

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF FINANCE AND ECONOMIC PLANNING
THE REPUBLIC OF UGANDA

THE MASTER PLAN STUDY
ON
THE INTEGRATED AGRICULTURAL
AND
RURAL DEVELOPMENT PROJECT
IN
CENTRAL UGANDA

MAIN REPORT

SEPTEMBER 1994

JAPAN AGRICULTURAL LAND DEVELOPMENT AGENCY (JALDA)

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PREFACE

In response to a request from the government of the Republic of Uganda, the Government of Japan decided to conduct a study on the Integrated Agricultural and Rural Development Project in Central Uganda, and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent a study team to the Republic of Uganda headed by Yoshihiro Suzuki of the Japan Agricultural Land Development Agency three times between February 1993 and July 1994.

The team held discussions with the officials concerned of the Government of Uganda, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

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

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

September 1994



Kimio Fujita
President
Japan International Cooperation Agency



September 1994
Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Fujita,

Letter of transmittal

We are pleased to submit to you the report on the Master Plan Study on the Integrated Agricultural and Rural Development Project in Central Uganda.

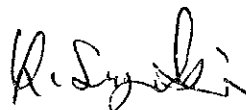
This Study was implemented during the period lasting from February 4, 1992 and August 31, 1994 by the Japan Agricultural Land Development Agency (JALDA) based on a contract between JALDA and Japan International Cooperation Agency. A great effort was made to establish the most suitable plan which would contribute to the development of agriculture in Central Uganda based on the careful consideration of the actual situation of Uganda.

The report contains many projects that should be implemented between 1995 and the year 2007 along with their implementation schedule. By materializing these projects, we estimate that an annual GDP growth rate of 6.9% can be achieved in the agricultural and livestock sector in the Study area.

In view of the promotion of economic recovery and development in Uganda whose main industry is agriculture, we strongly recommend that the government of Uganda give top priority to the implementation of projects.

We wish to take this opportunity to express our sincere gratitude to your Agency and the Ministry of Agriculture, Forestry and Fisheries. We also wish to express our deep gratitude to the Ministry of Agriculture, Animal Industry and Fisheries, other authorities concerned of the Republic of Uganda, the JICA office and Japanese Embassy in Kenya for the close cooperation and assistance extended to us during our investigations and study.

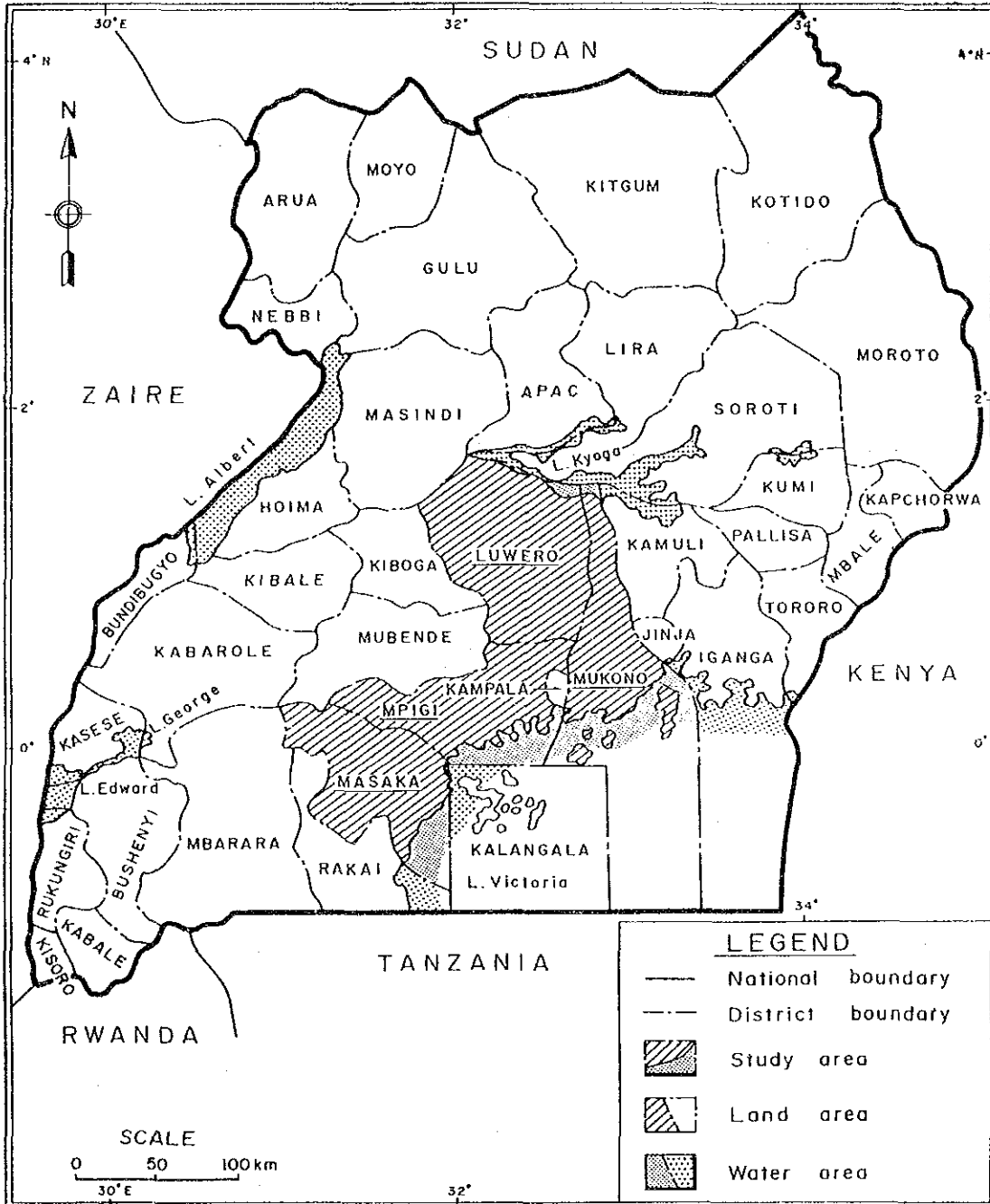
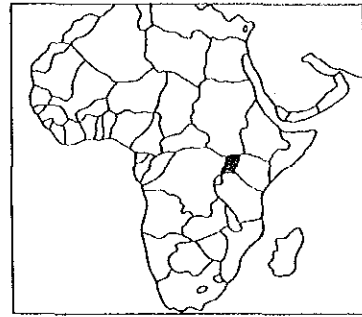
Very truly yours,



Yoshihiro Suzuki
Team Leader
The Master Plan Study on the Integrated
Agricultural and Rural Development Project
in Central Uganda.

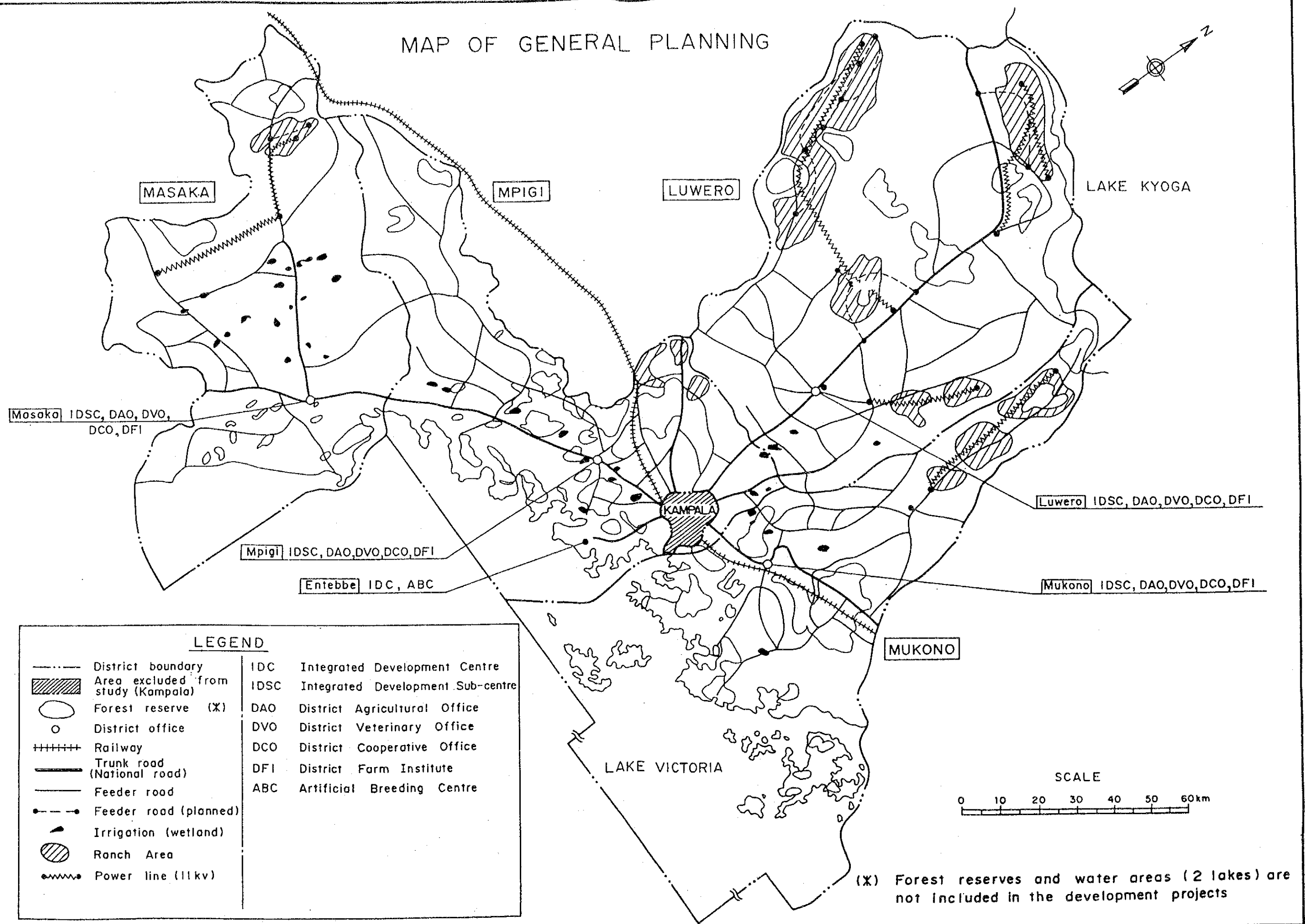
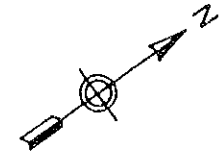


MAP OF THE STUDY AREA





MAP OF GENERAL PLANNING



Mosaka IDSC, DAO, DVO, DCO, DFI

Mpigi IDSC, DAO, DVO, DCO, DFI

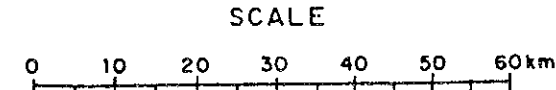
Entebbe IDC, ABC

Luwero IDSC, DAO, DVO, DCO, DFI

Mukono IDSC, DAO, DVO, DCO, DFI

LEGEND

- | | |
|--------------------------------------|--|
| --- District boundary | IDC Integrated Development Centre |
| ▨ Area excluded from study (Kampala) | IDSC Integrated Development Sub-centre |
| ○ Forest reserve (X) | DAO District Agricultural Office |
| ○ District office | DVO District Veterinary Office |
| +++++ Railway | DCO District Cooperative Office |
| — Trunk road (National road) | DFI District Farm Institute |
| — Feeder road | ABC Artificial Breeding Centre |
| — Feeder road (planned) | |
| ▾ Irrigation (wetland) | |
| ▨ Ranch Area | |
| ~ Power line (11kv) | |



(X) Forest reserves and water areas (2 lakes) are not included in the development projects

COUNTRY DATA SHEET

1	General (1991)		
	Total Area	sq.km	241,038
	Land Area	sq.km	197,096
	Population		16,671,705
	Population Density	per sq.km	85
	Population Growth Rate	% per annum	2.5
2	Population Characteristics (1991)		
	Crude birth rate	per 1,000	51
	Life expectancy at birth, male (female) years		46 (47)
3	Health (1991)		
	Population per physician		24,700
	Population per hospital bed		1,200
4	Income Distribution (1989-90)		
	Highest quintile of national income	% of population	8
	Lowest quintile of national income	% of population	30
5	Access to Electricity (1989-90)		
	% of urban population		40.1
	% of rural population		1.9
6	Education		
	Literacy rate	%, age 10 and over	54
	Female literacy rate	%, age 10 and over	45
	Adult literacy rate	%, age 20 and over	52
	Female adult literacy rate	%, age 20 and over	39
	Primary school enrollment-total	% of relevant population	72
	Primary school enrollment-female	% of relevant population	63
7	Gross Domestic Product (% per annum)		
	GDP growth rate (in 1991 prices)		3.2
8	Output and Employment (1991)		
	Agriculture (value added)	%	51.4
	Agriculture (labour force)	%	80.1
9	Principal Exports (fob) (1991)		
	Coffee	mn US\$	117.6
	Cotton	mn US\$	11.7
	Tea	mn US\$	6.8
10	Principal imports (cif) (1991)		
	Fuels, etc.	mn US\$	105.8
	Capital goods	mn US\$	28.1
	Consumer goods	mn US\$	15.8





SUMMARY

1. Background

Agriculture is the mainstay of the Ugandan economy. The agricultural sector has, however, many constraints acting on it such as:

- i) economic vulnerability due to fluctuations in foreign exchange earnings dependent on the international market price of coffee;
- ii) haphazard development of farmland for food crop production due to increased population pressure; and
- iii) low levels of agricultural productivity and living standards for small farm holders who comprise the majority of Ugandan farmers, amongst others.

To tackle the above-mentioned constraints, the government of Uganda has requested the Japanese government to make a Master Plan Study on the Integrated Agricultural and Rural Development Project in central Uganda where the potential for agricultural development is relatively high.

Based on this request, the Japanese government implemented the Study during the period from February 1992 through August 1994.

2. Purpose

The Study covers the four districts of Luwero, Masaka, Mpigi and Mukono in Central Uganda and aims to:

- i) formulate a Master Plan for the Integrated Agricultural and Rural Development Project covering the above-mentioned four districts;
- ii) transfer technology and knowledge to relevant Ugandan personnel through the process of carrying out the Study.

3. Economic Situation

3.1 General

The economic prospects for Uganda were extremely promising when the country became independent in 1962. By 1986, the national economy lay in ruins after nearly a decade of civil war. Most commercial sectors were devastated, manufacturing plants were operating at only 5% of capacity, and infrastructures had deteriorated dramatically. Since 1987, the economy has been recovering positively with increased political stability and has been growing at between 3 and 7% per annum.

The Ugandan economy, however, depends on agriculture, especially coffee which is a major cash crop, and which is vulnerable to international prices and weather conditions.

