AGRICULTURE AND FORESTRY IN UGANDA

PRESENT SITUATION AND ISSUES FOR DEVELOPMENT

JAICAF
Japan Association for International Collaboration of Agriculture and Forestry

March 2010

AGRICULTURE AND FORESTRY IN UGANDA: PRESENT SITUATION AND ISSUES FOR DEVELOPMENT

JAPAN ASSOCIATION FOR INTERNATIONAL COLLABORATION OF AGRICULTURE AND FORESTRY

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Preface

This publication is the summary of the basic information obtained through research and discussions on “Subsistence Crops” among the “Basic Information Collection and Analysis Project for the Support to Developing Countries”, commissioned by the Ministry of Agriculture, Forestry and Fisheries, Japan. The program “Studies on Subsistence Crops” has chosen the cooking banana as the target crop in 2009, but in practice, the study was not limited to cooking banana, but also covered more broad aspects including current situation of agriculture in Uganda and themes for future development.

This publication is thus issued as a separate report, considering that these basic information will not only contribute to the technology diffusion and promotion of cooking banana and related industry, but also will be valuable information for us to promote cooperation to Uganda in the field of agriculture and forestry,

In Uganda, rural population exceeds more than 87% of the total, and more than half of the labor force is employed by agriculture. However, the share of agriculture sector in GDP is declining year by year, with increasing trends of industry and service sectors due to increased private investment and public expenditure. In recent years, in parallel to urbanization, diet pattern has diversified, with increasing production and consumption of rice, partly owing to the cooperation of Japan. However, from the viewpoint of food security, traditional food in Uganda, led by cooking banana, root crops like cassava, sweet potato, potato, and grains such as maize, millet and sorghum should not be neglected.

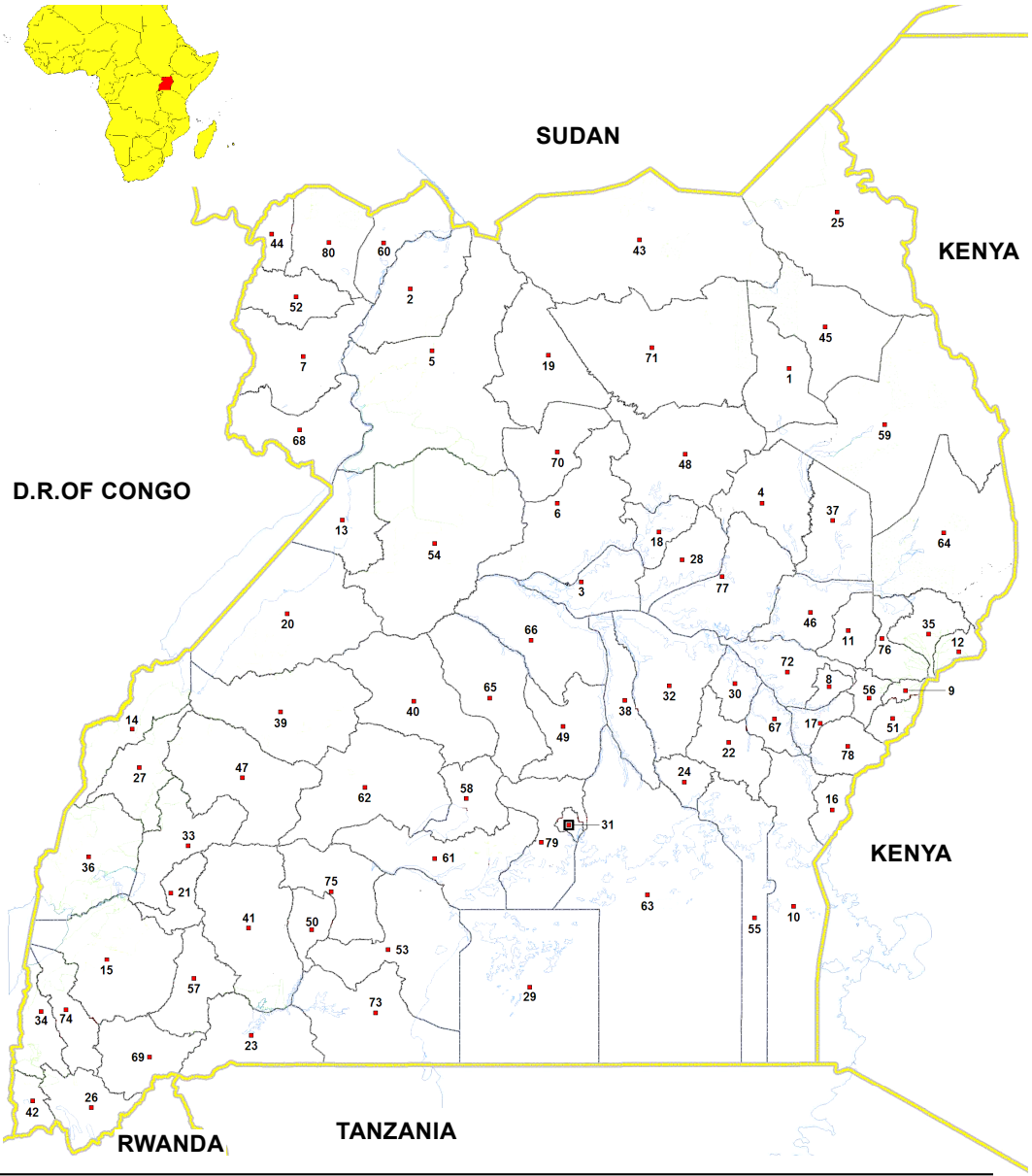
Therefore, in this publication, it was intended to clarify the direction of Japanese cooperation in the field of agriculture and forestry, and to sort out the themes of cooperation through the analysis of the current socio-economic situation as a whole and actual situation of agriculture, food and rural community of the country.

In execution of the study, a field study team was dispatched to collect accurate and latest information. At the same time, Subsistence Crops Investigation Committee was set up within the Association to discuss the issues from the viewpoint of experts.

The completion of this publication would not have been possible without the efforts of writers and committee members, and the Association wishes to express its sincere appreciation to all of them. At the same time, the Association wishes to extend its sincere thanks to the concerned persons of the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Foreign Affairs, Japan International Cooperation Agency and the Government of Uganda for their valuable cooperation.

