0

(as of October, 2006)

US\$ = United State Dollars

¥ = Japanese Yen

Ush = Ugandan Shillings

### Time

sec = Seconds

min = Minutes (60 sec.)

hr = Hours (60 min.)

The cost estimate is based on the price level and exchange rate of August 2006.

The exchange rate is:

US\$1.00 = Ush 1,850



## CHAPTER 1 INTRODUCTION

### 1.1 Authority

This Final Report is prepared pursuant to Clause VI of the Scope of Work (S/W) for the Study on Poverty Eradication through a Sustainable Irrigation Project in Eastern Uganda (the Study) agreed upon between the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and the Japan International Cooperation Agency (JICA) on the 24th of April, 2003. The S/W and the Minutes of Meeting on the S/W are presented in an Appendix.

### 1.2 Objectives of the Study

The objectives of the Study are:

- 1) To formulate a detailed Development Plan (D/P) for Eastern Uganda in accordance with the Plan for Modernisation of Agriculture, to promote sustainable irrigation development; an Action Plan(s) (A/P(s)) on paddy irrigation project(s) in the D/P to be formulated;
- 2) To implement pilot project(s) in the course of the Study; and
- 3) To carry out capacity building of Ugandan counterpart personnel as well as of the communities concerned in the course of the Study; implementation of the technical guidelines for paddy cultivation should be part of capacity building.

Achievement of the objectives stated above will contribute to poverty eradication in the study area.

### 1.3 Study Area

The study area stated in the S/W consists of 13 districts; Iganga, Mayuge, Bugiri, Busia, Tororo, Mbale, Kamuli, Sironko, Pallisa, Kumi, Soroti, Katakwi and Kaberamaido in Eastern Uganda. In July 2005, however, three new districts were established by dividing Tororo, Kamuli, and Katakwi districts into two, respectively. They were Butaleja from Tororo, Kaliro from Kamuli, and Amuria from Katakwi. In November 2005, two new districts were again created by dividing Iganga and Mbale districts into two, respectively, Namutumba from Iganga and Manafa from Mbale district. Further in May 2006, Manafa, Pallisa, Kumi districts were divided into two and Bududa, Budaka, Bukedea districts were created, respectively. As a result, the number of districts in the study area is 21 in total as of the end of October 2006.

### 1.4 Scope of the Study

The overall scope of the Study was defined in Clause IV of the S/W as follows.

- (1) Phase 1: Formulation of a draft D/P
  - 1) To collect and analyse relevant data and information from all the districts in

- the study area and at the national level,
- 2) To review the existing development programme(s) and project(s) relevant to the Study,
  - 3) To conduct a field survey in the study area,
  - 4) To identify major constraints, development needs and development potential in the study area,
  - 5) To identify priority areas for sustainable irrigation development,
  - 6) To formulate a draft D/P for promoting sustainable irrigation development,
  - 7) To select priority area(s) for Action Plan(s) on paddy irrigation project(s) after conducting a preliminary Environmental Impact Assessment (EIA),
  - 8) To formulate Action Plan(s) on paddy irrigation project(s), and
  - 9) To conduct in-depth EIAs on selected pilot project sites and prepare an implementation plan accordingly.
- (2) Phase 2: Implementation of the pilot project(s) and finalisation of the D/P
- 1) To implement the pilot project(s),
  - 2) To monitor and evaluate the pilot project(s),
  - 3) To formulate technical guidelines for paddy cultivation, and
  - 4) To finalise the D/P focussing on sustainable paddy production.

## 1.5 Technical Working Group

A Technical Working Group (TWG) consisting of the Ugandan counterparts and the JICA Study Team has been established in order to share the information and to support the Study. In the course of the Study, the TWG has held the following meetings (see Appendix):

### 1st Field Work

- 1) November 10, 2003: Review of Inception Report (Ic/R)
- 2) December 18, 2003: Review of draft D/P
- 3) January 27, 2004: Review of Progress Report (P/R) (1)

### 2nd Field Work

- 1) May 21, 2004: Discussion on study schedule based on study outputs in P/R (1)
- 2) July 2, 2004: Review of field survey results
- 3) August 11, 2004: Review of P/P implementation plan
- 4) September 3, 2004: Review of draft Interim Report (It/R)