3.2 Trade

Uganda's exports have always been dominated by agricultural products, of which coffee is by far the most important, accounting for on average about 90% of total export value between 1987 and 1992. This share fell to 76% in 1992, reflecting low coffee export volumes and prices. Uganda has traditionally sent most of its exports to Western Europe and the United States. Regional trade with East African countries has always been small. Most goods are shipped through Kenya. European countries accepted 78% of Ugandan exports in 1991. Europe also comprises the main source of imports, which constituted 43% of the total in 1991.

4. Agriculture

4.1 Agricultural Sector

Agriculture is the mainstay of the economy, providing more than half of the total GDP (54% in 1992). It provides a living for about 80% of the population of which 90% is living in rural areas.

Economic recovery is heavily dependent on growth and diversification in this sector. About 2.2 million smallholders are engaged in traditional farming, which mainly consists of the production of goods for home use and extensive livestock farming on an average of around 2.5 ha on a national level. Assuring stable food sources together with the rationalization of the distribution system are always becoming matters of concern.

The main food crops consist of plantains (bananas), cassava, sweet potatoes, maize, and the like. The main cash crops are coffee, cotton, tea and tobacco, though food crops are also becoming a greater source of cash income. The export base has remained narrow and heavily dependent on coffee, although the government has been trying hard to diversify cash crops for export.

4.2 Livestock

The natural environment provides good grazing for cattle, goats and sheep, most of which are highly indigenous breeds. About 95% of the cattle are owned by smallholders, though several hundred modern commercial ranches were established during the 1960s and early 1970s in tsetse-cleared areas. Though attempts to increase the cattle population by importing foreign breeds have not always been successful, pig and especially poultry production has increased considerably in recent years due to strong demand for pork, poultry and eggs.

5. Relevance to the National Plan

The Rehabilitation and Development Plan (RDP) for 1991/92 - 1994/95 was established as a national plan to achieve a sustained improvement in the economic and social welfare of the people of Uganda. The agricultural sector has a high priority in the RDP and consists of the following four objectives:

- i) increase of food production for self-sufficiency and food security;
- ii) diversification of agricultural exports by creating competitive systems for processing and distribution of agricultural products;
- iii) medium-term expansion coming from increased improvement in land productivity;
- iv) support for research and extension services which encourage farmers to adopt better husbandry practices and use appropriate technology.

This Master Plan Study is shown as AG39(A) in RDP and is expected to contribute to the above-mentioned objectives.

6. Background of the Study Area

The Study Area, having 2.51 million hectares (excludes water area), is located in central Uganda and consists of the four districts of Luwero, Masaka, Mpigi and Mukono surrounding the capital of Kampala and constitutes 13% of the total land area as well as 18% of the country's population.

Although this region is favored with natural conditions and the location has a comparatively high potential for agricultural development, it is currently faced with numerous problems such as the low international market price of coffee in recent years as well as poor facilities for processing and distribution etc. leading to a low level of agricultural productivity.

Against this type of background, the government of Uganda has positioned this Study as an integrated development plan for those areas which can serve as model regions of development and further, as a priority plan in its Rehabilitation and Development Plan (1991/92 - 94/95).

7. Present Condition of the Study Area

7.1 Natural Conditions

The area is located in the center of Uganda and consists of plateaus and wetlands which extend to the north-west of Lake Victoria. The average daily temperature of a comfortable 21.5°C remains virtually unchanged throughout the year in the Study Area. The overall average annual rainfall is 1,300 mm and the region is relatively favorable for the agriculture. The Study Area has two rainy and two dry seasons each year with the rainy seasons running

from March to May and September to November, while the dry seasons are from June to August and December to February. The area ranges from 1,000 m to 1,500 m above sea level and flat land with a grade of less than 2% accounts for about 59% of the total, reaching about 80% when combined with land having a grade of between 2 and 6%.

As far as soils are concerned, high productive catena is found in limited areas of south Mukono, most of which is taken up with sugar cane plantations and forest reserves. The majority of other soils range from reasonable to low quality and soil improvement is required. Most of them are in danger of erosion and in urgent need of engineering and vegetative soil conservation.

Clayey and/or sandy soil found in or on the fringes of wetlands is quite productive and suitable for paddy rice or vegetable cultivation. Except in Luwero, unused land which is available for land development and grassland development is limited. Especially, counties within the Lake Victoria crescent zone where land use ratio is high have little land available for new development.

7.2 Agroecology and Farm Management

Agricultural structure in the Study Area has the following characteristics.

- i) About 75% of all farmers own two hectares of land or less and account for the bulk of agricultural production.
- ii) Seventy-two percent of the total cultivated land is devoted to bananas, cassava and other tubers such as sweet potatoes and 26% is used for coffee production. Other crops such as grains and vegetables are cultivated by mixed cropping or inter-cropping with the above crops. On the other hand, agro-chemicals are rarely applied and only a few farmers use farm machinery, resulting in poor land productivity.
- iii) Almost every farmer raises animals such as cattle, goats and poultry while also cultivating crops. There are also a few farm households engaged in large-scale animal husbandry and the raising of beef and dairy cattle.
- iv) The area as a whole is currently moving beyond the stage where farmers practice self-sufficient farming, selling only surplus products, to the stage where they actively try to expand production to send to regional markets.

Although all farmers grow bananas and raise a few animals, farm households were divided into seven farm management types based on the principal crop produced.

- Type 1: Coffee + bananas
- Type 2: Cash crops other than coffee + bananas
- Type 3: Horticulture
- Type 4: Grains + oil crops
- Type 5: Cotton + oil crops

Type 6: Bananas + tubers

Type 7: Principally livestock

7.3 Processing and Distribution of Agricultural and Livestock Products

1) Processing

After harvesting, coffee beans are dried and stored by farmers, sold to cooperatives or traders for processing and then exported. Cotton is harvested and dried by farmers, graded and then sold to cooperatives. Afterwards it is processed into lint and delivered to the domestic market or shipped overseas.

The milk produced is consumed as fresh milk, in many cases being delivered directly to milk collection centres and bought by consumers without undergoing sterilization. Most livestock are slaughtered, butchered and sold at simple private facilities called slaughter slabs located near local markets. These facilities are not equipped with refrigeration equipment.

The following shortcomings are common to all processing facilities.

- i) Low quality and discrepancies in the quality of raw materials according to farm management level
- ii) Deterioration of processing machines in the plants
- iii) Irregular electric power supply

(2) Distribution

Government companies have monopolized the export of agricultural products for many years. But recently grain, followed by coffee exports have been liberalized, and the volume handled by private traders is increasing rapidly. Food products pass from farmers through traders to urban and rural markets, although in some cases, farmers sell their products directly to rural markets. Beef and other meat products are all marketed by private traders, while except for a small proportion handled by cooperatives, milk is almost all sold by private traders. Distribution is faced with the following problems.

- i) Restrictions on cargo collection areas due to the lack of a satisfactory rural feeder road network and means of transportation
- ii) Restrictions on cargo collection volume because of a lack of satisfactory distribution facilities
- iii) Loss of products and a decline in quality due to poor storage and transportation facilities.

7.4 Agricultural Support

1) Agricultural research

There are two institutes in the Study Area: the Kawanda Agriculture Research Institute (KARI) and Namulonge Agricultural and Animal Production Research Institute (NAARI). KARI is engaged in research on bananas, cash crops, horticultural crops, plant disease protection, soil, farm management, and plant genetics, while NAARI conducts research on fields relating to tubers, grains, fodder and animal husbandry. International cooperation is currently underway led by the IDA, but insufficient facilities, research staff, and research funds are preventing progress in this field.

2) Extension

Agricultural extension is now conducted by the District Agricultural Office (DAO) and the District Farm Institute (DFI). The DAO oversees the overall administration of agricultural affairs in the district, and provides farmers with guidance on agricultural management and cultivation technology through its extension staff. The DFI trains extension staff and farmers in its own facilities which are provided with a demonstration farm and lodging accommodations. However, there are nowhere nearer enough extension workers available given the number of farms. Only Masaka and Mukono have DFIs, both of which are in very poor condition. Although the District Veterinary Office (DVO) provides guidance to livestock farmers regarding the improvement of breeding and hygiene, the lack of staff and facilities acts as a major constraint on the development of the livestock field much in the same way as in farming management and cropping.

3) Farmers' organizations

Within the Study Area, there are 1,000 and odd primary societies each devoted to specific purposes, with only 28% of all farmers belonging to any these societies. As the low rate of participation in these societies suggests, many cooperatives are not operating properly because of a shortage of capital with which to purchase farm products and a lack of business know-how. Other farmers' organizations include the Uganda National Farmers Association (UNFA), which was recently formed by farmers and agriculture-related people to solve problems in agriculture and to improve rural economic standards. There are also many women's groups and youth groups in the Study Area involved in a broad range of regional activities.

4) Farmer's finance

At present farmers, traders and processors have predominantly four sources of access to funds.

- i) Bank loans from the Uganda Cooperative Bank, Uganda Commercial Bank, etc.
- ii) Funds provided and administered by aid agencies through cooperatives
- iii) Funds circulated in friendly societies and mutual financing associations
- iv) Loans between individuals and/or groups (traders and personal village loans)

While the above constitute a financial system of sorts, borrowing terms and available funds are less than satisfactory, and the system is far from complete. Of the 316 farm households surveyed in FIS, only 70 (20%) were loan recipients. The majority of farmers would be interested in making use of a revamped loan system with freer terms and conditions and simpler loan procedures to help increase production.

7.5 Irrigation, Drainage and Agricultural Infrastructure

1) Irrigation and drainage

Irrigation in the Study Area has just been introduced for the first time in the last few years by a few advanced farmers who practice irrigation on a small scale for high value crops, mainly vegetables. Irrigation remains, therefore, in a primitive stage both technologically and in terms of the facilities employed. Irrigation intakes installed in wetlands carry water either to fields in the wetlands using gravity, or to nearby fields by tractor and is applied manually.

2) Agricultural infrastructure

Until now, the Study Area has not seen any projects for improving agricultural infrastructures such as farm roads, ditches, and soil improvement. Existing facilities have all been adversely affected as farmers expand their farms by themselves. As a result, the density and design of facilities differ, and many are the absolute minimum required for cultivation conducted primarily through muscle power. Further, in agricultural land with large steep grades where there is a danger of soil erosion, soil conservation measures such as the digging of catch canals along contour lines or mulching are for the most part insufficient, and lead to a loss of land productivity due to sheet erosion.

3) Livestock infrastructure

Most livestock farming is conducted on natural grasslands. Natural grasslands in the Study Area have been classified into three groups depending on grass type. These differ in their capacity to support livestock, but all have large areas of poor vegetation (e.g. bushes) in the absence of any efforts to improve the land artificially. In addition to the low land use, grass yield varies considerably between the wet and dry seasons, which becomes a major factor hindering livestock growth. Water supplies and dipping facilities, necessary for grazing livestock, have not yet been restored to their previous condition.

7.6 Rural Social Infrastructure

People living in rural areas urgently require better social infrastructures such as water supplies, feeder roads (the most important roads in rural communities), education, health, electricity and communications facilities in order to lead healthy and normal lives.

1) Water Supplies

Most rural people have no choice but to drink water from rivers, wetlands and lakes, which is far from safe and causes serious hygiene problems such as diarrhea and other digestive diseases. Furthermore, a great deal of time and effort is expended in transporting drinking water which is a burden for women and children who do most of the carrying.

2) Feeder roads

Since 1986 the present administration has made rehabilitation of trunk roads linking the major cities of Uganda and neighboring countries one of its top priorities. The national road system is now functioning well, but the improvement of feeder roads has been delayed. This not only obstructs agricultural production by interfering with the transport of agricultural products and the distribution of farm inputs, but also places severe restrictions on the lives of the rural population.

3) Education

Uganda's primary and secondary education system includes primary, secondary, and higher schools. Pupils attend each for 7, 4, and 2 years, respectively. Not even primary school is compulsory. It is reported that primary school enrollment rates are 49% for boys and 29% for girls.

According to the *Farmer's Intention Study (FIS)* there are 1,670 primary schools and 467 secondary schools within the Study Area with enrollment rates of 47% for boys and 27% for girls. Although the Ugandan government is striving to make elementary education compulsory by the year 2000, school buildings are currently in ruins and there is a lack of teaching materials and teachers with teaching credentials.

4) Health and hygiene

Ten percent of young Ugandan children die before the age of five, and the average life span is around 46 years. The principal causes of the death in adults on a national base are AIDS, tuberculosis, malaria, meningitis and diarrhea. According to FIS, the major diseases in the Study Area are AIDS, malaria, diarrhea, pneumonia, and whooping cough, a situation similar to that found in all parts of Uganda.

5) Electricity and communications

Both electricity and communications facilities are available in the central parts of each district, but the extension of these services to farm villages is not so advanced. According to FIS, electrification in the Study Area is lowest in Masaka (2%) and highest in Mpigi (27%)

7.7 Environment

1) Environmental conservation measures

The rapid increase in Uganda's population that began during the early years of this century is quickly destroying its natural environment. This trend is revealed by the precipitous shrinkage of its tropical rain forests (1900: 3.09 million hectares, 1987: 0.73 million hectares). As a result, many plant and animal species have either been wiped out or face extinction. Efforts to end this process and conserve the environment are being carried out by the Department of Environment of the Ministry of Natural Resources (MNR) in addition to the Ministry of Tourism, Wildlife and Animals (MTWA) and Makerere University.

The population density in the Study Area is higher than the national average (nationwide: 85 persons/km², Study Area: 130 persons/km²), and the percentage of total land area under cultivation is also relatively high (nationwide: 21%, Study Area: 25%). This indicates that there is a great need for measures to protect the environment throughout Uganda as well.

2) Agricultural development and environmental conservation

(1) Forests

The Study Area contains 404,000 ha of forest, constituting some 16% of the total land area. Forest area per capita varies considerably between districts. Forests in Masaka, with only 0.04 ha per person, are under enormous pressure due to the demand for firewood and other materials.

(2) Wetlands

The Study Area has 340,000 ha of permanent and seasonal wetlands accounting for some 14% of the total land area. Some seasonal wetlands are already being used for livestock farming during the dry season. Some permanent wetlands chiefly consisting of papyrus vegetation are being converted to farmland through the excavation of drainage channels, thus destroying ecosystems important to many plant and animal species resulting in a continuing decrease in their number.

(3) Farmland

Soil degradation caused by soil losses on slopes has reduced crop yields with the contribution of drought, disease and pest damage, most noticeably on steep slopes (with gradients of more than 9%). Fertile soils are washed away and accumulate at the bottom of valleys.

(4) Water quality in lakes

Abnormal multiplication of water hyacinth is attributed to eutrophication in Lakes Victoria and Kyoga, a theory supported by field tests of ammonium nitrate content and electrical conductivity. In Uganda at least, waste water from urban areas is a greater contributor to eutrophication than nitrogen and phosphorous from farmlands.