March 2010

Hisao AZUMA
President
Japan Association for International Collaboration
of Agriculture and Forestry



No.	District	No.	District	No.	District	No.	District	No.	District	No.	District	No.	District	No.	District
1	ABIM	11	BUKEDEA	21	IBANDA	31	KAMPALA*	41	KIRUHURA	51	MANAFWA	61	MPIGI	71	PADER
2	ADJUMANI	12	BUKWO	22	IGANGA	32	KAMULI	42	KISORO	52	MARACHA	62	MUBENDE	72	PALLISA
3	AMOLATAR	13	BULISA	23	ISINGIRO	33	KAMWENGE	43	KITGUM	53	MASAKA	63	MUKONO	73	RAKAI
4	AMURIA	14	BUNDIBUGYO	24	JINJA	34	KANUNGU	44	KOBOKO	54	MASINDI	64	NAKAPIRIPIRIT	74	RUKUNGIRI
5	AMURU	15	BUSHENYI	25	KAABONG	35	KAPCHORWA	45	KOTIDO	55	MAYUGE	65	NAKASEKE	75	SSEMBABULE
6	APAC	16	BUSIA	26	KABALE	36	KASESE	46	KUMI	56	MBALE	66	NAKASONGOLA	76	SIRONKO
7	ARUA	17	BUTALEJA	27	KABAROLE	37	KATAKWI	47	KYENJOJO	57	MBARARA	67	NAMUTUMBA	77	SOROTI
8	BUDAKA	18	DOKOLO	28	KABERAMAIDO	38	KAYUNGA	48	LIRA	58	MITYANA	68	NEBBI	78	TORORO
9	BUDUDA	19	GULU	29	KALANGALA	39	KIBAALE	49	LUWERO	59	MOROTO	69	NTUNGAMO	79	WAKISO
10	BUGIRI	20	HOIMA	30	KALIRO	40	KIBOGA	50	LYANTONDE	60	MOYO	70	OYAM	80	YUMBE

* Capital

Administration map of Uganda

Source: http://www.reliefweb.int/rw/rwb.nsf/db900sid/HHOO-7U8MCA?OpenDocument&rc=1&cc=uga

Exchange rates

	2005	2006	2007	2008	2009
Ugandan shillings (Ush) per US dollar	1,780.7	1,834.9	1,685.8	1,658.1	2,073.3
Japanese yen per US dollar	110.22	116.18	117.99	103.58	94.50

Source: CIA Homepage

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CHAPTER I. NATIONAL ECONOMY AND AGRICULTURE & FORESTRY

1. Structural Characteristics of the Economy

1) General features of the national economy

The Republic of Uganda has achieved economic growth of 6 % on an average in the past 15 years. In recent years, growth rate is nearly 7 %, the target figure for poverty reduction strategy set by the Government. In the year 2008/09 (fiscal year is from July to June) also recorded high performance of 6.7 % in spite of the influence of the world wide recession.

Poverty ratio has also declined reflecting better economic conditions by decreasing percentage of population below poverty line from 56 % to 34 % in 1990's, and further to 31 % in 2006. However, no remarkable progress has been observed since then. GNI (Gross National Income) per capita was $280 in 2005 and Uganda remains one of the poorest countries with its Human Development Index of UNDP (2007) at 154th among 177countries. From the index of MDP (Millennium Development Goals), the ratios of primary school enrollment and girls school enrollment have been rapidly raised, and access to safe drinking water has been significantly improved. HIV/AIDS which raged in 1990's has subsided since 2000's dramatically. On the other side, due to high population growth rate of 3.2 % on an average between 1969 and 2002, per capita economic growth rate has remained low. Total population in 2009 was estimated at 30.7 million (Uganda Bureau of Statistics).

Disparity between urban and rural economy is considerable, particularly in the northern part of the country where internal strife has been continuing for more than 20 years.Though this area has started reconstruction and rehabilitation recently, poverty ratio remains as high as more than 70 % (OPM2006).

Table I.1.1 GDP growth rate 2004/05－2008/09

	2004/05	2005/06	2006/07	2007/08	2008/09
Real GDP Growth Rate	6.6	10.3	6.9	8.3	6.7
Nominal GDP Growth Rate	6.3	10.8	8.4	9.0	7.0

Source: MoFPED 2009b

2) Industrial structure

Of the total population, about 87 % live in rural areas and most of them work in the farming sector. Economy of Uganda typically depends on agriculture and rural community. Share of agriculture in total GDP has been declining and remains less than 20 % during the past several years. In the agriculture sector, coffee is the single most important crop, with a share of 80 % by monetary basis among total cash crops. While cotton and fisheries production are showing signs of recovery, tea production has been sluggish due to the lower international price in recent years. On the other hand, shares of industry and services sectors are increasing gradually owing to the increased private sector's investment and public expenditure. The industry sector's share has grown to 25 %, but the growth rate is now staggering, in one part by stagnation in the construction sub-sector. In the manufacturing sub-sector, food processing industry plays a leading role owing to the increasing demand for food from the neighboring countries. A rapid growth in production of construction materials is also observed.