### 3rd Field Work

- 1) December 16, 2004: Confirmation of contents of It/R
- 2) April 18, 2005: Review of P/R (2)

### 4th Field Work

- 1) October 24, 2005: Review of P/R (3)
- 2) February 21, 2006: Review of P/R (4)

### 5th Field Work

- 1) September 5, 2006: Review of P/R (5)
- 2) November 2, 2006: Review of Draft Final Report (1st version)

### 6th Field Work

- 1) December 15, 2006: Confirmation of contents of Draft Final Report (Df/R)

## 1.6 Method of the Study

In the Study, it was planned that the draft D/P and A/P formulated in the Phase 1 Study would be revised based on the lessons learnt from implementation of the P/P. Following this policy of the Study, the P/P has been implemented in the Phase 2 Study for about 23 months for the selected 14 P/P sites including the Doho Rice Scheme. In the P/P, all major components/programmes formulated in the draft D/P were implemented on a small-scale, and various lessons have been learnt that would be useful for the finalisation of the D/P and A/P. The D/P presented in this report is thus formulated with some modifications made on the draft D/P based on the lessons learnt from the P/P.

All the details of the P/P including P/P plans, activities, achievement, outcomes, evaluation, lessons learnt, and conclusion and recommendations are presented in the Pilot Project Report compiled as Volume II of the Final Report.

## 1.7 Performance of the JICA Study Team

The Study was conducted according to the schedule presented below.

Overall Study Schedule

|                       | 2003                                |   |   | 2004                 |   |   |   |   |   |                      |    |    |    |    |    | 2005   |    |    |    |    |    |                   |    |    |    |    |    | 2006     |    |    |    |    |    |          |    |    |    |    |    | 2007   |    |    |       |  |  |
|-----------------------|-------------------------------------|---|---|----------------------|---|---|---|---|---|----------------------|----|----|----|----|----|--|----|----|----|----|----|-------------------|----|----|----|----|----|----------|----|----|----|----|----|----------|----|----|----|----|----|--------|----|----|-------|--|--|
|                       | O                                   | N | D | J                    | F | M | A | M | J | J                    | A  | S  | O  | N  | D  | J  | F  | M  | A  | M  | J  | J                 | A  | S  | O  | N  | D  | J        | F  | M  | A  | M  | J  | J        | A  | S  | O  | N  | D  | J      | F  | M  |       |  |  |
|                       | C                                   | O | E | A                    | E | A | P | A | U | U                    | U  | E  | C  | O  | E  | A  | E  | A  | P  | A  | U  | U                 | U  | E  | C  | O  | E  | A        | E  | A  | P  | A  | U  | U        | U  | E  | C  | O  | E  | A      | E  | A  |       |  |  |
|                       | 1                                   | 2 | 3 | 4                    | 5 | 6 | 7 | 8 | 9 | 10                   | 11 | 12 | 13 | 14 | 15 | 16   | 17 | 18 | 19 | 20 | 21 | 22                | 23 | 24 | 25 | 26 | 27 | 28       | 29 | 30 | 31 | 32 | 33 | 34       | 35 | 36 | 37 | 38 | 39 | 40     | 41 | 42 |       |  |  |
| <b>Phase</b>          | Phase 1: Formulation of D/P and A/P |   |   |                      |   |   |   |   |   |                      |    |    |    |    |    | Phase 2: Implementation, Monitoring and Evaluation of Pilot Projects |    |    |    |    |    |                   |    |    |    |    |    |          |    |    |    |    |    |          |    |    |    |    |    |        |    |    |       |  |  |
| <b>Work in Uganda</b> | 1st                                 |   |   | 2nd                  |   |   |   |   |   | 3rd                  |    |    |    |    |    | 4th  |    |    |    |    |    | 5th               |    |    |    |    |    | 6th      |    |    |    |    |    |          |    |    |    |    |    |        |    |    |       |  |  |
| <b>Work in Japan</b>  | Preparatory Work                    |   |   | 1st                  |   |   |   |   |   | 2nd                  |    |    |    |    |    |  |    |    |    |    |    |                   |    |    |    |    |    | 3rd      |    |    |    |    |    |          |    |    |    |    |    |        |    |    |       |  |  |
| <b>Report</b>         | ▲ Ic/R                              |   |   | ▲ P/R(1)             |   |   |   |   |   | ▲ It/R               |    |    |    |    |    | ▲ P/R(2)   |    |    |    |    |    | ▲ P/R(3)          |    |    |    |    |    | ▲ P/R(4) |    |    |    |    |    | ▲ P/R(5) |    |    |    |    |    | ▲ Df/R |    |    | ▲ F/R |  |  |
|                       | Ic/R: Inception Report              |   |   | P/R: Progress Report |   |   |   |   |   | It/R: Interim Report |    |    |    |    |    | Df/R: Draft Final Report   |    |    |    |    |    | F/R: Final Report |    |    |    |    |    |          |    |    |    |    |    |          |    |    |    |    |    |        |    |    |       |  |  |