3) Social environment

Social environmental issues relating to this Plan can be divided into the following three problem areas.

i) Problems concerned with social living:

Changes in social structure due to discord and increasing disparity in distribution of incomes between participants and non-participants of the project as well as greater active involvement in various associations by participants.

ii) Health and hygiene related problems:

Possible occurrence of endemic and vector borne diseases.

iii) Problems related to social systems and customs:

Land tenure and water rights system.

8. Constraints on Agricultural Development

The Study Area is faced with the following constraining factors on its development.

- i) Extensive damage to infrastructure and agriculturally related facilities due to prolonged civil war.
- ii) Increased transport costs of export-oriented agricultural produce due to being a landlocked country.
- iii) Vulnerability of the economic base due to the extensive dependence on coffee exports
- iv) The low position of agricultural productivity
- v) Inadequate systems of distribution support
- vi) Inadequacy of support systems for farm management

9. Basic Plan of Development

The final objectives of the development plan consist of the following five points.

- i) Increase of food self-sufficiency and improvement of nutrition levels
- ii) Promotion of rural incomes and employment
- iii) Raising rural living standards
- iv) The promotion of exports and import substitution
- v) Sustainable agriculture and environmental conservation

10. Individual Development Plans

10.1 Land Use Plan

1) Expansion of land for agricultural use

Development areas were established in each county based on natural conditions and the Agriculture and Livestock Production Plan. These lands, totaling some 94,000 ha (gross area) (including 2,500 ha of small-scale irrigation area) of farmland and 284,000 ha (maximum available) of grassland for development, were from the 439,000 ha of land available for use as farmland and grassland based on land zoning of the approximately 440,000 ha of land (excluding wooded land) currently not used for agriculture in FFGM and SFGM areas. In addition, 47 wetland locations, totaling 5,900 ha (gross area), considered appropriate for use as paddy fields, were designated under the Paddy Field Development Plan.

2) Improvement of farmland

Farmland and grassland improvement, totaling 45,000 ha and 47,000 ha, respectively, was planned and established in each county. Farmland improvement will raise land and labour productivity through the construction of roads and facilities such as contour ditches. Grassland improvement will boost livestock raising capacity by removing unnecessary bushes within grassland areas, introducing improved varieties of grasses, and constructing roads and facilities.

10.2 Crop Cultivation Plan

1) Studying strategic crops

To cope with its rising population, Uganda needs to increase production of such staple food crops as bananas, cassava, sweet potatoes, maize, and beans, peanuts and soybeans, which are used as oil plants, and vegetables and fruits, as well as traditional export crops such as coffee, cotton, tea, and cacao. In addition, new cash crops, such as passion fruit, vanilla, and mulberry, as well as fruits, such as tomatoes and pineapples are attracting attention. At the same time, there is a need to watch trends such as the growing demand for grains as food crops, in particular the marked increase in the demand for rice. Many of the crops currently being planted are the result of specific regional characteristics, such as natural and economic conditions. Although their continued production has been planned for the future, it is conceivable that if improvements in the distribution system and production technology progress hereafter, farmers will shift their efforts to the cultivation of more highly profitable crops. Increased production has been planned, in particular, for crops whose exports are expected to increase and which can be processed in rural areas (cacao, vanilla, fruits, etc.).

2) Measures for increasing crop production

Farm production targets will be achieved through the following three measures.

i) Boosting land productivity:

Land productivity will be boosted by upgrading cultivation technology such as soil and fertilization improvements, better insect and pest control, suitable planting systems, etc., by strengthening agricultural support.

ii) Raising land use ratio:

The land use ratio will be raised by increasing double cropping, improving intercropping, and utilizing fallow land. As these techniques accelerate the loss of nutrients from the soil, they can cause deterioration of soil quality, i.e. a decline in productivity. To prevent this, these measures must be accompanied by careful soil maintenance and cultivation techniques that are responsive to changes in climate. This will not be achieved through better extension services alone. Research is needed into efficient crop rotation systems where crops complement the productivity of one another.

iii) Increasing agricultural land area:

In order to achieve the Production Target for the year 2007, it is necessary to create some 85,000 ha of new farmland in the Study Area in addition to the above land productivity and land use ratio increases. This figure has been determined for each county through the farm management plan and available land resources.

10.3 Farm Management Plan

In this Plan, the following eight types of farm management have been established based on the existing seven types in addition to taking into consideration the increased production of strategic crops.

As an example for type 1, the current income of USHS 450,000 from farming (the total being USHS 1,110,000 with non-farming sources) for households with 2 ha or less is aimed to be set at USHS 900,000 ~ 1,500,000 in the target year, based on case studies of advanced farms.

- i) Type 1 is the basic pattern of Central Uganda and is generally referred to as the Coffee-Plantain System. This is a combined management pattern in which a few heads of livestock are also raised.
- ii) In Type 2, commercial products such as cacao, tea, sugar cane, and vanilla are cultivated as cash crops in order to diversify into other export products.
- iii) In Type 3, farmers who currently engage mainly in subsistence production will grow new cash crops such as cocoons and rice.

- iv) Type 4 is a combined management pattern. The main crop consists of vegetables, urban demand for which has been growing in recent years. Small and medium-sized livestock, hogs and chickens, are also raised.
- v) In Type 5, fruits are the main produce. Although all areas in the Study Area are suitable for Type 5, Zone I is best for passion fruit and pineapples, and Zone II for local fruits such as avocados, as well as other fruits such as oranges. This is a combined management pattern in which livestock is also raised.
- vi) Type 6 is for large farms. The main crops are cereals and pulses. This is a management pattern in which farm mechanization is actively promoted.
- vii) In Type 7, cotton is the main crop. This type of farming requires capital investment and advanced production technology in order to achieve quality levels that are able to compete on the world market. However, as a cash crop, cotton is second only to coffee in priority under the national agricultural policy. Therefore, cotton cultivation should be developed in step with improvements in the processing and distribution industries.
- viii) Type 8 is a livestock farm management pattern. This pattern includes dairy farms, beef cattle farms, and farms handling both types of cattle. They also raise medium-sized livestock such as goats and sheep. Since these types of farms are mainly located in areas that are far from cities which are major consuming regions, it is important to establish processing and distribution systems linking them to urban markets.

10.4 Livestock Plan

1) Livestock production targets

Livestock production must be greatly increased because of Uganda's high population growth rate and its current low intake of animal proteins. The population within the Study Area is expected to grow at a rate of 3.1% per annum. Taking this into consideration, livestock production must grow at a higher rate. There are imbalances between the demand and supply for various types of livestock products within the Study Area. There is a surplus of beef, pork and milk in some areas and they are shipped to Kampala. On the other hand, goat meat, mutton, chicken and eggs are in short supply and their consumption rate per person is lower than national level.

Consequently, the rates of increase are set to be high for goat meat, mutton and chicken and to be low for pork, so as to balance production for all meats as well as to retain the current rate of supply of beef and milk from the Study Area to Kampala.

According to this, the annual per capita livestock product intake will be 11.3 kg for meats as a whole, a 17% increase over the current intake. In the same fashion, the intake for milk will be 28.9 kg (a 29% increase), and 1.0 kg for eggs (a 29% increase).

2) Achieving the production targets

The increased production targets for livestock products will be achieved through the following three measures.

- i) Increasing the number of livestock (beef cattle, dairy cows, goats, sheep, pigs, fowl)
- ii) Improving the productivity of livestock units
- iii) Reducing livestock mortality rates

The increases for the number of head of grazing livestock were set by county in line with available land resources. Along with improving productivity per animal for cattle through artificial insemination and the distribution of superior female cows, nutritional supply levels will be raised during the dry season. A project has been planned for the purpose of promoting the rebuilding and construction of veterinary centres (VCs) as a means of enhancing health and preventing the spread of infectious diseases among livestock.

3) New Ranch Plan (NRP)

By the year 2007 (target year), the number of farming households is estimated to reach 520,000 households of which 10,480 will engage in livestock husbandry in order to improve nutritional intake of animal produce and achieve balanced regional development. This livestock operation will contribute to the efficient use of savanna lands made available through land acquisition procedures. Of these 10,480 households, 6,480 will exclusively raise beef cattle, while the other 4,000 will manage a combination of beef cattle and goats.

The NRP consists of five main points:

- i) Acquisition of land
- ii) Design of farms and specialised facilities
- iii) Construction of related facilities
- iv) Establishment of Livestock Associations (LAs)
- v) Screening of farmers for the NRP

Farmers who wish to be considered as candidates for the NRP must apply through their sub-county office. Districts concerned should apply to the IDC, which will determine eligibility together with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

10.5 Processing and Distribution Plan

1) Processing facilities

The main processing facilities within the Study Area are for coffee (194 facilities), cotton (one) and tea (eight). Because the capacities of these processing facilities are large enough for the production volumes planned for the target year (2007), it was determined that there is no need for new facilities. However, the promotion of rural industries is an important issue. Plans have been established to set up primary processing facilities for products such as vanilla and cacao and processing facilities for passion fruit and pineapples in rural areas. These will be annexed to the Agricultural Product Collection Centres (APCCs), or planned distribution facilities. Furthermore, there are also plans for the construction of rice processing facilities (from threshing to polishing).

Since both beef and milk are distributed within the Study Area and transported to Kampala, there are also plans to construct milk collection centres with refrigeration facilities and sanitary slaughtering facilities at distribution terminals.

2) Distribution facilities

At present, farm produce is traded first between farmers and village level small-scale traders. Following this, transactions take place between these small-scale traders and medium or large-scale traders. Thereafter, produce is sold within the region or to large cities, such as Kampala. The problems of farm produce distribution are found primarily in the first stage of transactions. In order to amass the required volume, small traders must visit many farms. This markedly lowers collection efficiency. At the same time, farmers are in a disadvantageous position in which they are compelled to sell their products at the prices offered by the traders as they have little market information. The Agricultural Transportation and Market Activation Project (ATMAP) was established in order to resolve this collection inefficiency and improve the position of the farmer in commercial transactions. The ATMAP aims to improve the rural road network and build Agricultural Product Collection Centres (APCCs) as well.

10.6 Agricultural Support Plan

1) Research

Uganda's agricultural research institutes are supervised by the National Agricultural Research Organization (NARO). Within the Study Area are the Kawanda Agricultural Research Institute (KARI), Namulonge Agricultural and Animal Production Research Institute (NAARI), the Animal Health Research Centre (AHRC) in Entebbe, and the Forestry Research Institute in Kampala. An improvement plan was established to address infrastructure problems such as electric power, waterworks, and communications facilities that hinder normal activities

in this field, and to either enlarge or build research facilities that handle high priority research topics. The main points of the improvement plan consist of the following:

- i) Relocation of the NARO Headquarters;
- ii) Improvement of the Sericulture Laboratory and facilities of the Kawanda Agricultural Research Institute;
- iii) Infrastructure improvement and construction of a Plant Protection Laboratory and Livestock Laboratory in NAARI;
- iv) Improvement of the facilities of the Forestry Research Institute.

2) Extension

The Master Plan seeks to raise farm productivity by providing extension services to almost half or 240,000 of the 520,000 farms in the Study Area during the project implementation period (twelve years). The plan calls for restoring and building District Farm Institutes (DFIs), improving Bukalasa Agricultural College, which is run by MAAIF, and establishing extension centres annexed to APCCs. These plans for strengthening the extension system and services will be carried out jointly with the World Bank Agricultural Extension Project.

3) Farmers' organization plan

Agricultural, irrigation and livestock related projects are directly linked to farmers. The farmers involved will be required to establish Agricultural Associations (AAs), Irrigation Associations (IAs) and/or Livestock Associations (LAs). Then the respective associations will actively implement the projects. The facilities constructed and improved together with the machinery and livestock introduced will be used and managed by farm members and associations jointly in order to attain efficiency through the cooperation of farmers. Furthermore, the operation of newly constructed APCCs will be carried out by the Uganda National Farmers' Association (UNFA) to support suitable development of distribution.

4) Farmer finance plan

The following loan requirements have been identified for the expansion and promotion of agriculture, rural industries and the distribution of agricultural materials.

Long-term loans:

- i) Farmland reclamation and improvement to expand production
- ii) Construction/Rehabilitation of agricultural and livestock product processing plants

Medium-term loans:

- i) Introduction of trees (cash crops fruits, fuelwood, etc.)
- ii) Purchase, repair and sale of agricultural materials
- iii) Production and repair of agricultural tools and machinery

Short-term loans:

- i) Purchase and sale of farm inputs for agricultural production
- ii) Sale of agricultural produce
- iii) Production and sale of handicrafts and craft works (based on participation by WID)

The following measures must be undertaken so that these loans can operate smoothly together with providing the APCCs with the additional capabilities required for this.

- i) Encouraging farmers to save
- ii) Strengthening the administrative and management abilities of cooperative financial divisions
- iii) Providing advice on business and fund management to farmers
- iv) Establishing a financial system to support production and daily activities through WID

10.7 Irrigation and Drainage Plan

1) Small-scale irrigation plan

High-value farm produce, such as vegetables and fruits, call for irrigation projects to be implemented primarily by groups of 10~20 farms on existing cultivated lands which seek to use water from nearby wetlands. Based on topographical maps, 26 sites were selected with a total area of 2,500 ha. On a model 20 ha unit, a pump system was designed to carry water from the wetland water source to the fields for irrigation. The application of water in the field will be carried out by hand due to cost and technical requirements.

2) Wetland utilization plan

Of the 47 potential sites selected based on topographical maps, field surveys of topography, soil, soil bearing, hydrology and water quality were conducted in 24 sites. As a result, the order of priority for development was determined in the following manner for the 5,900 ha of total development area.

Rank A: 1,710 ha; Rank B: 1,260 ha; Rank C: 2,930 ha

The preliminary design for the 100 ha paddy field development model was prepared with satisfying of the following three environmental issues taken as a base.

- i) Development of sustainable agriculture
- ii) Conservation of the hydrological functions of the wetlands as a whole
- iii) Conservation of plants and animals in the wetlands

3) Water management plan

Water Management in the small-scale irrigation and the wetland utilization projects will be carried out by Irrigation Associations (IAs) formed by participating farmers. This must be implemented in principle to:

- i) allocate the water resources of the wetland appropriately to irrigation, environmental conservation, and drinking water;
- ii) allocate water fairly within irrigation units;
- iii) achieve optimum economic efficiency in operation of irrigation facilities such as pumps.

10.8 Agricultural and Livestock Infrastructure Improvement Plan

1) Agricultural infrastructure improvement plan

In order to achieve the target production volumes for agricultural products along with improving land productivity and raising the land use ratio, there will be 94,000 ha in gross of farmland reclamation in areas where land is available and 45,000 ha of farmland improvement to improve land productivity. To facilitate farm management, farm roads will be constructed within farmlands to connect with feeder roads which will boost agricultural and livestock produce transport capacity. Moreover, contour ditches with water pits will be built in order to conserve top soils from erosion, and tree lots/rows will be created within farmlands to produce fuel wood and mitigate climatic harshness.