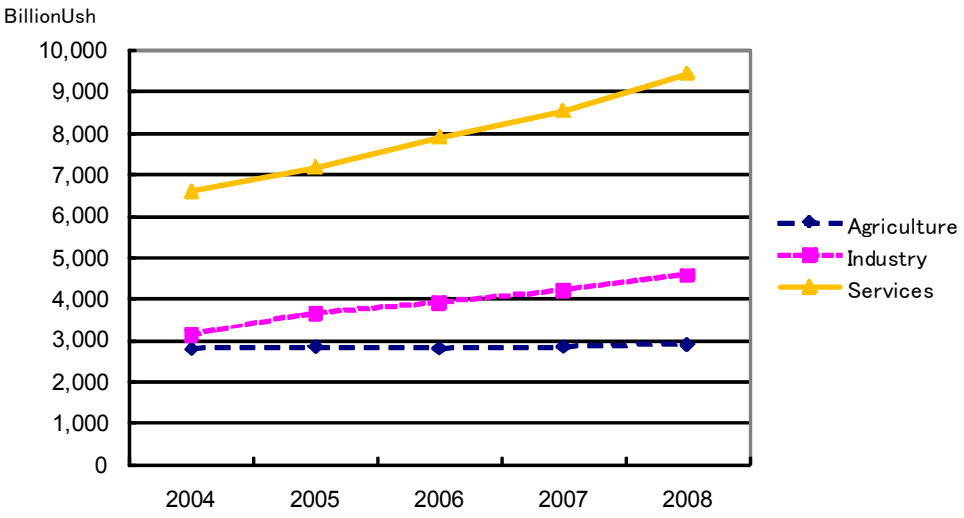

Fig. I.1.1 Production by industrial sectors

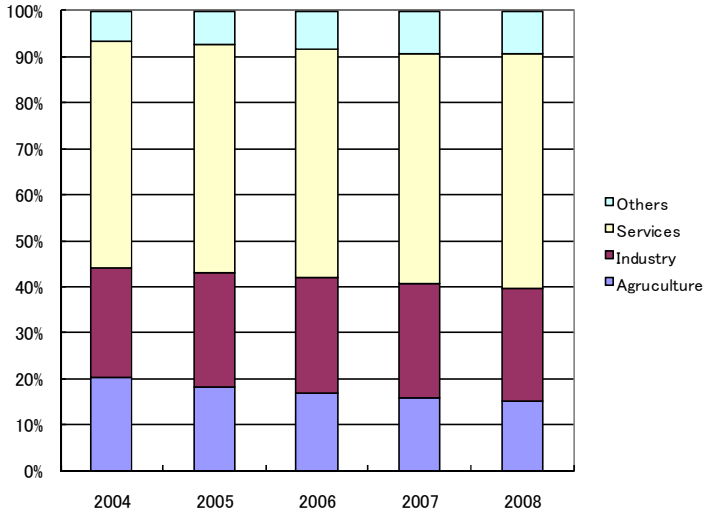

Fig. I.1.2 Share of GDP by industrial sectors

During the past several years, the services sector has supported economic growth of the country contributing to around 50 % of the total GDP, with annual growth rate of 10 % on an average. Especially, transportation and communication have been growing rapidly, and are expected to continue, owing to the government policy to strengthen infrastructure in these fields. The financial sector such as commercial bank and insurance has also achieved high average growth rate of 20 % in recent years (UBOS 2009).

3) Factors affecting the national economy

(1) Natural conditions

Of the total area of 240,000km^2 (around 3/4 of Japan), about 20 % is water surface or marshes and around 40 % is cultivated land (2005). Average altitude is 1200m above sea level (asl), from 620m asl of Albert Nile River surface to 5110m asl of the top of the Mount Rwenziri. The country is well endowed with affluent water resources led by Nile River, and its source Lake Victoria, the biggest one in Africa, and Lake Kyoga located in the central part of the country. Natural vegetation consists mainly of grassy plain, forest and tropical forest, with annual rainfall of 750－2000 mm and mild

weather throughout the year. As more than 80 % of the population depends on agriculture, Uganda is one of the countries most vulnerable to climatic changes. Droughts and floods in the past 5 years have caused serious damages to the effort for economic growth and poverty reduction (UBOS 2009).

(2) Geographic condition

As an inland country, Uganda depends on Mombasa, Kenya for about 90 % of international trade and remaining 10 % on Dar es Salaam of Tanzania, from where merchandise are carried overland. Distance between Kampala, the capital of Uganda, and Mombasa and Dar es Salaam is 1,200km and 1,900 km, respectively. As the railway network from the ports of Mombasa and Dar es Salaam to Kampala is not well established, there exist many problems on operation, maintenance and management. Therefore, transportation overland depends on trailers and heavy duty trucks. In this case, it usually takes 20 to 30 days from these ports to Kampala due to the long waiting time at the ports and the custom offices at the borders. Transportation cost for a 40-feet container from these ports to Kampala is $4,800 and $8,200, respectively (JICA 2009). At the same time, damages of paved roads by the heavy duty trucks are serious and require constant repairs.

With regard to the marketing in East Africa, negotiations started in March, 2008 among EAC countries (Kenya, Tanzania, Uganda, Rwanda and Burundi) for the establishment of a common market, which was officially signed in November, 2009. It aims at contributing to the improved production efficiency, increased investment, expanded job opportunity and increased trade among member countries. It basically intends to remove barriers for movement of labor force, commodity, services and capital. This is expected to come into effect in July, 2010. This movement has been expanding to other common regional economic organizations. In February, 2009, a joint meeting of EAC, COMESA and SADC was held in Uganda where there were discussions to create a Free Trade Zone involving 26 countries with an estimated total GDP of $ 642 billion (MoFPED 2009b, AU 2009).

(3) Population growth

As already stated, yearly population growth of Uganda since 1969 is 3.2 % on an average, which is extremely high even from the world standard. If this trend is to continue, 1.2 million babies will be born a year and in 2025, the total population is expected to exceed 50 million. It is quite worrisome that the rapid population increase will not only slow down the economic growth but also degrade the level and quality of various social services.

Issues of population growth are taken up in the parliament debate seriously from the view point of food security. In September 2008, Ministry of Finance, Planning and Economic Development officially announced the revised population policy in which necessity of population control was emphasized. However, on the occasion of this announcement, read on behalf of the President Museveni, it was emphasized that “Population increase is not itself the problem. What we should do is to maintain and upgrade the quality of public services and to provide job opportunity to the people for the development of the country”.

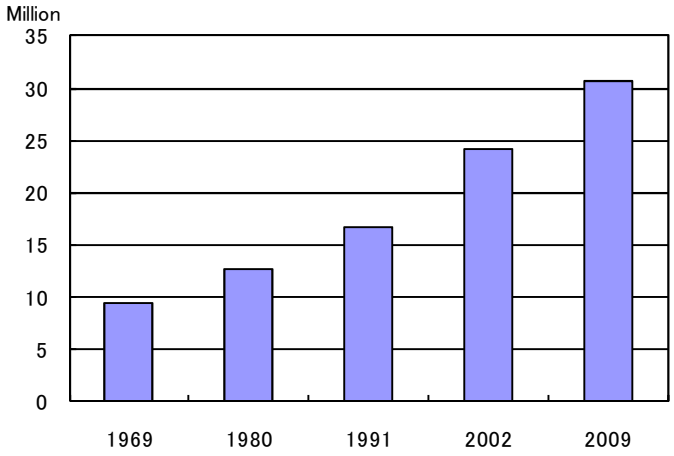

Fig. I.1.3 Population sensus: 1969, 1980, 1991, 2002, 2009
Source: Wiegratz 2009

(4) Political trend

Uganda, former Protectorate of the United Kingdom, had achieved independence in 1962. After the socialist President Obote, followed by dictatorship of President Amin, and the days of invasion by Tanzania, Mr. Museveni was inaugurated as President in 1986 by coup d'etat. Winning both of the presidential elections in 1996 and 2001, his leadership and democratic management of the politics had internationally won a high appraisal, and multi party system was introduced in 2005.