The Phase 1 study was carried out for about 12 months from October 2003 to October 2004. In this period, the following study was conducted.

## Preparatory Work in Japan

- 1) Preparation of Ic/R

### 1st Field Work

- 1) Assessment for the present conditions and identification of major constraints, development needs and potential in the study area
- 2) Categorisation of the study area, establishment of the approaches to solve constraints
- 4) Formulation of draft D/P
- 5) Supplemental study for preliminary Environmental Impact Assessment
- 6) Selection of priority area for Action Plan (A/P) and selection of constraints in A/P

### 1st Home Work

- 1) Explanation and discussion on P/R (1) in JICA Advisory Committee

### 2nd Field Work

- 1) Selection of target area for A/P and formulation of A/P
- 2) Identification of the P/P sites and formulation of P/P plan

### 2nd Home Work

- 1) Explanation and discussion on It/R in JICA Advisory Committee

In the Phase 1 study, the Study Team submitted the following reports to MAAIF. All the results of Phase 1 were compiled in the It/R.

- 1) Ic/R: November 2003
- 2) P/R (1): January 2004
- 3) It/R: October 2004

The Phase 2 study was carried out for about 28 months from November 2004 to March 2007. During this period, the following study was conducted.

### 3rd Field Work

- 1) Explanation and discussion on the It/R
- 2) Implementation and monitoring of the P/P

### 4th Field Work

- 1) Implementation and monitoring of the P/P
- 2) Mid-term evaluation of the P/P

### 5th Field Work

- 1) Implementation and monitoring of the P/P
- 2) Final evaluation of the P/P
- 3) Preparation of technical guidelines
- 4) Finalisation of D/P and A/P
- 5) Explanation and discussion on the 1st version of the Df/R

### 3rd Home Work

- 1) Explanation and discussion on 1st version of Df/R in JICA Advisory Committee
- 2) Preparation of the Df/R

## 6th Field Work

- 1) Explanation and discussion on the Df/R
- 2) Seminar on the Df/R

During the Phase 2 period, the Study Team submitted the following reports to MAAIF.

- 1) P/R (2): April 2005
- 2) P/R (3): October 2005
- 3) P/R (4): February 2006
- 4) P/R (5): September 2006
- 5) Df/R (1st version): November 2006
- 6) Df/R: December 2006

In addition to the above reports, the Study Team prepared and submitted the following seven volumes of technical guidelines to MAAIF.

- 1) Technical Guidelines for Farmers Participatory Small Scale Irrigation Project From Development Planning, Implementation, to Operation and Maintenance
  - 1-1 Part-I: Participatory Development Planning and Implementation of Small Scale Irrigation Project
  - 1-2 Part-II: Participatory Management, Operation and Maintenance of Small Scale Irrigation Project
  - 1-3 Video Pictures (DVD) on Implementation Process of 4-Pilot Projects
- 2) Technical Guidelines for Paddy Cultivation
  - 2-1 Part-I: Essential Works on Preparation of Paddy Nursery
  - 2-2 Part-II: Essential Works on Paddy Cultivation in Main Field
  - 2-3 Standard Cropping Calendar for Paddy Cultivation
- 3) Technical Guidelines for Nurturing Farmers' Organizations for Small Scale Paddy Rice Growers -Facilitation of the Process-

In principle, the Study was carried out by the joint efforts of the Study Team and the counterpart personnel assigned from MAAIF and the respective district offices. The Study Team transferred technical knowledge to the counterpart personnel in the course of the Study.