2) Livestock infrastructure improvement plan

At present, 715,000 ha of land is used as pasture. Most of this is natural grassland which contributes to low livestock productivity. The New Ranch Plan (NRP) includes 29,000 ha of new grasslands to be developed for fodder crops. The plan will upgrade 47,000 ha of grasslands currently in use, with emphasis on the production of hay which is used as livestock feed during dry seasons to supplement natural grasses. Various facilities, such as valley dams for water and dips for tick control, will be constructed and/or improved on new ranches and existing grasslands.

10.9 Rural Social Infrastructure Improvement Plan

The slow development of rural facilities within the Study Area (potable water, roads, education, medical care, electricity, etc.) affects the motivation of farmers to boost production and improve agricultural and livestock productivity. Rural areas are not only places of production, but must also be places where people live healthy and culturally rich lives. Therefore, improvement of the basic rural social infrastructure must proceed without delay.

The improvement plan for these facilities takes into consideration the priority of respective facilities and current imbalances in levels between districts.

1) Drinking water supplies

Currently, only 15% of the rural population has safe water. The goal is to raise this level to 50% by the target year 2007, principally by drilling new boreholes, restoring old boreholes and protecting springs.

2) Feeder roads

Some 2,096 km of new feeder roads will be constructed in the NRP area to enable efficient use of livestock facilities and rural social infrastructure, and to promote efficient distribution of livestock produce. In addition, four sets of heavy machines will be introduced to improve and maintain existing feeder roads for each district.

3) Education, hygiene and sanitation

(1) Education

Sixty new primary schools and nineteen new secondary schools will be built, and educational materials will be distributed in the NRP area. In addition, communication centres annexed to APCCs will be responsible for the distribution of agricultural and livestock farming technology and information on markets and distribution.

(2) Hygiene and sanitation

Health centres will be annexed to APCCs, and a minimum care health system established. In addition, the minimum required quantity of pesticides, germicidal agents and disinfectants will be allotted to prevent the spread of harmful insects and disease causing germs.

4) Rural electrification

The 11 KV, 450 V and 240 V electrification facilities required by the NRP will be newly constructed. Improvement of existing facilities will be left to separate individual plans.

10.10 Environmental Measures

The following five issues were addressed in response to the development plans in the Master Plan. The issues are based on JICA's matrix for "Environmental Consideration Guidelines Related to Agricultural Development Surveys." All development plans are obliged to take into consideration the conservation of the respective environmental issues listed.

a) Forestry:

All forest reserves and private forests are exempt from development. Wooded areas in farmlands and grasslands will be maintained and agroforestry will be encouraged.

b) Wetlands:

A unified plan based on local participation was established for the conservation and the agricultural development of wetlands mainly as paddy fields. Only some of the wetlands particularly rich in water resources (1.4% of the total) have been designated for development.

c) Farm and Grasslands Conservation:

The relationship between gradient and topsoil loss for farmlands was clarified. A strong link between type of grazing and the deterioration of grasslands was found. Soil and land conservation measures for farmlands and grasslands, respectively, were considered based on these findings.

d) Water Quality:

The pollution level of Lake Victoria was determined from water analysis, and farm management strategies were considered.

e) Social Environmental issues:

The following two issues were addressed.

- i) Problems accompanying changes in the existing social structure
- ii) The potential for outbreaks of endemic diseases

Regarding i) above, the projects will be implemented mainly by the farmers themselves in order to ensure fairness among the regional population. Regarding ii), monitoring and emergency response systems will be established when the projects are implemented.

10.11 Preliminary Design of Major Facilities

1) Small-Scale Irrigation Scheme (SSIS)

Irrigation for 20 ha of land forms one unit. The irrigation system has been designed so that the facilities from pumps to farm ponds operate efficiently.

2) Wetland Utilization Scheme (WUS)

Although the scale of development among wetlands differs according to such natural conditions as topographical and hydrologic characteristics of the wetland, an average sized model would be 100 ha of paddy field development. The utilization schemes are based on the natural water intake and gravitational irrigation method.

The schemes have been designed to achieve optimum economic efficiency in the operation of a coordinated set of facilities: water intake facilities, water supply canals, paddy fields, farm roads, and main drainage canals etc.

11. Priority Projects

1) Projects that should be given priority were selected based on an analysis of actual conditions in the Study Area and the development plan for each sector.

This selection was based on the following three criteria.

a) Projects which make it possible to expect long-term extensive effectiveness regarding agricultural development (increased productivity, diversification of crops, increased employment, etc.)

- Projects which make it possible to expect significant development of agricultural production activity

b) Projects which strengthen the public community

- Projects which have a strong public nature and which require the leadership of an administrative organization to implement

c) Projects which promote the integrated development of the region as a whole

- Projects in which administrative leadership and model forms of implementation are desired in order to encourage well balanced development of the region as a whole

2) The following six priority projects were selected from the development plan for each sector.

a) Projects which make it possible to expect long-term extensive effectiveness regarding agricultural development include the following three projects were selected for their need and importance from the sector of extension, distribution and livestock.

i) Agricultural Extension Institute Improvement Project

ii) Agricultural Transportation and Market Activation Project

iii) Livestock Service Strengthening Project

b) Projects which strengthen the public community

i) Paddy Field Development Pilot Project

ii) Rural Water Supply Project in Mpigi District

c) Projects which promote the integrated development of the region as a whole

i) Integrated Agricultural and Rural Development Project

12. Implementation and Management Plan

12.1 Implementation Plan

1) Fundamental values

- i) The Master Plan for these projects assumes an annual population growth rate of 3.1%.
- ii) It is assumed that by the year 2007 there will be 520,000 farm households and 360,000 non-farming households
- iii) Forest reserves and water areas are excluded from development projects. The total area available for development is 221,000 ha or 6.1% of the Study Area.
- iv) Estimated rate of agricultural production varies from 1.19 to 4.78 times, except for vanilla. The livestock component will double between 1991 and 2007. The economy will reach a gross income of US\$ 640 mn, with a net income of US\$ 403.8 mn. with some of 35% of the gross income expected to contribute to improving the balance of international trade.

12.2 Implementation Schedule

- | | | |
|----------------|--------|---------|
| 1) Preparation | 1 year | 1994/95 |
|----------------|--------|---------|

This period is for arranging the financing and the detailed designs for the implementation of the priority projects (Stage I).

- | | | |
|-------------------|----------|-------------------|
| 2) Implementation | 12 years | 1995/96 - 2006/07 |
|-------------------|----------|-------------------|

The 12-year period is divided into three stages of four years each. The terms correspond to the National Plan in Uganda. Those contents will be presented for consideration and incorporated in the Plan

- | | | |
|-----------------------------------|---------|-------------------|
| i) Stage 1: Short-term projects | 4 years | 1995/96 - 1998/99 |
| ii) Stage 2: Medium-term projects | 4 years | 1999/00 - 2002/03 |
| iii) Stage 3: Long-term projects | 4 years | 2003/04 - 2006/07 |

- | | | |
|---------------------|--|---------|
| 3) Year of maturity | | 2006/07 |
|---------------------|--|---------|

12.3 Cost Estimates

1) Basic assumptions

Construction costs have been estimated based on the preliminary design and following conditions:

- i) Administrative costs which are 3% of the Investment Cost Total (ICT) and are cumulatively carried over to each subsequent year;
- ii) Engineering service fees which are 15% of ICT for each year;
- iii) Physical contingency reserves which are 10% of ICT for each year;
- iv) Price contingency reserves will be considered at an annual escalation rate of 3% for foreign currency and 10% for domestic currency for each year;
- iv) Exchange rate: 1,185 USHS = US\$ 1.

2) Cost estimates

The principle items comprising cost estimates are as follow:

a) Investment Cost Total (ICT)	US\$ 414,307,000	(45.4%)
i) Agricultural Infrastructure	US\$ 183,541,000	(20.1%)
ii) Agricultural Support	73,510,000	(8.1%)
iii) Processing and Marketing	32,321,000	(3.5%)
iv) Rural Social Infrastructure	124,222,000	(13.6%)
v) Integrated Development Centre	713,000	(0.1%)
b) Administration Cost	105,400,000	(11.6%)
c) Physical Contingency	41,431,000	(4.5%)
d) Engineering Service Fee	62,146,000	(6.8%)
e) Price Contingency	288,814,000	(31.7%)
f) Total Costs	US\$ 912,098,000	(100.0%)
Foreign Currency	US\$ 555,884,000	(60.9%)
Local Currency	US\$ 356,214,000	(39.1%)

12.4 Implementation Priority

The order of the priority stages is described in 8.1.2. The implementation schedules are as follows:

- i) Stage 1 (Short-term projects) is for urgent and important projects.
- ii) Completion ratios are about 50% at Stage 1 (short-term), 30% at Stage 2 (medium-term) and 20% at Stage 3 (long-term), respectively. These will produce satisfactory results in the early stages. The distribution of project costs is roughly equivalent to the above ratios.
- iii) Considering funds and office staff, larger and long-term projects will on an average be implemented between Stages 1 and 3.
- iv) WID and environmental issues have been given due attention in the Master Plan.
- v) This Plan will create commercial farmers in the Study Area.

12.5 Structure of Project Implementation

An overall organization should be required to successfully implement the projects in the Master Plan. Implementation is the responsibility of the Integrated Development Centres (IDC) and Integrated Development Sub-centres (IDSC's). It should be noted that both IDC in MAAIF and IDSC's in district administrative offices are to be formed by reorganizing existing institutions so as to avoid duplicated administrative structures. The IDC will be led by the MAAIF and the Steering Committee of other concerned organizations. The Principal Agricultural Officer (PAP) will coordinate with the Steering Committee (SC). The Account Section of the IDC will be required to establish, manage and evaluate the three farmer's associations (AA, LA, IA).

12.6 Management and Maintenance

1) Agricultural infrastructural facilities

Facilities that are to a great extent for the common benefit of the community, such as major irrigation works, wetland use facilities, and livestock facilities, will be maintained, managed and operated by farmer's associations such as AAs, IAs and LAs, set up for that purpose.

Farmlands and grasslands, whose use is limited to individual farmers, will be managed and operated by the individual beneficiaries as part of their farm management activities.

Small-scale irrigation works, wetland use facilities, and livestock facilities will be managed and operated jointly by the members of the respective farmers' associations guided by those members who receive suitable training.

The respective associations will be managed and operated by a certain number of representatives selected from among their members. The working expenses of the associations will be covered by collecting membership fees as necessary. The expenses involved consist of the costs for administrative affairs, the purchase and repair of facilities and machinery.

2) Agricultural support

Research and extension development projects mainly consist of improving existing facilities. Maintenance, management and operation of those facilities will be the responsibility of existing organizations.

The MAAIF will manage and operate veterinary centres (VCs), artificial insemination sub-centres (AISCs) and collect user fees to cover working expenses.

The farm machinery acquired by AAs, IAs, and LAs will be operated and maintained by specially assigned operators. The working expenses for farm machinery use will be covered by user fees collected from association members as necessary. The expenses involved are the costs for the administrative affairs of the associations, wages of the operators, and the purchase and repair of facilities and machinery.

3) Processing and distribution

Since processing and distribution facilities are to a great extent for the public good, the IDC will entrust their maintenance, management and operation to the farmers association such as the Uganda National Farmers Association.

4) Rural social infrastructure

Due to the high level of the technology and the costs involved in maintaining and managing the rural social infrastructure, each district's public bodies will maintain, manage, and operate these facilities in accordance with their existing administrative practices.

5) Executive bodies

The IDC will entrust the maintenance, management and operation of the Master Plan through the IDSCs to the DAO, DVO and DCO in each district which will act as executive bodies.

13. Project Evaluation

13.1 Environmental Impact Assessment (EIA)

The EIA has been implemented based on the following criteria which dominate the success of environmental conservation within the Study Area:

- i) sustainable agriculture;
- ii) conservation of natural resources ;
- iii) social cohesion.

The projects which require the EIA among the all projects formulated in the Master Plan consist of two types. The one is a land expansion type such as farm and grassland reclamation and paddy field development. The other comprises land improvement type such as farmland and grassland improvement and irrigation.

At the same time, the establishment of agricultural support institutes (such as research, extension, farmers' and agricultural credit organizations) as well as processing and distribution systems can assure the achievement of the EIA.

13.2 Project Evaluation

1) Financial analysis

The financial internal rate of return (FIRR), calculated for the processing and distribution facilities, varies from 1.0 to 36.4%. The FIRRs of slaughter slabs, livestock markets and warehouses are below the estimated real interest rate of 13.0%. Operation by the government itself or subsidies from the government such as low interest loans or aids for facility construction should be considered for these facilities. The FIRRs of the various farm management types have also been calculated. All of these rates exceed 13%, and therefore the farmers' participants in the projects should not have any financial problems.

2) Economic analysis

All the economic internal rates of return (EIRR) for the projects which are subject to economic analysis exceed the opportunity cost of capital of 10 - 12%. As regards the performance of the total investment for the Master Plan, an annual growth rate of 6.9% can be expected in the agricultural sector in the Study Area.

3) Other benefits

The generation of some three hundreds thousand jobs is expected by the implementation of the Master Plan.

Small farmers will be the direct beneficiaries of the Master Plan, and the improvement in living standards can be expected through an increase in incomes and improved nutrition. The severe working conditions which now exist for women and youth in the country will particularly be improved through the introduction of ox-cultivation, the tractor and small-scale irrigation schemes. As for the government, the balance of payments will be improved through the promotion of foreign exchange earnings and import substitution, and improvements in the balanced economic development between districts can also be expected.

14. Recommendations

The following items are recommended as areas requiring particular attention in the implementation of this Master Plan.

1) The government should incorporate the priority projects (see paragraph 8.1.4) in the next National Development Plan and funding should be procured as soon as possible in order to undertake the Master Plan. At that time, it will be necessary to coordinate the functions to be borne by the central and local governments in keeping with the policy of decentralization currently in progress.

2) This plan indicates the basic directions and potentials for integrated agricultural development in the Study Area, and includes items that are not clear at this level. Consequently, more detailed studies and plans are necessary with the implementation of the Master Plan.

3) In order to smoothly promote each project established in the plan, it is necessary for the Integrated Development Centre (IDC), which is the organization with primary responsibility for promoting the Master Plan, to carry out this function effectively. For this purpose, it is necessary to enhance the organization and human resource development of the Ministry of Agriculture, Animal Industry and Fisheries and associated institutions. Furthermore, there are projects which also come under the control of ministries (Ministry of Local Government, Ministry of Natural Resources, etc.) other than the Ministry of Agriculture, Animal Industry and Fisheries. In such cases, coordinated efforts in planning and implementation must be maintained with all agencies concerned.

4) Farm organizations will be essential to the implementation of the Master Plan. Women should play an important role in such farm organizations and their participation should be increased even further. Sufficient attention and consideration must be given to this point, in particular, when establishing and managing agricultural, livestock and irrigation associations.