But at the election held in 2006, he amended the constitution to make possible three terms of the presidency. Museveni tightened his control to opposition party and won the 3rd term Presidency. World opinion to this development was fairly negative and this led to the direct impact of economic difficulties by decreased assistance from abroad. Noting the severe criticism from abroad on the chronic corruption, the government has been announcing its strict control repeatedly for more than 10 years, without effective results.

Similar to the cases in neighboring countries, decentralization of the authority has been promoted, and transfer of financial disbursement to the local government increased to nearly 7 times during the past 10 years. However, as the progressive taxation was abolished in 2005, a year before the election, local governments have been facing financial difficulty and public services have been deteriorating. In 2008, a new tax system was introduced but this seems unable to compensate the abolished progressive taxation (OPM 2006).

(5) Strife at the border area

In 2006, after more than 20 years of strife with an anti-government party called LRA (Lord's Resistance Army), a comprehensive peace agreement was reached and LRA has moved its base to Democratic Republic of Congo (DR Congo) and the east and central Africa. Therefore, peace seems to be prevailing so far within the country. However, in spite of the intervention effort by the U.N. and Sudan, disarmament of LRA has not been realized yet.

Apart from this strife, border dispute has occurred with DR Congo on the territorial right of islet in Lake Albert, as the huge deposit of oil had been confirmed there. On the other hand, in October, 2009, border dispute between southern part of Sudan and northern part of Uganda reoccurred. Presently, there exist disputes with Kenya on the territorial right of Migingo island in Lake Victoria, and with Rwanda and Tanzania on the land of custom houses at the border.

TableI.1.2 Political events in Uganda

Year	events
1962	Independence from U.K.
1963	Transition to Republic
1966	Coup d'etat by P.M. Obote (President Obote)
1971	Coup d'etat by General Amin (President Amin)
1979	Downfall of Amin, President Lule
	Downfall of Lule, President Binaisa
1980	President Obote (come back)
1985	Coup d'etat by General Okello (President Okello)
1986	Coup d'etat by Museveni (President Museveni)
1995	Promulgation of new constitution
1996	Inception of original HIPC initiatives
	Election of the President, Museveni won the election
1997	Drawing up PEAP (Poverty Reduction Action Plan), reached decision point of HIPC initiative
1998	Reached completion point of HIPC initiative, $347million debt reduction
1999	Creation of Budget for Poverty Action Fund, Initiation of management/ control of general budget support, Enhanced HIPC initiative starts
2000	PEAP 1st revision、Expanded HIPC Initiatives achieved target
2001	2nd election of the President, President Museveni
	Election of Parliament Members
2002	Completion of Expanded HIPC Initiatives, $656million debt reduction
2003	PEAP 2nd revision starts
2004	PEAP 2nd revision finalized
2005	Amendment of Constitution (3 terms allowed for President)
2006	3rd Election of President, Election of Parliament Members, Museveni President 3rd Term
2007	PFA (Prosperity for All Program) start
2008	PRDP (Peace, Reconstruction and Development Plan) start

Source: Ministry of Foreign Affairs 2008 (modified)

(6) Business environment

In addition to the difficulties of inland country as stated earlier, in Uganda there exist a number of institutional constraints from the viewpoints of business environment. According to the Doing Business 2010 of World Bank/ IFC, the comprehensive business environment of Uganda was ranked 112th among 183 countries. Of the 10 indices, such 6 indexes as, [procedure for business start up], [movable property registration], [access to credit], [protection of investor], [trade] and [effectiveness of contract] are more than 100th in order. Relatively high evaluation was given to [employment of laborer], and this seems to be due to the fact that the regulations related to labor in Uganda are lax. Anyhow, to attract investment, there still remain many issues to be improved.

(7) Support by donors

Uganda depends highly on assistance from abroad. In the early half of 2000's, amount of aid was 11 % of GDP and around a half of the total budget. About 40 donors extend support to Uganda. But most of the aid is quite small, with the top 10 donors occupying 76 % and 96 % of the total aid amount in the year 1997 and 2003, respectively. Higher rank donors include World Bank, EC, African Development Bank, DFID (UK) and USAID followed by Germany and Scandinavian countries.

In recent years, the share of the foreign assistance in the national budget has been less than 40 % and in 2007/08, the share declined to 28 %. This might meet the basic policy of the President to shake the country free from high dependence on foreign aid, but as the investment to big scale infrastructure continued in 2007/08, expanded loan would have raised the share of aid to 40 % again (MoFPED 2009b). Dependence on donors would definitely continue, and it seems necessary to carry out financial management in full consideration of the risk by declining donor fund.

4) Trend of economic policy

From 1980's, under the strong leadership of the Ministry of Finance and the support by IMF/World Bank for structural adjustment policy, Uganda's economic policy paved the way for economic liberalization and achieved in such areas as non intervention on exchange market, liberalization of commodity market and reduction of trade barrier. In recent years, the government has been taking great pains in ensuring monetary and financial discipline in the course of expanding public expenditure and these performances are acclaimed by IMF and others (IMF 2009).

PEAP (Poverty Eradication Action Plan), details of which will be provided later, sets the target of GDP growth at 7 % for the reduction of poverty ratio, but from 2003 to 2005 it could not be achieved. As the greatest cause, failure in the agriculture sector was raised. However, in recent years, some indication of reconstruction and development are observed in the northern part of the country and brisk construction sector due to expanding public works are noted, all of these being expected to contribute to higher growth rate. Further, the situations with DR Congo and Southern Sudan have been stabilizing and the rapidly increasing export of farm products and others to these countries altogether will contribute to the improved growth rate.

The government fully recognizes that the private sector investment is essential to the economic growth. To realize this situation, the Investment Agency established referential tax offices at 22 major cities in the country and started first phase construction of Namanve Business Park about 30 minutes from Kampala with a total area of 1,000 ha, inviting firms both from abroad and within the country.

Reconstruction of the northern region, increased demand for food products from the neighboring countries and government emphasis on infrastructure investment are the major factors contributing to higher growth rate. Therefore, the impact of the worldwide recession is not considered to be so serious (IMF 2008). Reconstruction of the northern region has the particular implication to the country's development. With around 20 % of the total population, this region has not participated in production activities for a long period. Repatriation of refugees to their homeland from the camps is now rapidly going on, and their anticipation in production activities will be expected to enhance the economic growth further (OPM 2006).