## CHAPTER 2 BACKGROUND

### 2.1 Agricultural Sector in Uganda

Over the years, agriculture has remained a dominant sector in the Ugandan economy, contributing 32% to the total GDP in fiscal year 2005/06 with a dominant food crop sub-sector (65%) followed by livestock (13%), cash crop (10%), fishery (6%) and forestry (5%).

**GDP at Factor Cost at Constant 1997/98 Prices and Contribution**

| (million Ush.)     |                  |                   |                   |                   |                   |
|--------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| Industry Sector    | 2001/02          | 2002/03           | 2003/04           | 2004/05           | 2005/06           |
| Agriculture sector | 3,523,066        | 3,603,098         | 3,633,395         | 3,687,358         | 3,702,222         |
| share              | (37%)            | (36%)             | (34%)             | (32%)             | (32%)             |
| Non-Agriculture    | 6,119,878        | 6,495,143         | 7,019,222         | 7,665,516         | 7,791,787         |
| share              | (63%)            | (64%)             | (66%)             | (68%)             | (68%)             |
| <b>Total GDP</b>   | <b>9,642,944</b> | <b>10,098,241</b> | <b>10,652,617</b> | <b>11,352,874</b> | <b>11,494,009</b> |
| Agri. Sub sector   | 2001/02          | 2002/03           | 2003/04           | 2004/05           | 2005/06           |
| Cash crop          | 375,279          | 392,369           | 393,520           | 410,018           | 379,580           |
| share              | (11%)            | (11%)             | (11%)             | (11%)             | (10%)             |
| Food crop          | 2,335,625        | 2,364,747         | 2,401,139         | 2,417,086         | 2,424,287         |
| share              | (66%)            | (66%)             | (66%)             | (66%)             | (65%)             |
| Livestock          | 448,977          | 469,459           | 447,909           | 453,218           | 476,890           |
| share              | (13%)            | (13%)             | (12%)             | (12%)             | (13%)             |
| Forestry           | 158,553          | 165,343           | 172,468           | 179,942           | 187,788           |
| share              | (5%)             | (5%)              | (5%)              | (5%)              | (5%)              |
| Fishery            | 204,632          | 211,180           | 218,360           | 227,095           | 233,677           |
| share              | (6%)             | (6%)              | (6%)              | (6%)              | (6%)              |
| <b>Total</b>       | <b>3,523,066</b> | <b>3,603,098</b>  | <b>3,633,395</b>  | <b>3,687,358</b>  | <b>3,702,222</b>  |

Source: 2006 Statistical Abstract, UBOS

The growth of the agriculture sector GDP is on the decrease, while the non-agriculture sector shows a potential rise. The GDP growth of the agriculture sub-sectors shows that food crop production is declining, while cash crops have a relatively high growth rate except in 2000/01 due to drought.

However, agricultural products are still the mainstay of Ugandan export, providing a significant share, being 71% of annual export earnings in 2002. Analysis of the major export products shows that the reduction in value of coffee export, which has been a centrepiece of Ugandan trade, and the increase of fish and fish products are striking. In 1998, coffee was a peerless leading commodity of export. Its export value was Ush. 296 million compared to Ush. 40 million for fish and fish products. However, these values came to Ush. 97 million and Ush. 88 million, respectively in 2002. They have been getting very close due to the fall in the international coffee price and the prosperous expansion of the fishery sub-sector.

As estimated by the FAO statistics for Uganda's cereal import, the main commodities are wheat and rice. Wheat relies entirely on import, because of almost zero domestic production. On the other hand, rice production has some history, and the domestic production is showing a fair increase. Rice is one of the staple foods in Uganda

especially in urban and eastern Uganda where it is mainly grown. It is an important substitution crop that saves Uganda considerable foreign exchange. The recent rice production estimated by the Study Team is at 144 thousand tons calculated on a milled basis. 60 thousand tons of rice is imported as reported by the FAO statistics. Ugandan imports of rice have been valued at US\$ 18 million in the last 5 years, out of US\$ 63 million representing the total value of cereal imports. It shows that 29% of cereal import value is occupied by rice.