5) In order to increase the production of export oriented products, it will be necessary to encourage the creation of areas specializing in specific forms of production based on a strengthening of agricultural producers' associations, improvement of product quality and the promotion of product standards. In such cases, strong links between the associations and research as well as extension organizations will be important.

6) Haphazard encroachment of agricultural areas onto non-developed lands, diminishing woodlands and forests as well as soil erosion are matters of serious concern in the Study Area due to the pressures of population growth. Although existing forests are outside the purview of this plan, active forestation should be performed on hilltops which have thin topsoil and steep land which is unsuitable for agricultural use. Particular consideration should be given to environmental conservation when implementing the farmland and grassland development plans. Moreover, farmers need to undergo thorough extension training regarding the observance of standards for applying and using agro-chemicals.

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ABBREVIATIONS

AA	Agricultural Association
ABC	Artificial Breeding Centre
AfDB	African Development Bank
AIC	Artificial Insemination Centre
BTA	British American Tobacco Company
CARE	Cooperative for Assistance and Relief Everywhere
CMB	Coffee Marketing Board
CPSU	Central Processing Storage Unit
DA	District Administrator
DANIDA	Danish International Development Agency
DAO	District Agricultural Office
DCO	District Cooperative Office
DES	District Executive Secretary
DFCU	Development Finance Corporation of Uganda
DFI	District Farm Institute
DVO	District Veterinary Office
DWD	Directorate of Water Development
EEC	European Economic Community
ERP	Economic Recovery Programme
FAO	Food and Agriculture Organization
FFGM	Forest / Farmland, Grassland Mosaic
FIS	Farmers' Intention Study
FSSP	Farming System Support Programme
F&B	Food and Beverage LTD
F/S	Feasibility Study
GDP	Gross Domestic Product
GTZ	Gesellschaft fur Technische Zusammenarbeits
IA	Irrigation Association
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IDC	Integrated Development Centre
IDSC	Integrated Development Sub-centre
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
IRR	<i>Internal Rate of Return</i>
ISEL	Inula Silk Estates Ltd.
IUCN	International Union for Conservation of Nature

JICA	Japan International Cooperation Agency
KARI	Kawanda Agricultural Research Institute
LA	Livestock Association
LMB	Lint Marketing Board
MAAIF	Ministry of Agricultural, Animal Industry and Fisheries
MCIC	Ministry of Commerce, Industry and Cooperative
MFEP	Ministry of Finance and Economic Planning
MIA	Ministry of Internal Affairs
MMPTC	Milk and Meat Processing Technical Cooperation
MOES	Ministry of Education and Sports
MOH	Ministry of Health
MOLG	Ministry of Local Government
MNR	Ministry of Natural Resources
MOTI	Ministry of Trade and Industry
MOWTC	Ministry of Works, Transport and Communications
MPED	Ministry of Planning and Economic Development
MTWA	Ministry of Tourism, Wildlife and Animals
MWDYC	Ministry of Women in Development, Youth and Culture
NAARI	Namulonge Agricultural and Animal Production Research Institute
NARO	National Agricultural Research Organization
NGO	Non-government Organization
NORAD	Norwegian Agency for International Development
NPC	National Project Coordinator
NRP	New Ranch Plan
NRWSP	National Rural Water Supply Programme
ODA	Overseas Development Administration
ODA	Overseas Development Agency
PMB	Produce Marketing Board
PS	Permanent Secretary
RDP	Rehabilitation and Development Plan
RPS	Regional Planning Section
RUWASA	Rural Water and Sanitation Project
SC	Steering Committee
SCC	Swedish Cooperative Centre
SFGM	Savanna / Farmland, Grassland Mosaic
SIDA	Swedish International Development Authority
SSIP	Small-Scale Irrigation Project
SWIP	South West Integrated Project
UCA	Uganda Cooperative Alliance

UCC	Uganda Central Co-operative Union
UCDA	Uganda Coffee Development Authority
UGMC	Uganda Grain Millers Company
UNDP	United Nation Development Programme
UNFA	Uganda National Farmers Association
UNEX	Union Export Services
UNSO	United Nation Sudano-Sahelian Office
UPTC	Uganda Posts and Telecommunication Corporation
USA	United States of America
USAID	United States, Agency for International Development
USIL	Uganda Silk Industries Ltd.
UTA	Uganda Tea Authority
WDD	Water Development Department
WFP	World Food Programme
WHO	World Health Organization
WID	Women in Development
YMCA	Young men's Christian Association



UNITS AND OTHERS

1. Measurements

1) Length

mm	-	millimetre
cm	-	centimetre
m	-	metre
km	-	kilometre

2) Area

cm ²	-	square centimetre
m ²	-	square metre
km ²	-	square kilometre
ha	-	hectare

3) Volume

l	-	litre
m ³	-	cubic metre

4) Weight

mg	-	milligram
g	-	gram
kg	-	kilogram
ton	-	metric ton

5) Unit

%	-	per cent
C°	-	degree in Celsius
ca	-	car
cas	-	cars
ft	-	foot, feet
gr	-	group
grs	-	groups
he	-	head
hes	-	heads
ho	-	house
hos	-	houses
mn	-	million

mos	-	months
NOS	-	numbers
pi	-	piece
pis	-	pieces
pl	-	place
pls	-	places
Scs	-	schools
se	-	set
ses	-	sets
st	-	station
sts	-	stations
USH	-	Uganda Shilling
US\$	-	US dollar
sec	-	second
min	-	minute
hr	-	hour

6) Others

ASL	-	Above Sea Level
EL	-	Elevation above the mean sea level
FY	-	Fiscal Year (From July 1 to June 30 next year)
GDP	-	Gross Domestic Product
max	-	maximum
min	-	minimum

2. Exchange rate

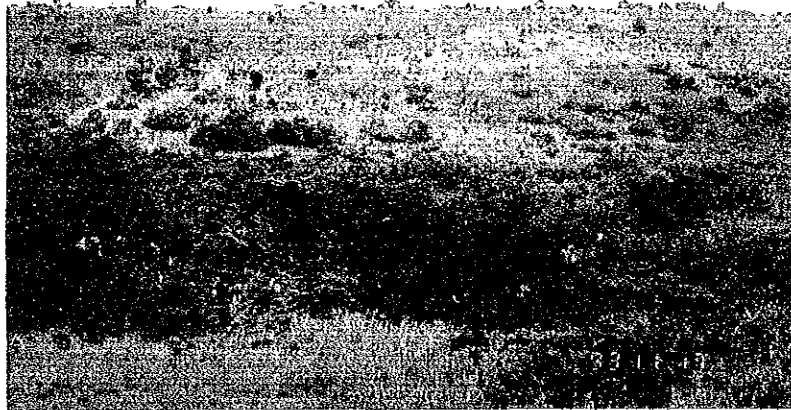
1 US\$ = 1,185 USHS (as of November 1993)

3. Weight Unit

1 bale (= 400 pounds) = 181.44 kg (net lint) = 185 kg (gross lint unit bag)

PICTURES OF THE STUDY AREA

1. Mosaic land use area with forests, farmlands and grasslands on sloped terrain (The most common landscape form in the Lake Victoria Crescent Zone)



2. A wetland with thick papyrus vegetation embedded in hilly terrain



3. A small-scale farmhouse:
A subsistence farmer and his homestead with plantain (staple food, banana) trees





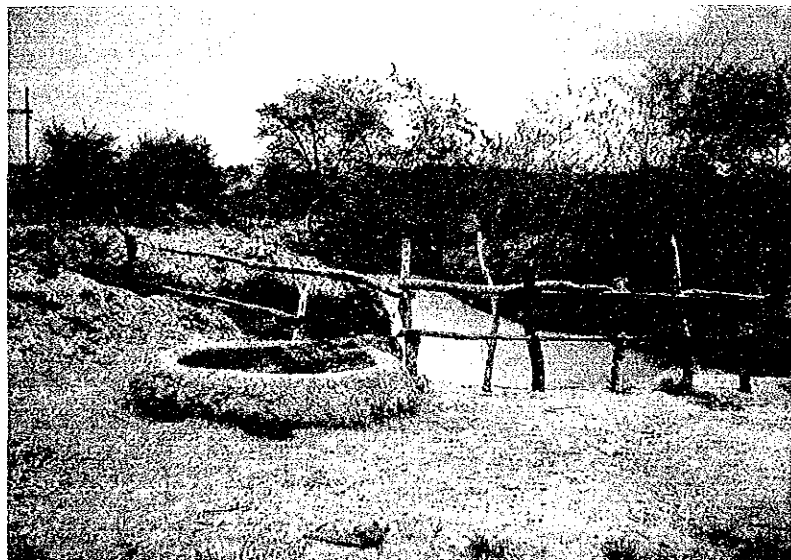
4. A feeder road (rural arterial road) of poor condition (Poor maintenance and paucity of the road thwarts activation of rural areas)



5. A water supply facility used as potable water for rural people (For most rural people the only accessible water is of poor quality that must be carried over long distances)



6. A valley tank (a water facility for cattle) seen in the Savanna area





7. Transportation of farm produce by bicycle from farm to market, etc. (Common means of transportation available to most farmers)



8. Local Market with vegetables, fruits, meat, fish, etc. being offered for sale

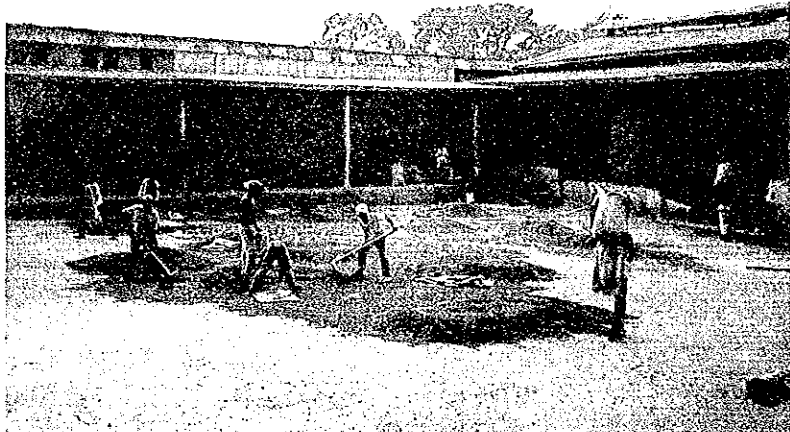


9. A storage facility with a high floor for helping to protect goods from insects and moisture.





10. A coffee Processing Facility in the rural area



11. A well tended farmland with contour ditches effective for both soil conservation and water collection



12. Gully Erosion seen in Savanna area (Many such gullies are made by cattle trails and overgrazing)





1. Introduction

1.1 Background of the Study

Agriculture is the mainstay of the Ugandan economy. The sector accounted for 54% of GDP (money base in 1992), 90% of exports and 90% of the population is living in rural areas (1990). The importance of agriculture sector is also understandable through the fact that the development of agricultural sector is regarded as one of main strategies in Rehabilitation and Development Programme (1991/92 - 1994/95).

The agricultural sector has, however, many constraints such as: i) economic vulnerability due to fluctuations in foreign exchange earnings dependent on the international market price of coffee, ii) haphazard development of farmland for food crop production due to increased population pressure, iii) low levels of agricultural productivity and living standards for small holders who comprise the majority of Ugandan farmers, amongst others.

In order to address above-mentioned constraints, the Ugandan government requested the Japanese government to prepare a Master Plan Study on the Integrated Agricultural and Rural Development Project in central Uganda. The potential for agricultural development is relatively high in this region due to the favorable natural conditions of the area, and the demonstration effect for the Study Area is also high. Based on this request, Japanese government despatched the project formulation mission from October to November 1991 to confirm the contents of the request and further the preparatory study team at April 1992 to sign the Scope of Work on the Master Plan Study (see Appendix A-3).

1.2 Aims and Area of the Study

The Study covers the four districts of Luwero, Masaka, Mpigi and Mukono in Central Uganda aims to:

- a) formulate a Master Plan for the Integrated Agricultural and Rural Development Project covering the above-mentioned four districts;
- b) transfer technology and knowledge to relevant Ugandan personnel through the process of carrying out the Study.

Table 1.2.1. shows the breakdown of 22 counties and 106 sub-counties in the four districts. The region being studied has a total area of 36,703 km², of which 11,612 km² is water area.

Table 1.2.1 Contents of the Study Area

Name of District	No. of Counties	No. of Sub-counties	Land Area (sq. km)	Water Area (sq. km)	Total Area (sq. km)
Luwero	4	21	9,018	180	9,198
Masaka	6	24	5,865	1,121	6,986
Mpigi	6	31	5,167	1,111	6,278
Mukono	6	30	5,041	9,200	14,241
Total	22	106	25,091	11,612	36,703

Source: Based on data obtained from Statistics Department of MFEP (Oct. 1993)

1.3 Implementation of the Study

The Study consists of two phases having three and two stages respectively. The components of each phase are discussed below. The work schedule, including submission of reports, is shown in Figure 1.3.1.

1) Phase I

- a) Submission of inception report
- b) Stage 1: Study of present situation

To identify the socio-economic situation in Uganda as a whole, and also the present state of nature, agriculture, livestock, agro-economy, processing and distribution, rural social infrastructure, environmental matters and so on within the Study Area. To implement a contract for the farmers' intention study (see Appendix 1.2) and an agreement on ground water survey between Uganda and Study Team (see Appendix 2.1.3).

c) Stage 2: Analysis of present situation

To analyze the present situation on such areas as land use, agricultural zones, crops, livestock, infrastructure, meteorology and hydrology. Also to examine the above-mentioned contract and agreement.