5) Trade

With the exception of food items, most of the basic commodities, construction material, petroleum products, etc, are imported from abroad. In trade balance, increase in import far exceeds that of export. Import surplus in 2008 expanded to $2.8 billion from $2.15 billion in 2007. This is mainly due to the sharp increase in import other than oil products. Again, as shown in Table I.1.3, informal border trade with neighboring countries are notable and growth of export was 69.4 %, estimated at $1.3 billion. Of this amount, around 70 % are those of industrial products and daily necessaries, but in recent years export of maize and beans show rapid increase to neighboring countries; about 50 % increase from the previous year. This is mainly because of the increased demand from the southern part of Sudan., Trade balance is estimated at $ 1.5 billion deficit (including these informal trade).

Table I.1.3 Import & export, trade balance and growth rate (2004 - 2008)

(unit: Billion US$)

year	2004	2005	2006	2007	2008
Import	172.62	205.41	255.73	349.54	452.59
Export	66.51	81.29	96.22	133.67	172.43
Trade balance	-106.11	-124.12	-159.51	-215.87	-280.16
Growth rate (Import)	2.55	1.90	2.45	3.67	2.95
Growth rate (Export)	2.45	2.22	1.84	3.89	2.90
Import (Informal)		6.58	8.06	5.72	7.35
Export (Informal)		20.03	23.17	77.65	131.59

Source:UBOS 2009

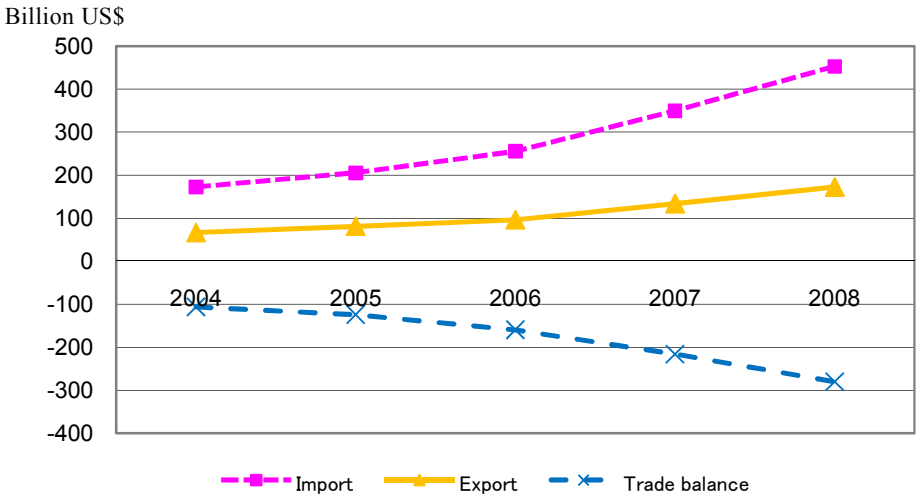

Fig. I.1.4 Growth of export/import and trade balance (excludes informal)

Export in 2008 was $1.7 billion against $ 1.3 billion in the previous year, which shows an increase of 29 %. Export of coffee, a major export commodity of Uganda, increased 21 % in quantity in 2008, but due to the recovery of the coffee price of international market, export amounted to 50 % increase. Therefore, contribution of coffee export to total export increased from 19.9 % in 2007 to 23.4 % in 2008. Other traditional export commodities, such as tea, cotton and tobacco are decreasing their shares in the total export though they maintained their export volume as shown in Fig. I.1.5. Major non-traditional commodities for export include maize, beans, fresh water fishes, flowers, electric power and others. Among these, maize, sesame, cobalt showed notable increases compared to the previous year (UBOS 2009).

Major import commodities are petroleum products, vehicles, iron and steel, electric appliances and medicines. Among these, a high demand is expected for such items as machinery and vehicles related to the private sector investment, and also construction equipment. The government recognizes this as a sign of strong concern of the investors from abroad and within the country, reflecting Uganda's steady economic growth even in the global economic crisis (MoFPD 2009b).

Major export destinations are COMESA and EU and the share of these two regions in total export (excluding informal one) in 2008 was 42.1 % and 26.7 %, respectively. Shares by countries are 14.3 % for Sudan, 9.5 % for Kenya, 9.0 % for Switzerland, 7.9 % for Rwanda, 7.4 % for United Arab Emirates (UAE) and 6.9 % for UK.

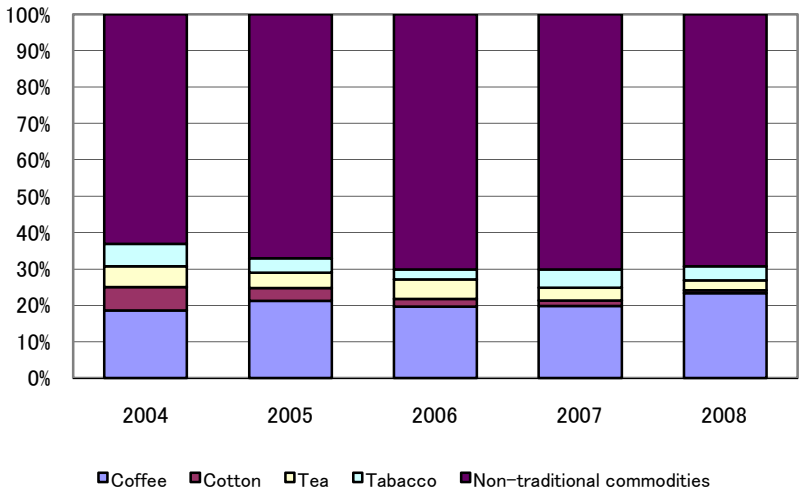

Fig. I.1.5 Share of export by commodities

In case of import, Asia shares 34.8 % of the total import, followed by EU of 19.4 % (2008). By country, UAE leads by a share of 11.4 %, followed by Kenya (11.3 %), India (10.4 %), China (8.1 %), South Africa (6.7 %), and Japan (5.9 %). The share rankings for both export and import by country have not changed for the past several years (UBOS 2009).

As far as international agreements on trade are concerned, EBA (Everything But Arms) with European countries and AGOA (African Growth Opportunity Act) with USA are notable organizations. The former permits Uganda's export free of tariff without ceiling of quota except arms, and the latter permits Uganda's export to USA free of tariff for specified commodities. Under the general preferential tariff system, Canada, Japan, China and others also provide favorable treatment of tax exemption to African countries. Uganda is in a position to utilize this favorable treatment for their export to these countries, although these have not effectively been utilized yet. No significant growth of export has been observed except those to East African countries and the effect of the above mentioned agreements have been so far limited. The problems are that production and supply system of export commodities both in quantity and quality is not yet established in the country, and that there exists no support from the government on this aspect. The National Trade Policy established in August, 2007, raises questions about the capacity of Ministry of Trade, Industry and Tourism and reforming the Ministry is taken up as a first priority. In addition to the reform of the Ministry, formulation of the National Trade Sector Plan was also stated but not realized yet (MTTI 2007a). On the other hand, MTTI has prepared National Export Strategy in October, 2007, in which 6 sectors, namely coffee, tea, flower, fresh water fish, cotton and services were designated as priority sectors.