In Uganda, agricultural fertilizers and chemicals are costly because they are entirely imported.

## **2.2 Development Policies and Targets**

According to the Uganda National Household Survey 2002/2003, 39% of the population, corresponding to 9.6 million people, are unable to meet their basic needs and are living below the absolute poverty line. The percentage of people who are poor in the rural area stands at 43%. 83% of the households, i.e. 88% of the population, which is mostly directly or indirectly engaged in agriculture, is located in the rural area. It means that roughly half of the rural people belong to the poverty group.

Due to its strategic role in the national economy, agriculture represents a key factor in the general improvement of economic performance, increased incomes and rising living standards of rural households as well as in ensuring food security and poverty eradication.

### **2.2.1 Poverty Eradication Action Plan (PEAP)**

Uganda set a national strategy to eradicate poverty through agricultural modernisation, employment creation and industrialisation. The Poverty Eradication Action Plan (PEAP) is Uganda's comprehensive development framework. In the 1990s, the government of Uganda developed the PEAP setting forth its strategy for eradicating absolute poverty by 2017. A wide consultation process was undertaken to develop the first PEAP published in 1997. In 2000, the government updated the PEAP, drawing on a series of consultations with a wide range of stakeholders, including the poor through a participatory poverty assessment to establish their priorities and address their concerns.

The PEAP has 4 key pillars as follows:

- 1) Rapid and sustainable economic growth and structural transformation,
- 2) Good governance and security,
- 3) Increased ability of the poor to raise their incomes, and
- 4) Enhancing the quality of life of the poor.

These goals are interlinked.

The government of Uganda has intended to decrease the number of the population living under the poverty line to less than 10% by 2017 in the PEAP.



## 2.2.2 Plan for Modernization of Agriculture (PMA)

The Plan for Modernization of Agriculture (PMA) is a strategic framework for eradicating poverty through multi-sectoral interventions enabling the people to improve their livelihoods in a sustainable manner. It is an outcome-focused set of principles upon which sectoral and inter-sectoral policies and investment plans can be developed at both the central and local government levels. The PMA is a part of PEAP, which has four pillars as already mentioned in the above sub-section 2.2.1. Modernizing agriculture will contribute to increasing incomes of the poor by raising farm productivity, increasing the share of marketed agricultural production, and creating on-farm and off-farm employment.

The PMA aims at making adjustments in institutions and policies so as to improve service delivery for the purposes of enabling the rural poor to attain a better standard of living. These changes are taking place in seven priority areas:

- 1) Agricultural research and technology development,
- 2) Agricultural advisory services,
- 3) Rural financial services,
- 4) Agricultural marketing and processing,
- 5) Agricultural education,
- 6) Sustainable use and management of natural resources, and
- 7) Physical infrastructure.

PMA objectives are, in particular:

- 1) Increase incomes and improve the quality of life of poor subsistence farmers,
- 2) Improve household food security through markets,
- 3) Provide gainful employment, and
- 4) Promote proper use and management of natural resources.

The eight strategies of PMA to achieve these objectives are:

- 1) Making poverty eradication the overriding objective of agricultural development,
- 2) Extending decentralisation to lower levels of government for efficient service delivery,
- 3) Removing direct government involvement in the commercial aspects of agriculture and promoting the role of the private sector,
- 4) Supporting the dissemination and adoption of productivity-enhancing technologies,
- 5) Guaranteeing food security through markets and improved incomes,
- 6) Ensuring that all intervention programmes are gender focused,
- 7) Involving and empowering local governments in the planning and budgeting process to enable them to influence public policy, and
- 8) Ensuring coordination of the multi-sectoral interventions to remove any constraints to agricultural modernization.

PMA principles are derived from the key government policies and include:

- 1) Privatisation
- 2) Decentralisation
- 3) Liberalisation
- 4) Democratisation and stakeholder participation
- 5) Sensitivity to gender and the environment
- 6) Multi-sectoral approach and working in partnership with all stakeholders.