- d) Submission of the progress report 1
- e) Stage 3: Formulation of development scheme

To set development targets for each sector for use in specific projects.

f) Submission of the interim report

Figure 1. 3. 1 Work Schedule (1)

Study Item	FY 1992			FY 1993			FY 1994			
	1	2	3	4	5	6	7	8	9	
A. Study Period	4 14			15		30	11 12	11 12	11 23	25 31
B. Phase	Phase I			Phase I			Phase II			
C. Fiscal Year	1st Year			2nd Year			3rd Year			
D. Report *1	A--A ICR			A--A PR(O)			A--A IUR	A--A PR(O)	A--A DER	A ER
1. Discussion / Meeting in Uganda										
2. Study of Present Situation										
Sector-specific Study on Present Situation *2										
Contracted Survey *3										
Observations on Meteorology, Hydrology and Water Quality *4										
3. Analysis of Present Situation										
Development Policy in the Country and Study Area										
Preparation of Land Use Maps										
Preparation of Land Classification Maps										
Meteorological and Hydrological Data Analysis										
Classification of Farming Areas, and Farm Management Patterns										
Formulation of Technology and Facility Development Targets *5										
Clarification of Constraints on Development										
Clarification of Environmental Conservation Issues										
Farmer Incomes by Farm Management Patterns										

Legend: — Preliminary Preparation, [] Study in Uganda, [] Study in Japan, A--A Explanation on Reports, Others

Figure 1. 3. 1 Work Schedule (2)

Study Item	Year																					
	FY 1992			FY 1993			FY 1994			FY 1994												
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	
4. Formulation of Development Scheme																						
Formulation of Framework of Overall Development Programme																						
Formulation of Technology and Facilities Targets																						
Formulation of Environment Conservation Targets																						
Selection of Crops and Animals																						
Formulation of Cropping Patterns																						
Formulation of Target Crop Yields and Livestock Output																						
Formulation of Target Farmer Income by Farm Management Pattern																						
Land Use Plan																						
Water Use Plan																						
5. Formulation of Basic Development Plans																						
Sector-Specific Basic Plan * 6																						
Project Identification																						
Preliminary Design of Major Structures																						
Benefit and Cost Estimation																						
Environmental Assessment																						

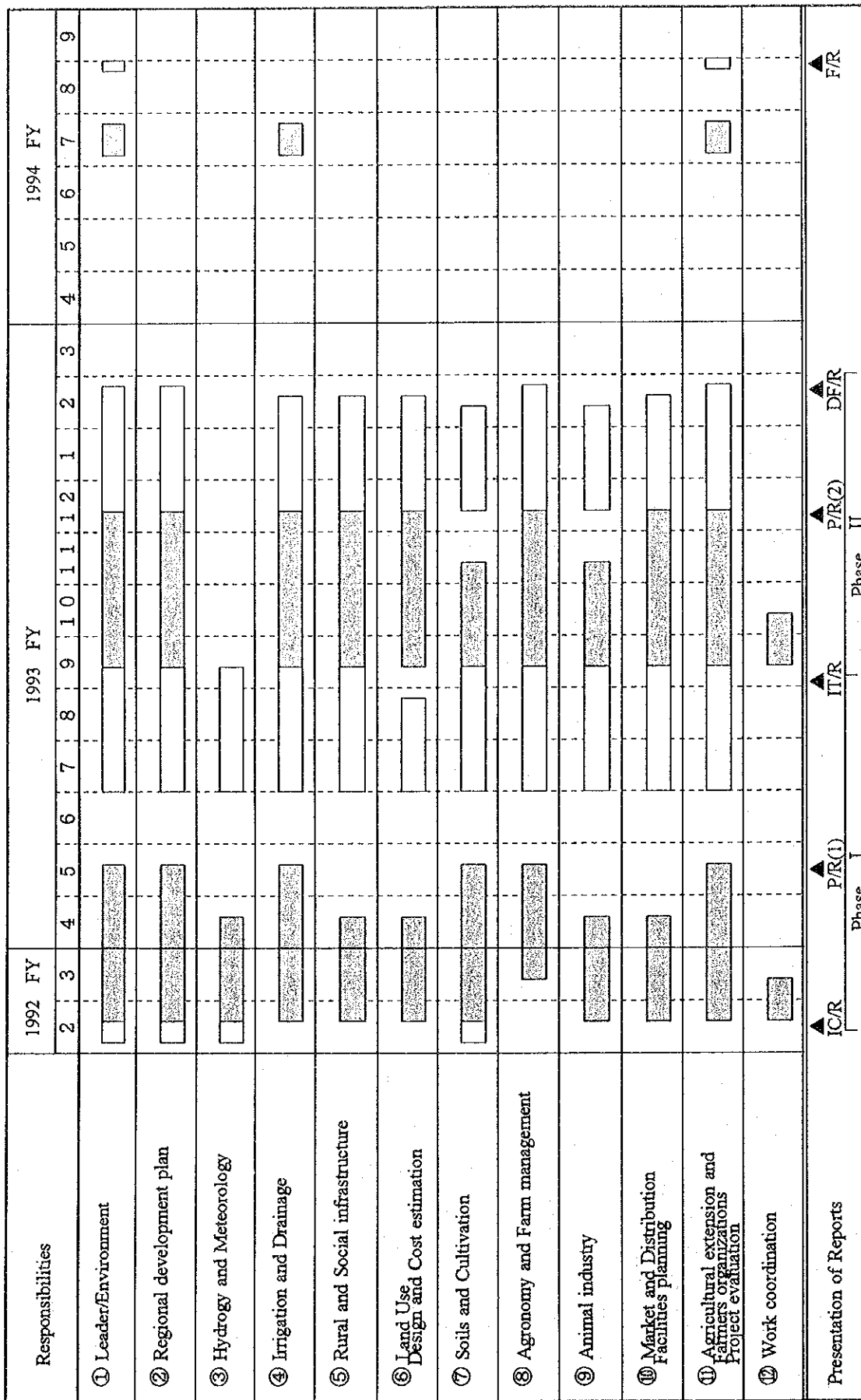
Legend: — Preliminary Preparation, [Pattern] Study in Uganda, [Pattern] Study in Japan, Δ--Δ Explanation on Reports, Others

Figure 1. 3. 1 Work Schedule (3)

Study Item	FY 1992			FY 1993			FY 1994		
	1	2	3	4	5	6	7	8	9
6. Formulation of Development Plans									
Project Priority List									
Project Phasing									
Project Evaluation									
Environment Conservation Measures									
Sector-specific Development Plans									

Legend: — Preliminary Preparation, Study in Uganda, Study in Japan, a--b Explanation on Reports, Others
 *1 : Japanese fiscal year runs from April through to the end of March.
 *2 : ICR, P/R, ITR, DE/R and ER denote Inception, Progress, Interim, Draft Final and Final Report respectively.
 *3 : Present State of Socio-Economic, Natural, Agriculture, Stock Raising, Agro Economic, Agricultural Infrastructure, Rural Social Infrastructure, Environment
 *4 : Questionnaire Survey on Farmers, Soil survey and Ground Water Survey
 *5 : Set of Meteorological Gauges (Temperature, Humidity, Rain, Wind and Radiation), Automatic Water Level gauge, Water Level Observation Gauges(5)
 *6 : Farm management, Cultivation, Stock Raising, Post Harvest, Marketing, Farmers' Credit, Farmers' Organizations, Research, Extension, Agricultural Infrastructure, Rural Social Infrastructure
 *7 : Cropping Patterns, Farm Management Plan, Stock Raising Management Post Harvest, Marketing, Agricultural Supporting Organization Plan, Irrigation Plan, Agricultural Infrastructure Plan, Rural Social Infrastructure Plan

Figure 1. 3. 1 Work Schedule (4) Staffing Schedule



2) Phase II

a) Stage 4: Formulation of basic development plan

To formulate basic development plan on a number of areas, including land use, cropping types, cultivation, farm management, agricultural supports, irrigation, agricultural and livestock infrastructure, rural social infrastructure through additional field surveys.

b) Submission of progress report 2

c) Stage 5: Formulation of development plan.

To formulate development plan and prepare the draft final report on the Integrated Agricultural and Rural Development Project in Central Uganda.

d) Submission of the draft final report

To submit the draft final report based on the result of discussion between Ugandan authorities and the Study team about the draft final report.

e) Submission of the final report

1.4 Structure of the Final Report

The Report presents the achievements of Stage 1 (study of present situation), Stage 2 (analysis of present situation), Stage 3 (formulation of development scheme) and Stage 4 (formulation of basic development plan). Stage 5 is for the formulation of development plans and the completion of the Draft Final Report. The Final Report was prepared taking account of the comments of the Steering Committee on the Draft Final Report.

The Report consists of two separate volumes, text and annex. The text is composed of ten chapters and three appendices.

- | | | |
|--------------------|---|--|
| i) Chapter 1 | - | Introduction |
| ii) Chapter 2 | - | Background of Project |
| iii) Chapter 3 | - | Present Situation for Each Sector |
| iv) Chapter 4 | - | Constraints on Agricultural Development |
| v) Chapter 5 | - | Basic Plan for Development |
| vi) Chapter 6 | - | Development Plan for Each Sector |
| vii) Chapter 7 | - | Priority Projects |
| viii) Chapter 8 | - | Implementation and Management |
| ix) Chapter 9 | - | Project Evaluation |
| x) Chapter 10 | - | Conclusions and Recommendations |
| xi) Appendix A-1 | - | List of Study Team Members |
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- i) Appendix 1 - Fundamental Data and Others
- ii) Appendix 2 - Present Situation for Each Sector
- iii) Appendix 3 - Development Plan for Each Sector
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2. Background of Project

2.1 Economic Situation of Uganda

1) General

The economic prospects were extremely promising when Uganda became independent in 1962. Good agricultural conditions supported a wide range of food crops together with valuable cash crops such as coffee and cotton. The manufacturing sector accounted for only about 7% of GDP, mainly in food and textiles. Between 1965 and 1971 the economy grew annually at about 4%, aided by the country's valuable mineral (copper) and water power resources. By 1986, however, the national economy laid in ruins after successive civil war and political turmoil. Capital assets in agriculture, manufacturing and transportation were seriously run down due to a lack of maintenance and investment. Most commercial sectors were devastated, manufacturing plants were operating at only 5% of capacity, and infrastructures deteriorated. Only the subsistence farming sector survived in reasonable order together with coffee production, which by this time made up more than 95% of export earnings. Since 1987, the economy has been recovered positively with the political stabilization.

2) Gross Domestic Product (GDP)

Tables 2.1.1 and 2.1.2 show that the economy was growing at on average about 7% per annum in 1988-89, falling to 4.5% in 1990, 3.4% in 1991 and 3.2% in 1992. The drop in growth was due to three factors:

- a) Reduced imports and sales of petroleum products during the Gulf war in the second half of 1990. The transport (roads) sector, which had been expanding rapidly during the two previous years (1988-89), fell in 1990, 1991 and 1992.
- b) Drop in revenue at the CMB (Coffee Marketing Board) due to falling world market prices for coffee. The value added to cash crops fell 1.7% in 1992, despite increased production of other cash crops such as tea, cotton and sugar cane.
- c) The late start to the second seasonal rains in 1991 and the first rains in 1992 affected production.

Figure 2.1.1 illustrates the changes in GDP over the past ten years. Total GDP has been growing comparatively well since 1986. Figure 2.1.2 shows the index of industrial production from January 1990 to March 1992. The 12-month moving average has also been good tendency, except between August and November 1992. In short, the Ugandan economy depends primarily on cash crops (especially coffee) and is vulnerable to international prices and weather conditions.

3) Agriculture

Agriculture is the mainstay of the economy, providing more than half of the total GDP (54% in 1991), the majority of exports and a significant proportion of tax revenue. It provides a living for about 80% of the population and 90% is living in rural area.

Economic recovery is heavily dependent on growth and diversification in this sector. Most of Uganda's farming is carried out by about 2,200,000 small holders using simple traditional methods, on averaging only 2.5 ha in national base. Uganda has always been self-sufficient in food, and shortages usually result from problems in distribution or, as in the recent past, the security difficulties. The main food crops are banana, cassava, sweet potatoes, maize, millet, sorghum, beans, groundnuts and sesame. The main cash crops are coffee, cotton, tea and tobacco, though food crops are also grown recently for cash income. The export base has remained narrow and heavily dependent on coffee, although the government has been trying hard to diversify cash crops for export.

4) Livestock

The natural environment provides good grazing for cattle, goats and sheep, most of which are highly indigenous breeds. About 95% of the cattle are owned by small holders, though several hundred modern commercial ranches were established during the 1960s and early 1970s in tsetse-cleared areas. Basically, livestock farmers raise livestock for their own use. Attempts to increase the cattle population by importing foreign breeds have not always successful, and the authorities have embarked upon a programme of artificial insemination. Pig and especially poultry production has increased considerably in recent years due to strong demand for pork, poultry and eggs. Considerable emphasis has been given to disease control and ranch rehabilitation.

Table 2.1.1 GDP at Factor Cost at Constant (1991) Price

	(Million Shillings)									
INDUSTRY GROUP	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
MONETARY										
Agriculture	406,828	383,125	389,041	379,852	390,968	423,071	449,005	469,318	475,779	485,779
Cash crops	59,286	61,038	63,744	55,505	54,478	55,676	58,676	61,857	64,216	65,297
Food crops	190,983	161,009	171,577	175,424	186,463	200,581	220,150	226,671	223,749	227,585
Livestock	114,343	112,104	107,635	102,865	101,107	115,657	119,417	123,868	128,490	130,890
Forestry	12,047	11,801	11,101	10,881	12,307	13,634	13,379	13,988	14,692	15,624
Fishing	30,169	37,173	34,984	35,177	36,613	37,523	37,383	42,934	44,632	46,383
Mining & quarrying	2,947	2,600	2,039	2,004	1,661	1,570	1,811	4,851	6,372	6,870
Manufacturing	59,616	56,079	48,970	46,288	53,888	64,184	73,387	76,908	84,963	90,850
Coffee, cotton, sugar	4,650	4,533	4,137	4,230	4,404	5,067	6,596	6,906	9,400	9,841
Manufactured food	8,525	7,488	7,655	6,840	9,151	11,782	11,731	12,430	13,300	13,327
Miscellaneous	46,441	44,058	37,178	35,218	40,333	47,335	55,060	57,572	62,263	67,682
Electricity/water	8,216	8,828	8,009	9,719	10,755	9,508	10,301	11,574	13,770	14,299
Construction	62,702	50,706	48,141	54,207	81,723	89,129	99,659	104,948	110,650	115,155
Commerce	204,641	192,634	185,043	181,455	196,456	220,549	238,933	250,487	260,145	270,572
Transport/communication	57,086	59,717	62,952	67,568	72,361	76,395	80,355	83,841	87,609	89,557
Road	36,418	40,834	43,753	46,760	49,393	53,887	57,841	60,213	62,195	63,764
Rail	4,187	3,937	3,184	3,435	3,649	3,392	3,522	4,109	5,124	4,459
Air & Support. Services	5,645	3,635	4,252	4,613	6,227	5,860	6,247	6,381	6,817	7,074
Communications	10,836	11,311	11,763	12,760	13,092	13,256	12,745	13,138	13,473	14,260
Community services	204,144	203,679	204,177	211,849	218,588	231,725	246,408	262,965	275,390	288,055
General government	59,816	57,997	56,234	56,230	57,160	58,462	60,136	62,137	64,464	67,173
Education	51,487	54,573	53,609	55,270	53,587	56,245	59,734	65,091	66,699	67,599
Health	20,385	20,724	21,086	21,666	22,261	22,872	23,501	24,146	24,810	25,491
Rents	42,253	39,354	41,354	45,215	49,914	56,143	62,551	68,465	73,488	78,885
Miscellaneous	30,203	31,031	31,894	33,468	35,666	38,003	40,486	43,126	45,929	48,907
TOTAL MONETARY	1,006,180	957,368	948,372	952,942	1,026,400	1,116,131	1,199,859	1,264,892	1,314,678	1,361,137
NON-MONETARY										
Agriculture	506,919	467,002	485,348	495,447	518,601	550,962	586,055	602,526	616,171	631,540
Food crops	438,046	398,622	417,726	428,021	448,330	476,540	508,969	521,782	532,218	545,524
Livestock	48,467	46,648	45,717	44,928	46,999	50,392	52,399	54,687	57,080	58,332
Forestry	16,601	17,043	17,493	18,061	18,654	19,297	19,972	20,642	21,244	21,834
Fishing	3,805	4,689	4,412	4,437	4,618	4,733	4,715	5,415	5,629	5,850
Construction	7,090	7,210	7,339	7,546	7,799	8,103	8,551	9,111	9,908	10,975
Owner-occupied Dwellings	52,008	52,872	53,798	55,276	56,794	58,355	59,958	61,605	63,297	65,036
TOTAL NON-MONETARY	566,017	527,084	546,485	558,269	583,194	617,420	654,564	673,242	689,376	707,551
TOTAL GDP	1,572,197	1,484,452	1,494,857	1,511,211	1,609,594	1,733,551	1,854,423	1,938,134	2,004,054	2,068,688
PER CAPITA GDP (SHS)	113,757	105,653	104,563	102,881	106,649	111,791	116,388	118,390	119,144	119,695