6) Balance of international payment and public debt

Balance of international payment of Uganda in recent years shows a rather negative position. In 2007/08 the balance was plus $690 million but in 2008/09 it was estimated to decline to minus $48 million (0.3 % of GDP) (MoFPED 2009b). In spite of better export performance and loans and grants from donors, foreign payment has expanded due to rapid increase of import of construction material, declining remittances from abroad and required remittances to home country by foreign firms and NGOs. In addition to withdrawing foreign currency reserve to make up this deficit, the big fall of Uganda Shilling against other currencies in 2008 forced the government to intervene by buying U. Shilling and this led to the decline in foreign reserve by $200 million. According to IMF, the aftermath

of global economic crisis is being observed gradually in Uganda in 2009, and if the export remains stagnant, the possibility to increase deficit of international payment will exist. However, IMF considers that as the level of decrease of foreign reserve will be equivalent to 4 to 5 months export at most, the balance of international payment will be sustainable for medium term if the sign of global economic recovery is indicated (IMF 2009).

Regarding the government debt, the ratio of remaining debt to GDP improved from 47.9 % ($4.4 billion) in 2005 to 11.4 % ($1.5 billion) in 2007, partly due to debt relief measures of HIPC and MDRI initiatives. The ratio of remaining debt to export also declined from 14.2 % to 4.1 % in the same period. Debt Sustainability Analysis (DSA) conducted jointly by IMF and World Bank in December, 2008, also indicates that with all indices the figures for Uganda were all far below the threshold (IMF 2008). At the end of 2007, Ministry of Finance, by preparing [Debt Strategy], clearly indicated a very cautious attitude on borrowing money from donors and private sectors. The intention was to maintain the level of debt drastically decreased by HIPC and MDRI initiatives so as to be at the repayable level. The Strategy clearly states that borrowing should be limited to the cases where no grant is available from donors and to be used for productive sectors such as infrastructure, water and irrigation.

7) Inflation rate

Inflation rate of Uganda has been kept low since 1992 at around 5 % on an average. However, in recent years, soaring food price due to the increasing demand in East African countries, together with higher transportation cost from rising international crude oil price, prices have been going up in general. In particular, due to the riot in Kenya just after the election of the President at the end of 2007, commodity supply had delayed, and in early part of 2008 international prices of food and oil soared rapidly. All of these led to the high inflation rate of 15.9 % in August, 2008. Though indication of improvement has been observed since March, 2009, inflation rate of food remains relatively high. High inflation rate of the past 1-2 years is due to the expanding demand for food (demand for fresh water fish from Europe, demand for grain from neighboring countries, particularly from Southern part of Sudan and Eastern region of DR Congo), soaring price of construction materials, increasing transportation cost and falling of Uganda Shilling (MofPED 2009b). According to the 5th Review of the PSI (Policy Support Instrument) started by IMF since 2005, it is forecasted that the inflation rate could be brought down to the target of 5 % by 2010 if the government continues cautious financial policy (IMF 2009).

2. Target and Plan of Economic Development and Agriculture/ Forestry Development

1) Target and plan of economic development

(1) Poverty Eradication Action Plan (PEAP)

PEAP was drawn up in 1997 as a comprehensive 10-year development framework of Uganda. In 2000 and 2004, PEAP was revised as 2nd PEAP and 3rd PEAP, respectively. The 2nd PEAP of 2000 was officially acknowledged as a first Full Poverty Reduction Strategy Paper (Full-PRSP) by World Bank.

The target of PEAP is set as [to reduce the ratio of absolute poverty to less than 10 % by 2017]. However, due to stagnation of growth rate of agriculture by falling crop prices, deteriorating security situation in the northern region, high population growth and high infection rate of HIV/AID, poverty ratio soared from 34 % in 2000 to 38 % in 2003, and Gini coefficient increased from 0.35 in 1997 to 0.43 in 2003, showing the increasing income disparity. After taking development into account, the

following five were set as priority areas in the 3rd PEAP.

①Economic administration and management

- Stabilization of macro economy through inflation control, reduction of financial deficit, increase in tax revenue, improvement of financial system, promotion of investment and international trade

②Increase in production, competitiveness and income

- Agriculture sector: As agriculture continues to be a core industry of the country modernization of agriculture is to be promoted to eradicate poverty in rural areas.
- Road sector: Road construction including community roads, and their operation and maintenance
- Energy sector: Electric power supply to be increased as the current supply is only 317MW against the forecasted demand of 649 MW in 2010
- Exploitation of natural resources: Promotion of natural resources exploitation including petroleum
- Tourism: Implementation of support to tourism industry to increase visitors from abroad
- Promotion of science and technology and industrial development: Creation of awards for technology development and other incentives
- Financial services: Micro-finance system development in rural areas for better access
- Promotion of small- medium scale industries: support to upgrade the business skill, revision of related laws and regulations
- Environment: Multi-disciplinary policy formulation and execution for avoiding soil fertility decline and deforestation
- Labor market: Quality improvement of laborer through vocational training, improvement of working environment through improved insurance system

③Security, settlement of strives, disaster management

- Settlement of strives with anti-government force, eradication of livestock robbery, promotion of resettlement of internal refugees, protection of lives and property by disaster management

④Good governance

- Human right and democratization, improvement of legal system, enhanced accountability of the public sector

⑤ Human resources development

- Education: improved quality of education, strengthened medium level education and vocational training
- Health and medical care: improvement of health index and promotion of family planning
- Water supply：Improvement of access to safe water
- Social development: Improvement in levels of adult literacy, support to the underprivileged

Further, as multi-sectorial issues, eight areas namely gender, environment, HIV/AID, employment, population, social security, income distribution and regional disparity are set in the 3rd PEAP.

As the succeeding document of the 3rd PEAP, National Development Plan (NPD) is now under preparation. After extending one year for the 3rd PEAP, NPD is scheduled to start from July, 2010. In NDP, an approach of setting priority sectors is to be taken, paying attention to [Primary Growth Drivers] and [Complementary Sectors] which will be able to accelerate the reform of the state.