In 2001, the National Agriculture Advisory Services (NAADS) were launched as part of the PMA based intervention. NAADS has emphasised “reflection of the locality and farmer needs”, which will be realised through 1) provision of agriculture support services, 2) sustainable use of the natural resources, 3) empowerment of the farmers, and 4) gender mainstreaming. In the study area, NAADS has been in operation in Soroti and Tororo since 2001, and in Iganga and Busia since 2002. In 2003, NAADS was expanded to Mbale and Kamuli.

### 2.2.3 Irrigation Sector Development Plan

Irrigation is not so widespread in this country due to its high investment cost and unsure production return.

An explanation of irrigation is given in the PEAP, PMA, and in the Water Sector Reform: Water for Production Component, and Concept Paper on Irrigation Policy.

#### (1) PEAP

In the PEAP paper related to irrigation, the following explanations are given in the section “Water for Production”.

##### 1) Irrigation Strategy

Weak and overlapping institutional coordination at national level is a key challenge to developing Uganda’s water resources for increased production purposes.

While the Water Policy clarifies the ministerial roles with respect to water production, it is clear that provision of water is not sufficient to guarantee successful or optimal irrigation productivity. Key factors affecting irrigation that are beyond the water sector are as follows:

- Irrigation economics: including the identification of suitable and high value crops;
- Land ownership and accessibility to water resources, implications of the current land legislation;
- Absence of viable rural financing systems and financial services, and agricultural marketing systems for small farmers and small industries;
- Management of government schemes, including farmer participation, contributions/payment for infrastructure/input services and operation and maintenance arrangements;
- Access to quality seeds, fertiliser and other inputs;
- Technical and managerial capacity in water supply development and water

- use management at national, district, extension and farmer level;
- Promotion and regulation of private sector participation,
- Post-harvest management and marketing;
- Promotion of household small-scale appropriate technologies, irrigation expertise, efficient soil-water management practices, livestock water supply management; and
- Research and demonstration, extension services and farmer education.

These factors, which relate to irrigation, are crucial to the successful achievement of the PMA and PEAP objectives. However, they cannot be adequately addressed under the Issue Paper 4: Water for Production Sub-sector (IP4WFPS) (Directorate of Water Development, MWLE, 2003). Part of the reason for the delay in finalising the IP4WFPS was due to attempts to address all such issues under the water sector.

The Water for Production Sub-sector Working Group recommended that MAIFF should be requested and facilitated to prepare an Irrigation Strategy to advise/facilitate farmers, private sector and government on how to address the observed challenges, including provision of cost-effective water to be handled under the IP4WFPS. The same recommendation is made to the Production Sector Working Group and PMA Secretariat and PEAP Revision Secretariat for implementation.

## (2) PMA: Eradicating Poverty in Uganda

In the section “Water for Production” about irrigation, the following explanation can be seen.

“Experience from other countries suggests that supplementary irrigation, as a drought alleviation strategy, especially when handled on an ad-hoc basis waiting for drought to strike and then mobilizing for irrigation and valley dams/tank construction, is not an economically viable proposition.”

### 2.2.4 Land Tenure System and Its Implication to Agriculture Development

It is commonly regarded that the land is an important asset in rural livelihoods. PEAP and PMA indicated that the fair access and distribution of land is a critical factor in enabling the poor to improve their livelihoods through farming. Currently, the “Land Sector Strategic Plan 2001-2011: Utilising Uganda’s Land Resources for Sustainable Development (LSSP)” has been developed with a view to actual implementation of the Land Act and improving the use of and access to land. In Uganda, the above-mentioned documents have pointed out the issues associated with land as follows: land fragmentation, land use and tenure, and gender inequity in land ownership.

Land fragmentation is induced by the increasing population coupled with land tenure in the case of customary tenure. In this type of tenure, the land is often owned by a family and inherited by the sons of the family. In cases where there are many

children in the household, each one will receive a small part of the land as that generation moves on. The land fragmentation forces the farmers to over-exploit the land fertility and leads to a decrease in the yield. Encroachment in the forest or wetlands also becomes a problem from sustainable management of the natural resources and the environmental conservation points of view.