Source: Background to the Budget (1993-94), MFEP (June, 1993)

Table 2.1.2 GDP at Constant (1991) Prices

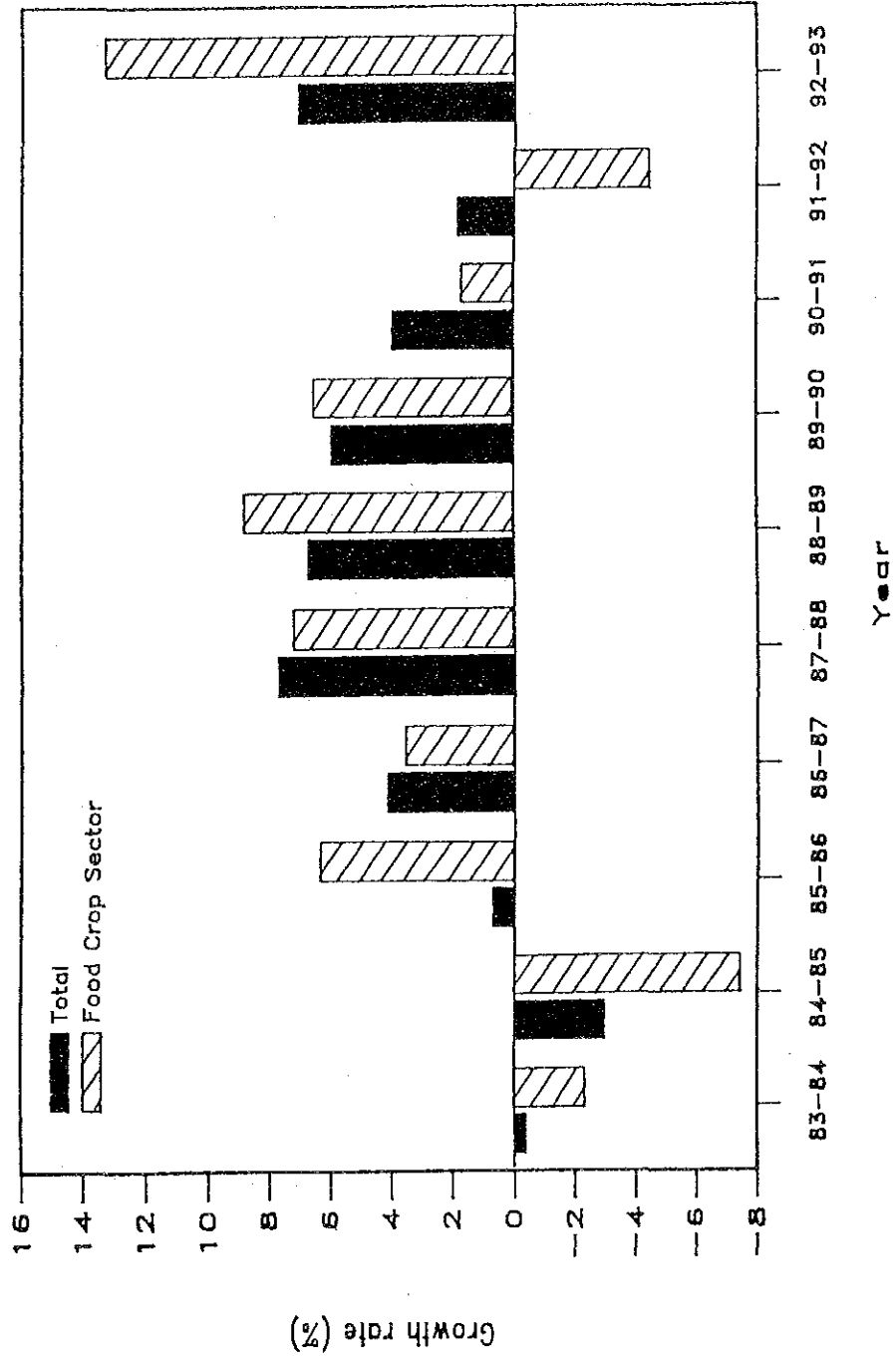
INDUSTRY GROUP	(Percentage Growth Rates)									
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
MONETARY										
Agriculture	6.4	-5.8	1.5	-2.4	2.9	8.2	6.1	4.5	1.4	2.1
Cash crops	5.9	3.0	4.4							
Food crops	11.3	-15.7	6.6	2.2	6.3	7.6	9.8	3.0	-1.3	1.7
Livestock	0.8	-2.0	-4.0	-4.4	-1.7	14.4	3.3	3.7	3.7	1.9
Forestry	4.9	-2.0	-5.9	-2.0	13.1	10.8	-1.9	4.6	5.0	6.3
Fishing	1.4	23.2	-5.9	0.6	4.1	2.5	-0.4	14.8	4.0	3.9
Mining & quarrying	8.3	-11.8	-21.6	-1.7	-17.1	-5.5	15.4	167.9	31.4	7.8
Manufacturing	7.3	-5.9	-12.7	-5.5	16.4	19.1	14.3	4.8	10.5	6.9
Coffee, cotton, sugar	-7.5	-2.5	-8.7	2.2	4.1	15.1	30.2	4.7	36.1	4.7
Manufactured food	4.1	-12.2	2.2	-10.6	33.8	28.8	-0.4	6.0	7.0	0.2
Miscellaneous	9.7	-5.1	-15.6	-5.3	14.5	17.4	16.3	4.6	8.1	8.7
Electricity/water	-1.9	7.4	-9.3	21.4	10.7	-11.6	8.3	12.4	19.0	3.8
Construction	-11.8	-19.1	-5.1	12.6	50.8	9.1	11.8	5.3	5.4	4.1
Commerce	6.8	-5.9	-3.9	-1.9	8.3	12.3	8.3	4.8	3.9	4.0
Transport/communication	10.0	4.6	5.4	7.3	7.1	5.6	5.2	4.3	4.5	2.2
Road	9.3	12.1	7.1	6.9	5.6	9.1	7.3	4.1	3.3	2.5
Rail	5.1	-6.0	-19.1	7.9	6.2	-7.0	3.8	16.7	24.7	-13.0
Air & Support. Services	33.5	-35.6	17.0	8.5	35.0	-5.9	6.6	2.1	6.8	3.8
Communications	4.6	4.4	4.0	8.5	2.6	1.3	-3.9	3.1	2.5	5.8
Community services	2.5	-0.2	0.2	3.8	3.2	6.0	6.3	6.7	4.7	4.6
General government	-1.0	-3.0	-3.0	0.0	1.7	2.3	2.9	3.3	3.7	4.2
Education	3.6	6.0	-1.8	3.1	-3.0	5.0	6.2	9.0	2.5	1.3
Health	2.3	1.7	1.7	2.8	2.7	2.7	2.8	2.7	2.7	2.7
Rents	4.9	-6.9	5.1	9.3	10.4	12.5	11.4	9.5	7.3	7.3
Miscellaneous	4.6	2.7	2.8	4.9	6.6	6.6	6.5	6.5	6.5	6.5
TOTAL MONETARY	4.5	-4.9	-0.9	0.5	7.7	8.7	7.5	5.4	3.9	3.5
NON-MONETARY										
Agriculture	6.2	-7.9	3.9	2.1	4.7	6.2	6.4	2.8	2.3	2.5
Food crops	7.0	-9.0	4.8	2.5	4.7	6.3	6.8	2.5	2.0	2.5
Livestock	1.1	-3.8	-2.0	-1.7	4.6	7.2	4.0	4.4	4.4	2.2
Forestry	3.0	2.7	2.6	3.2	3.3	3.4	3.5	3.4	2.9	2.8
Fishing	1.4	23.2	-5.9	0.6	4.1	2.5	-0.4	14.8	4.0	3.9
Construction	3.9	1.7	1.8	2.8	3.4	3.9	5.5	6.5	8.7	10.8
Owner-occupied Dwellings	2.3	1.7	1.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7
TOTAL NON-MONETARY	5.8	-6.9	3.7	2.2	4.5	5.9	6.0	2.9	2.4	2.6
TOTAL GDP	5.0	-5.6	0.7	1.1	6.5	7.7	7.0	4.5	3.4	3.2
PER CAPITA GDP	2.6	-7.1	-1.0	-1.6	3.7	4.8	4.1	1.7	0.6	0.5

Source: Background to the Budget (1993-94), MFEP (June, 1993)

Figure 2.1.1 (Annual Growth Rates of GDP - 1983/84 to 1992/93)

ANNUAL GROWTH RATES OF GDP - 1983/84 TO 1992/93

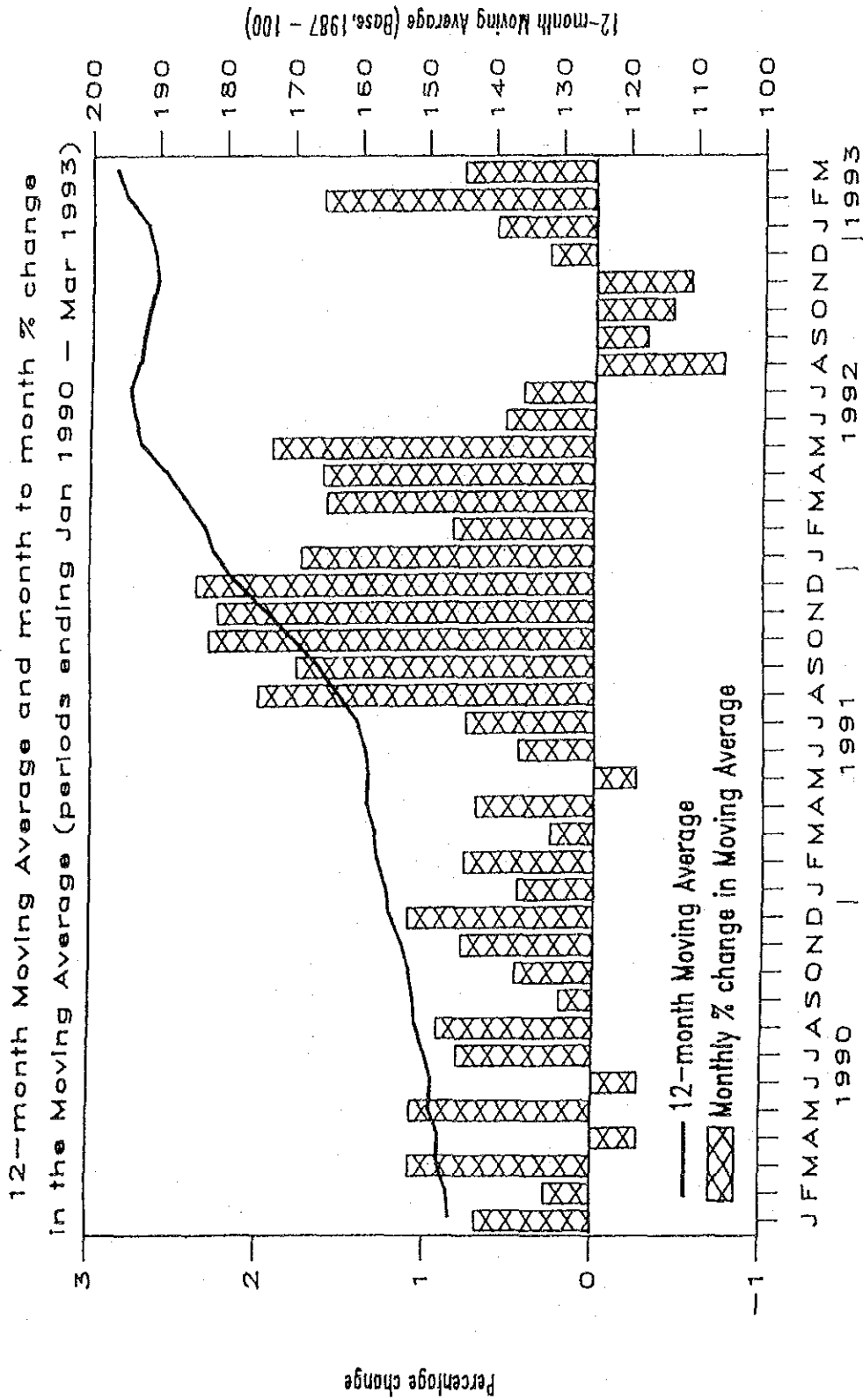
Trends in Total GDP compared with the Food Crop Sector



Source: Background to the Budget (1993-94), MFEP (June, 1993)

Figure 2.1.2

INDEX OF INDUSTRIAL PRODUCTION



Source: Background to the Budget (1993-94), MFEP (June, 1993)

5) Trade

Uganda's exports have always been dominated by agricultural products, of which coffee is by far the most important, accounting for an average about 90% of total export value between 1987 and 1989. This share fell to 65% in 1991, reflecting low coffee export volumes and prices. Vulnerability to low coffee prices has encouraged a drive to increase exports of other crops, mainly food crops.

Table 2.1.3 Main Exports

Unit: mn US\$

Item	1987	1988	1989	1990	1991	1992*1
Coffee	307.5	265.3	262.8	140.4	117.6	98.1
Cotton	4.1	3.0	4.0	5.8	11.7	8.2
Tea	1.9	3.1	3.2	3.6	6.8	7.7
Total	333.6	271.4	277.0	177.8	173.8	150.2
Ratio (%)*2	92.2	98.0	94.9	79.0	67.7	65.3

Note: *1-Preliminary figures, *2-Compared with total export value

Source: Uganda Country Profile 1993-94 (The Economist Intelligence Unit)

Uganda has traditionally sent most of its exports to Western Europe and the USA (61% of the total export in 1991). Regional trade with East African countries has always been small. However, there have been signs of an increase, in food exports especially maize (US\$ 3.3 mn started in 1990, US\$ 4.4 mn in 1991). The main source of imports is Europe, which constituted 43% of the total in 1991. Most goods are shipped through Kenya. European countries accepted 78% of Ugandan exports in 1991.