(2) Priority issues on budget formulation

The process of budget formulation in Uganda starts with a high level meeting attended by officials from each ministry, concerned agencies, donors and private sector, invited by the Minister of Finance, who announces the priority issues of the budget. For those sectors of priority issues, final adjustment is made by allocating additional budget to the MTEF (Medium Term Expenditure Framework: preliminary budget for each sector for 3years based on the forecasted revenue of medium term). At this meeting, the status of the budget disbursement and its effect are reviewed and the participants are invited to make comments, thus making the process very much transparent.

Budget statement of 2008/09 by the Minister of Finance covered the following six points as priority issues for economic management of the government. Budget statement of 2009/10 followed almost the same line as the previous year, reflecting the additional budget (Fig. I.2.1). Although the agriculture sector always remains as priority, budget allocation is limited, with only 4.4 % of the total budget in 2009/10. This is slightly higher than that of 2008/09 (3.8 %) but is very much lower than the target of 10 % for the agriculture sector, made by the Maputo Declaration of AU in 2003. The education sector is increasing its budget as primary education is now compulsory while tuition is not required in secondary schools since 2006.

①Pavement for newly constructed road, and maintenance of national, provincial and community road

②Increased agricultural production by mechanization and promotion of improved varieties

③ Start construction of power transmission lines for Karuma hydroelectric power station, and implementation of F/S for Isimba hydropower station

④Promotion of industrialization (Financial, institutional and technical support, support to agro-processing)

⑤Provision of minimum medical services at the health centers (Reproductive health, HIV/AIDS, Malaria), quality improvement of education (Free of charge for primary and secondary education)

⑥Comprehensive peace and security, maintenance of public order

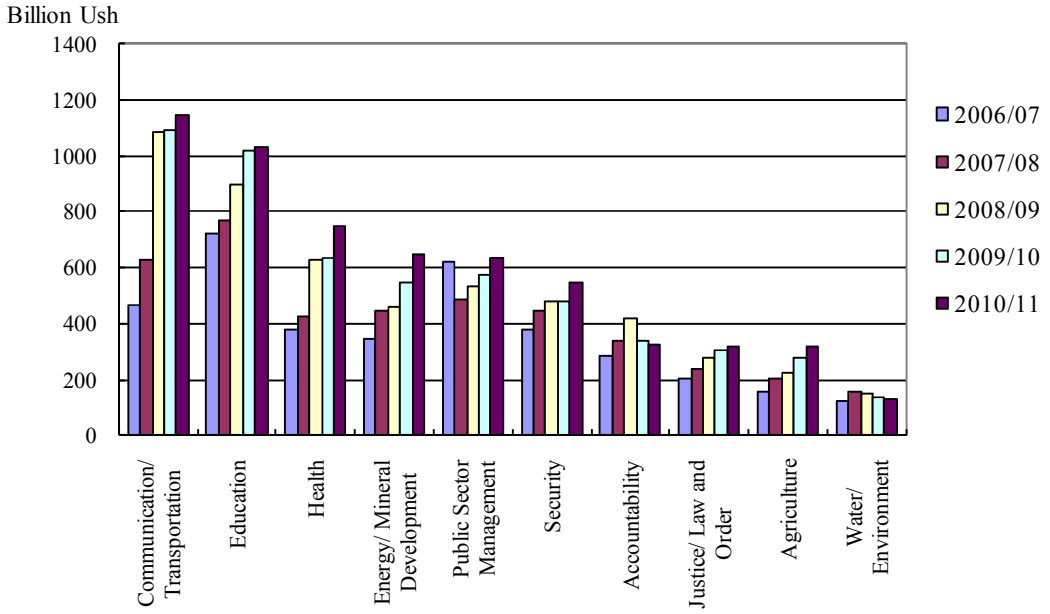

Fig. I.2.1 Budget trend for 10 priority sectors (2006/07 - 2010/11*)

*Figure for 2010/11 is expected budget amount to be allocated under MTEF

Among these priority issues, importance of the two sectors, energy/mineral development and

communication/ transportation, are repeatedly emphasized for economic growth by President Museveni on various occasions. Frequent power failure and high cost transportation system are recognized as the issues likely to cause serious consequences to the economic situation. In case of power supply, power generation had seriously decreased due to the drought in 2005, when the water level of Lake Victoria declined and supply of water to other existing power stations had also reduced. Further, the construction of Bujagali power station, originally scheduled to start from 2002, has been tentatively delayed due to the protest by the environment protection group, leading to unstable power supply. By the completion of Bujagali power station in 2011, power supply is expected to be much improved.

The 2008/09 budget for the transportation sector was much increased. This was in response to the Growth Diagnosis, implemented with the support of World Bank in 2007 which reported that the traffic infrastructure improvement contributed to the cost reduction of transportation and business substantially (Fig. I.2.1). However, the allocated budget of 170 % to the previous year was rather hard for the implementing organizations, Works and Transport Ministry as well as Uganda National Road Authority to their limited capacities, and at the end of the fiscal year, unused budget had been returned to the National Treasury. But the level of the allocated budget is said to be maintained for the following years (MoFPED 2009a).

Another influential factor for Ugandan economy is discovery of natural gas fields at the lake shore of Albert in eastern part of Uganda. Initially there was a fear of commercial feasibility from the scale of deposit, but now the deposit has been confirmed to be 0.6 billion barrels. Estimated deposit is sometimes said to be more than 2 billion barrels. A huge investment is required for the construction of a refinery, thermal power generation station, pipeline connecting to Mombasa port for export, and others. And if the commercial production of natural gas is initiated, the issue of whether the money to be earned can effectively be used is of serious concern within the country and to donors as well.

As for the sectors energy/mineral development and transportation, their development requires participation of private sectors judging from the size of investment. Therefore, the government is considering the approach of public-private sector partnership. Aforementioned Bujagali power station depended on private sector investment and it required $880 million for construction. In the case of Karuma power station, if a capacity of 700 MW is attained as expected by the President, the construction cost is roughly estimated at around $1.5 billion (Presidential Speech 2009). In addition to its own fund, the government is seeking support from various donors, but so far no commitment has been obtained. Other major big projects include construction of international power transmission network in East Africa, construction and rehabilitation of railroad connecting Mombasa port and Kampala, transportation on the Lake Victoria, on the central corridor connecting Dar es Salaam and Kampala.