The land tenure, especially customary tenure, has not been defined clearly and the current use of the land sometimes conflicts with the government policy. The use of the wetland can be an example of the conflict in land ownership between the government and farmers. Farmers have been using the wetlands for many years based on the customarily identified ownership. This means that among the farmers wetlands are owned by individuals. In the recent promotion of wetland conservation, they are owned by the government. The farmers should seek permission of use from the government prior to the use of the wetlands. However, in reality, farmers and governments have not reached a state of agreement. In order to maximise the productive use of the wetlands and to sustain the environment, there needs to be a dialogue between the government and farmers as well as providing alternatives for the farmers to prevent further encroachment in the wetlands.

Lastly, gender bias in access to land has been a key issue to be tackled in the LSSP. In the present land tenure system, women's land ownership is not clearly defined and, thus, is vulnerable to the deprivation of access to land. It has been recognised in the PMA that women provide a significant amount of labour force in the agriculture sector. The spread of HIV/AIDS has caused an increasing number of female-headed households in the rural area yet they often do not have the control over their resources for production. This means the livelihoods of female-headed households will be left vulnerable.

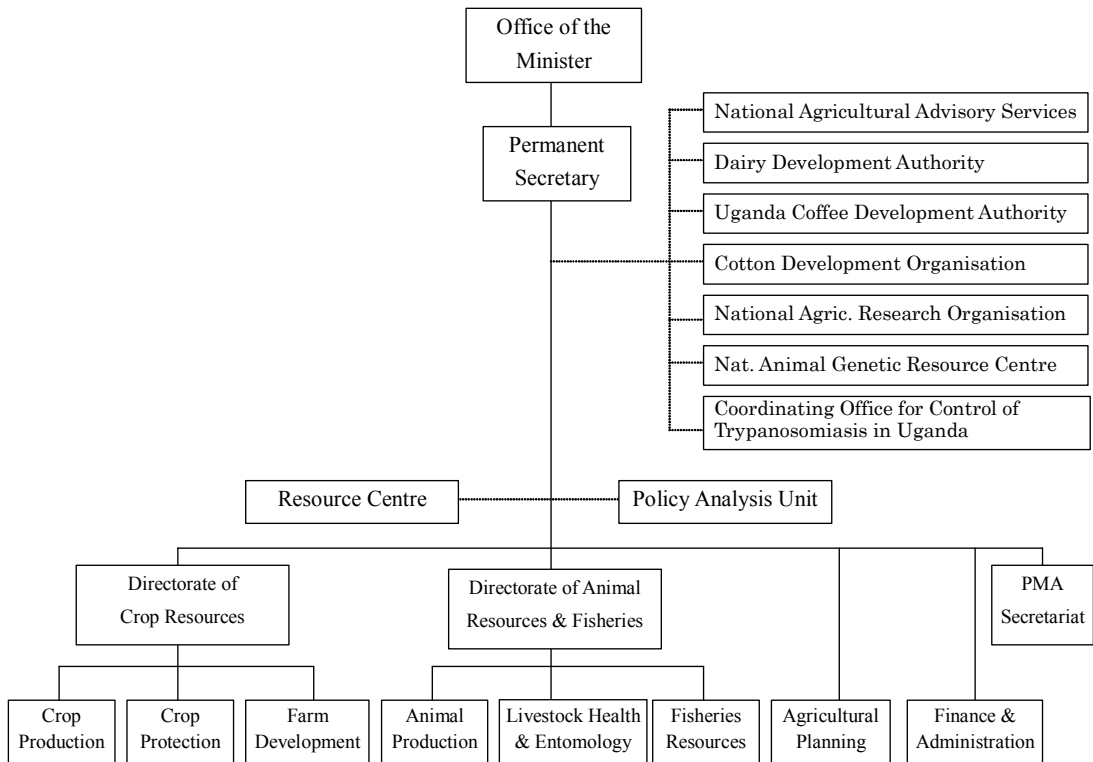
## **2.3 Structure and Budget of MAAIF**