6) External payments and debts

The trade deficit peaked at US\$ 462 mn in 1989 and fell back to US\$ 362 mn in 1992. This was due to a keen drop in imports, from US\$ 740 mn in 1989 to US\$ 513 mn in 1992 (see Table 2.1.4). Table 2.1.5 shows the current account deficit growing from US\$ 112 mn in 1987 to US\$ 134 mn in 1992. All balance of payments moved firmly into the red from 1990.

Table 2.1.4 Trade and Balance Trends

Unit: mn US\$

Item	1987	1988	1989	1990	1991	1992*
Exports (fob)	333.6	266.3	277.7	177.8	173.8	150.2
Imports (cif)	-598.3	-658.2	-740.0	-617.6	-474.4	-512.6
Balance	-264.7	-391.9	-462.3	-439.8	-300.6	-362.4
Additional balance	-264.7	-656.6	-1,118.9	-1,558.7	-1,859.3	-2,221.7

Note: *Preliminary figures

Source: Background to the Budget 1993-94, MFEP (June 1993)

Table 2.1.5 International Balance of Payments

Unit: mn US\$

Item	1987	1988	1989	1990	1991	1992*
Trade balance	-264.7	-391.9	-462.3	-439.8	-300.6	-362.4
Service (net)	-113.5	-125.4	-108.8	-116.5	-197.5	-196.1
Unrequited transfer (net)	266.0	322.4	311.6	293.0	324.4	424.4
Current account balance	-112.2	-194.9	-259.5	-263.3	-173.7	-134.1
Official inflows	275.5	269.2	461.1	314.0	184.3	193.6
Official outflows	-86.8	-65.8	-162.5	-96.4	-128.2	-178.0
Short-term capital (net)	-67.5	-157.7	18.9	-40.1	-21.2	-9.5
Capital account balance	121.2	45.7	317.5	177.5	34.9	6.1
Change in arrears	19.1	142.1	-41.5	0.0	0.0	0.0
Overall balance	28.1	-7.1	16.5	-85.8	-138.8	-128.0

Note: *Preliminary figures

Source: Background to the Budget 1993-94, MFEP (June, 1993)

The overall balance has fluctuated considerably plunging into deficit level of US\$ 139 mn in 1991 and US\$ 128 mn in 1992, mainly due to the progressive deterioration of the capital account balance. This was caused by a marked drop in the level of new official inflows, from US\$ 276 mn in 1987 to US\$ 194 mn in 1992. Official outflows have also been increasing steadily, rising to US\$ 178 mn in 1992, compared with US\$ 128 mn in 1991.

Table 2.1.6 shows that total external debt had climbed to US\$ 2,830 mn by 1991. 82% of the total external debt consisted of long-term debt. In 1991, the debt service ratio of 60% increased from 60% in 1988.

Table 2.1.6 External Debt

Unit: mn US\$

Item	1986	1987	1988	1989	1990	1991
Total external debt	1,400	1,916	1,946	2,231	2,637	2,830
Long-term debt	1,084	1,577	1,611	1,899	2,212	2,325
Short-term debt	67	66	83	107	143	175
Use of IMF credit	249	273	252	225	282	330
Public and publicly guaranteed						
Long-term debt	1,085	1,577	1,611	1,896	2,213	2,325
Official creditors	893	1,289	1,332	1,619	1,941	2,093
Private creditors	192	288	279	279	272	232
Total debt service	167	160	194	170	129	139
Total external debt/GNP (%)	36.2	44.4	79.6	76.7	96.4	109.2
Debt service ratio (%)	42.0	43.8	60.0	59.6	55.6	63.6

Source: Uganda Country Profile 1993-94 (The Economist Intelligence Unit)

Most of the major bilateral and multilateral donors chose to deter new aid commitments until the government drew up a viable policy framework for the task of rehabilitation. According to the Uganda Country Profile, the level of gross donor assistance rose 200% from US\$ 208 mn in 1986 to US\$ 626 mn in 1991. During the same period total disbursements amounted to US\$ 2,706 mn, 57% from multilateral sources and 43% from bilateral sources. The proportion given as grants in aid was about 54%. In 1991, gross official development assistance consisted of two donor portions: US\$ 293 mn in bilateral and US\$ 333 mn in multilateral aid, includes US\$ 371 mn (59%) in grants.

2.2 Progress of the National Plan

1) Economic Recovery Programme (ERP)

In mid-1987, the government started an Economic Recovery Programme (ERP: 1987/88-1990/91) with support from the IMF. The main goal of the ERP was to rehabilitate the economy and to lay the foundations for sustainable economic growth via the following strategy:

- i) Promoting exports to generate the foreign exchange resources required to sustain economic growth
- ii) Reforming agricultural policy to improve efficiency, and restoring price incentives for producers
- iii) Encouraging investment to enhance import substitution and domestic savings
- iv) Instituting budget reforms to increase revenue mobilization and enhance expenditure control
- v) Reducing inflation arising due to excessive monetary expansion.

Specially, this ERP emphasized the development of the agricultural sector for Ugandan economic recovery. The performance of the economy between 1987/88-1990/91 was impressive. Real GDP growth exceeded 6% a year on average, inflation fell from 207% in July 1987 to 32% in June 1991.

2) Rehabilitation and Development Plan (RDP)

The government's economic programme (Rehabilitation and Development Plan: RDP) for 1991/92-1994/95 was built on the progress made under the ERP to achieve a sustained improvement in the economic and social welfare of the people of Uganda. The RDP aims to maintain economic growth while continuing to reduce macro-economic imbalances in the economy.

The government has set a number of macro-economic targets to quantify progress towards this objective as follows:

- a) Annual growth rate of at least 5%.
- b) A reduction in the rate of inflation to 10% by 1994/95.
- c) An improvement in the economy's external credit worthiness as measured by:
 - i) An accumulation of foreign reserves to over 1 month of imports.
 - ii) A reduction in the debt service ratio.
 - iii) A reduction in the level of arrears on external debt.
- d) A substantial improvement in economic and social prioritisation of public expenditures towards the wage bill and government's priority sectors.

The Strategy adopted by the government to achieve these objectives focuses on:

- i) The development and diversification of the economy's export base.
- ii) The mobilization of domestic savings by stimulating private savings and reducing expenditure in the public sector.
- iii) Investment promotion.
- iv) Reduction in the debt burden.
- v) Reform of the government's budget to operate effectively as an instrument of economic and social policy.

Sector priorities are determined with respect to the long-term objectives for the economy, which emphasizes:

- i) inter-sector linkages, especially for agro-processing.
- ii) efficient import substitution.
- iii) efficient and sustained investment in export oriented industries.
- iv) development of a viable and resilient banking sector as a source of medium-term investment funds including human resource development.
- v) programme to encourage foreign research and technology.
- vi) Rehabilitation, expansion, and maintenance of economic infrastructures.

The objectives of agricultural sector are as follows.

- i) Increase of food production for self-sufficiency and food security.
- ii) Diversification of agricultural exports by creating competitive systems for processing and distribution of agricultural products.
- iii) Medium-term expansion coming from increased improvement in land productivity.
- iv) Support for research and extension services which encourage farmers to adopt better husbandry practices and use appropriate technology.

In terms of macro-economic targets, the agricultural sector has a high priority in the RDP. This Master Plan Study is shown as AG39(A) in RDP and expected to contribute the above-mentioned objectives.

The government is working to improve the policy and regulatory environment in the industrial sector in order to encourage the private sector to produce competitive exports and import substitutes. Transport policy plays an important supporting role in opening up productive areas, improving the distribution infrastructure, and promoting integration with other sectors of the economy. Emphasis must be given to the recurrent costs of maintaining the road network. In the social sector, the government encourages the mobilization of private resources, for instance through a cost recovery programme for the provision of water, health and education services.

Table 2.2.1 gives the sector breakdown of RDP for 1991/92-1994/95.

Table 2.2.1 Sector Breakdown of RDP (1991/92-1994/95)

Sector	No. of Projects	Expenditures (mn US\$)	Share (%) of expenditures
Agriculture	41	240.2	12.9
Environment	14	44.4	2.4
Industry	18	165.5	8.9
Mining & Energy	11	273.9	14.7
Public Administration	39	187.1	10.1
Social Infrastructure	67	603.9	32.5
Transport and Communication	38	315.8	17.0
Tourism & Wildlife	8	27.0	1.5
Total	236	1857.8	100.0

Source: Rehabilitation and Development Plan, 1991/92-1994/95

Volume 1 (Macro-economic and Sector Policy)

Appendix 1.1 outlines the relevant projects in RDP to the Master Plan Study. The progress of these projects is as follows:

- i) At the end of September 1993, 74(79%) of a total 94 projects were underway, seven (17%) had been completed and 13 (14%) had not yet started.
- ii) The sub-county survey findings indicate that it will take some time before the results gained from experimental research filter down to the sub-county level.
- iii) It will be necessary to verify whether these results are being passed down from the central government to the sub-county level.

Table 2.2.2 shows government finances. Total balances are in deficit, dependent on external financing to cover the shortfall. At any rate, the efforts of the Ugandan government and people in implementing the RDP should be supported with external assistance.

Table 2.2.2 Government's Finances

Unit: mn USHS

Item	1990/91	1991/92	1992/93*
Total revenues & grants	279,997	373,809	568,497
Revenues	136,808	187,901	287,111
Grants	143,189	185,908	281,386
Grants (%)	(51.1)	(49.7)	(49.5)
Total Expenditures	358,292	569,912	738,425
Recurrent	139,713	302,929	350,831
Development	214,079	258,483	380,094
Net lending	4,500	8,500	7,500
Total balance	-78,295	-196,103	-169,928
Financing	+78,295	+196,103	+169,928
Domestic	+8,171	+36,279	-34,767
External (net)	+70,124	+159,824	+204,695
External (net) (%)	(89.6)	(81.5)	(120.5)

Note: Fiscal years starting July 1, *Estimates

Source: Background to the Budget 1993-94, MFEP (June 1993)

2.3 Background of the Study Area

The Study Area is located in central Uganda and consists of the four districts of Luwero, Masaka, Mpigi and Mukono surrounding the capital of Kampala, and constitute 13% of the total land area as well as 18% of the country's population (see to Table 2.3.1).

Although this region is favored with good climate, fertile soil, topography and other natural conditions and has a comparatively high potential for agricultural development, it is currently faced with numerous problems leading to a low level of agricultural productivity. Further, while this region is the main coffee producing area of the country, production levels have been low in keeping with the low international value of coffee in recent years, and the diversification of export oriented crops has become a matter of immediate concern.

From the perspective of the natural conditions of the region, it is possible to introduce other varieties of export oriented crops in addition to horticultural crops, and since farmers have experience in cultivating the cash crop of coffee, they have a foundation for accepting the extension of techniques and information that may be provided regarding new cash crops. Moreover, while the region is favorably located within 200 km of the export base of Kampala, which is also the greatest consumer of agricultural produce in Uganda, it is confronted with a number of different problems. Chief among these are the low marketability of agricultural and livestock products due to inadequate storage, processing and roads which comprise the

distribution facilities, and the resulting ineffective realization of these products as export goods.

Table 2.3.1 Main Contents on the Study Area

Item	Study Area (1)	Uganda (2)	Ratio (1)/(2)
Population ('000 p.)	3,026.9	16,671.7	0.18
Land area (sq. km)	25,091	197,096	0.13
Population density (per sq. km)	131	85	1.54
Growth rate (1980-91)	2.3	2.5	0.92
Agricultural products*			
Food crops ('000 t.)			
Banana	1,017.0	8,080	0.13
Root crops	973.6	5,629	0.17
Cereals	69.2	1,523	0.05
Cash crops ('000t)			
Coffee	101,681	150,000	0.68
Cotton	940	8,200	0.11
Tea	5,099	9,000	0.57
Livestock* ('000 h.)			
Beef cattle	654.9	3,282.0	0.20
Milk cattle	11.7	84.5	0.14
Sheep	76.2	850.0	0.09
Goats	366.8	3,203.0	0.11
Pigs	186.5	625.0	0.30
Poultry	1,769.2	10,000.0	0.18

Source: Final results of the 1991 population and housing census, Statistics Department in MFEP (October 1992), Report on Uganda National Census of Agriculture and Livestock (1990-91) in MAAIF and other data.

Note: *Estimate (1991)

Against this type of background, the government of Uganda has positioned this study as an integrated development plan for those areas which can serve as model regions of development and further, as a priority plan in the Rehabilitation and Development Plan (1991/92 - 94/95).

Table A1.2.3 in Appendix 1.2 presents a summary of the desires of the heads of the Sub-counties regarding this Master Plan Study. (Question 99 of the Farmers Intention Study (FIS). Interviews with 101 Sub-county heads.) (Responses from heads of five Sub-counties on islands in Lake Victoria were obtained through interviews with representatives from Mukono District.) The items most desired are listed below in descending order (percentage figures indicate the ratio of desire as regards 106 Sub-counties).

i) Borehole (water supply)	76.4%
ii) Feeder road (rehabilitation)	72.6%
iii) Tractor service (reduce burden of heavy labour on women)	67.0%
iv) Agricultural inputs (chemicals and fertilizers)	67.0%
v) Education (school-PS, SS, TS)	37.7%
vi) Health centre (medical care and hygiene)	35.8%

Table 2.3.2 estimates the balance of food in the four districts, including the consumption in Kampala at the mean value of three years (1989-91).

(1) Plantains (banana)

Production of plantains far exceeds consumption in Masaka, the reverse is true in Luwero and Mpigi. These shortages in the latter two are compensated by root crops. However, the balance including in the capital of Kampala is totally lacking in food supply. Food is brought in the lacked areas from other districts, excluding the Study Area (four districts).

(2) Cereals

The degree of self-sufficiency is very low about 20% in all areas except Luwero. This is compensated by a food supply of plantains, root crops and so on. Specially, only 2 ha of rice is grown in the Study Area. There is a shortage of about 40,000 tons at the national level according to the National Agricultural Research Strategy and Plan.

(3) Pulses

Pulses are slightly lacking in Masaka and Mukono, but abundant in Luwero and Mpigi. The self-sufficiency ratio, including the capital of Kampala, is about 75%. Oil seeds are produced for home consumption. It is estimated that a number of oil products are made in Kampala using raw material from the Study Area.

(4) Vegetables

Vegetables are produced in surplus, with the exception of Mukono. Problems with the distribution system have led to bruised and rotting vegetables.

(5) Fruits

Fruit production is abundant at Masaka and Luwero, much of the produce is consumed in Kampala.

Table 2.3.2 Mean Food Production and Consumption for 1989-91

(Unit: ton)

Item	Production	Consumption*	Balance
Banana	1,016,998	1,047,722	-30,724
Cereals	69,177	383,012	-313,835
Root crops	973,649	503,886	469,763
Pulses	81,758	99,457	-17,699
Oil seed	24,837	45,910	-21,073
Vegetables	127,065	78,850	48,215
Fruits	120,322	125,404	-5,082

Note: * --- Consumption volume of food per capita
(Production - export) / Ugandan population

Source: Towards a National Food Strategy (MAAIF)