### **2.3.1 Organisation Structure of MAAIF**

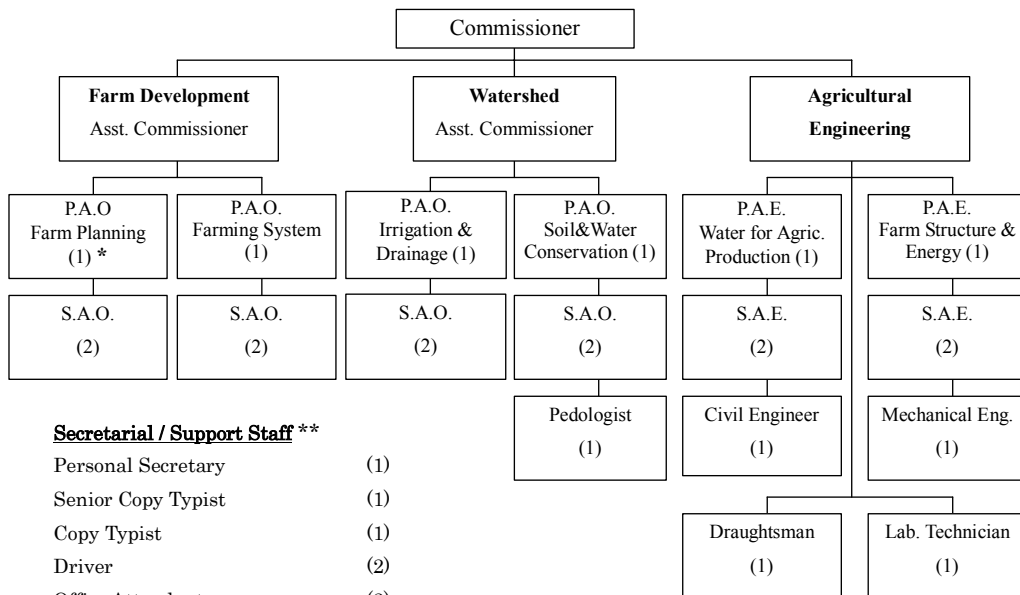
The main agency that implements agricultural development is MAAIF. The Ministry has two Directorates, and two to three Departments in each Directorate. The Farm Development Department in the Directorate of Crop Resources is in charge of farmland development.

The organisation charts of MAAIF and the Farm Development Department are as follows:

**THE MACRO-STRUCTURE OF THE MINISTRY OF AGRICULTURE, ANIMAL  
INDUSTRY AND FISHERIES**



**ORGANISATION STRUCTURE  
FARM DEVELOPMENT DEPARTMENT**



**Secretarial / Support Staff \*\***

|                    |     |
|--------------------|-----|
| Personal Secretary | (1) |
| Senior Copy Typist | (1) |
| Copy Typist        | (1) |
| Driver             | (2) |
| Office Attendant   | (2) |

**Abbreviations**

PAO - Principal Agricultural Officer  
 PAE - Principal Agricultural Engineer  
 SAO - Senior Agricultural Officer  
 SAE - Senior Agricultural Engineer

\* : Figures in parentheses represent number of staff  
 \*\* : Secretarial / support staff are distributed in the Department.

### 2.3.2 Annual Budget of MAAIF

The following table shows the budgetary arrangement of the MAAIF from 2001/02 to 2004/05.

**Budgetary Arrangement of MAAIF (Ush. billion)**

|                        | 2001/02 | 2002/03 | 2003/04 | 2004/05 |
|------------------------|---------|---------|---------|---------|
| <b>Budget Proposal</b> |         |         |         |         |
| Wage                   | 1,369   | 2,072   | 2,072   | 2,100   |
| Non wage, Recurrent    | 5,775   | 3,935   | 2,808   | 7,436   |
| Development            | -       | 87,851  | 64,668  | 56,911  |
| Total                  | 7,144   | 93,858  | 69,548  | 66,447  |
| <b>Budget Outturn</b>  |         |         |         |         |
| Wage                   | 1,477   | 2,173   | 2,314   |         |
| Non wage, Recurrent    | 2,031   | 3,138   | 3,173   |         |
| Development            | 25,022  | 52,551  | 21,437  |         |
| Total                  | 28,530  | 57,862  | 26,924  | -       |

Source: Policy Statement for MAAIF, 2001/02, 2002/03, 2003/04, 2004/05

According to MAAIF, the budget is on a decreasing trend. In fact, the total outturn in 2003/04 was only about 46% of that in 2002/03.