2) Agricultural development plan

(1) Plan for Modernization of Agriculture (PMA)

The Government of Uganda had drawn up the Plan for Modernization of Agriculture (PMA) in 2001 as a multi-sectorial national policy for all the ministries with 2017 as the target year. PMA aims at achieving poverty reduction through the transformation of agriculture from subsistent to commercial with increased competitiveness and sustainability, and powerful agriculture/agro-industries as a supreme goal. As detailed goals, the following four points are raised.

① To increase income and improve the quality of life of small scale farmers by raising productivity and introduction of cash crops.

② To improve the food security depending on market mechanism, apart from the self sufficiency

farming.

③To create jobs by the promotion of agro-industry through PMA mechanism.

④To ensure a sustainable utilization of resources by the promotion of environment friendly technologies.

To achieve these goals, the following six strategies have been proposed.

① Decentralization of the administrative power to local governments for providing effective support services to farmers.

② To expand the roles of the private sectors in commerce by minimizing the role of the government.

③ To support the extension of agricultural technology for increased productivity.

④ To ensure full consideration on gender in all support services.

⑤ To take the two ways of top-down (central-local) and bottom-up (local-central) approaches in the planning and budget formulation process, so that the local governments will be able to influence the policy and budget allocation and, to tackle the particular issues in multi-sectorial approach.

⑥ To ensure multi-sectorial framework for achieving agriculture modernization.

Further, the following seven are raised as areas of priority in PMA

① Research and technology development

② National Agricultural Advisory Services (NAADS)

③ Agricultural Education

④ Improved access to Rural Finance

⑤ Agro-processing and marketing

⑥ Sustainable utilization and management of natural resources.

⑦ Infrastructure improvement

In PMA, farmers in Uganda are classified into 3 categories as [small-scale farmers], [medium-scale commercial farmers] and [commercial farmers] with respective characteristics and supports to be provided by the government as follows:

Table I.2.1 Classification of farmers by PMA

Category (%)	Characteristics	Required government supports
Commercial (5 %)	・high educational level ・profit seeking farming ・high production, marketing, processing ・hiring skilled/unskilled labor ・high input, high yield technology ・collection of market information within the country and abroad ・owning input for risk reduction	・Guarantee on ownership of asset and input ・Stable macro economy(lower inflation, lower interest rate) ・Improved infrastructure(road, electricity, water resources, market) ・Access to domestic, regional and international markets ・Efficient banking services ・fulfillment of contract, establishment of quality grading on farm products
Medium scale commercial farmers (25 %)	・production for family use and as cash crop ・relatively improved production technology ・Family labor and hired labor ・Farm management partly fragile	・Guarantee on ownership of asset and input ・Support to upgrade business skill ・Ensure access to market and provision of market information. ・Establishment of the efficient and reliable distribution system for input (fertilizer, chemical etc.) ・To ensure access to post harvest/ agro-processing services ・Ensure access to credit services

Small scale farmers (70 %)	・Low literacy, technology and knowledge ・Self sufficiency farming ・Low input/low yield technology ・Dependence on family labor ・Getting smaller of farmland ・Unplanned marketing (not by market movement but to the necessity of cash requirement) ・Fragile to the climate change etc.	・To guarantee on ownership of asset and input ・To raise literacy and provision of basic technology and knowledge ・To encourage the participation in development activity ・To ensure access to improved technology ・To provide market information and ensure access to market ・Financial support (encourage saving, ensure access to credit) ・Ensure availability of farmland

(2) Development Strategy and Investment Plan (DSIP)

DSIP is placed as the medium term plan for the implementation of the priority issues of PEAP and PMA, and provides basis for policy and budget formulation of the Ministry of Agriculture, Animal Industry and Fisheries. First DSIP, DSIP 2005/06-2007/08 was formulated in 2006 but due to lack of coordination within the Ministry and also limited amount of budget allocated, no substantive effect has been achieved. In 2009, as DSIP 2005/06-2007/08 has expired, the Ministry has formulated DSIP09/10-2013/14. To realize the policy taken up by DSIP, it requires USh 200 billion (¥ 92 billion) for 5 years and the Ministry aims to increase the share of agriculture sector in total budget from the current level of 3 % to 5.2 %.

The following five targets have been incorporated into DSIP2009/10-2013/14.

① Increasing income of farmers
② Ensuring food security of farmers
③ Creation of on farm and non-farm jobs
④ Increase in added value of agricultural products
⑤ Promotion of both domestic and international trade of farm products

To realize these targets, four components and output are set as shown in Table I.2.2.

Among these components, [Crop production and productivity] is given the first priority and 86 % of the total budget is allocated. Among this, the share for extension works is 43.8 %, while 12.2 % is for research, 9.1 % for crop protection, 5.9 % for promotion of strategic crops, 5.7 % for irrigation and 5 % for enhancement of quality control. As the strategic crops, to be emphasized in extension and research, rice, maize, beans, citrus fruits, cassava, potatoes, cattle, poultry, fisheries, coffee and tea are selected.

Table I.2.2 Components of DSIP and output

Components		Expected output
Crop production and productivity	Increase productivity of land, labor and capital on crop, livestock and fisheries production	・High productivity technologies are developed by research programs based on the needs of farmers ・Effective, efficient, sustainable and decentralized extension services are realized. ・Damages are decreased by pest and disease protection system ・Land productivity is increased by sustainable soil and water management ・Environment friendly irrigation systems are developed ・By appropriate mechanization and investments to agriculture, labor saving technologies are developed ・Through rehabilitation of the Northern Uganda, living condition of inhabitants are improved ・Access to high quality inputs and implements are improved ・Production of strategic crops (rice, maize, citrus fruits etc.) with higher market value are promoted
Market and added value	Expansion of domestic and international markets for farm products	・Value added products are increased by the use of Public Private Partnership (PPP) ・Management/ operation and business skill of the existing farmer organizations are developed

Value chain	Policy and legal system development for promoting private enterprises	• Safety standard of input and products are revised and capacity for quality management is upgraded. • Effective policy, strategy, programs and projects are implemented with much less waste
Strengthening organization	Strengthening capacity for policy formulation and implementation of the Ministry of Agriculture, Animal Industry and Fisheries and other concerned organizations	• Capacity, material and machinery are equipped for the execution of policy of MAAIF and other related organization • MAAIF office is relocated to Kampala • Efficiency of the administration officers is upgraded

3) Forestry development plan

The National Forest Plan established in 2003 is currently the basis of the forest development of Uganda. In line with the Forest Law and forestry policies enacted in advance, this Plan includes summaries of seven forest and forest-related programs to be implemented within 10 years.

(1) Executing agency

Concerned ministries and agencies coordinate, guide and supervise the progress of the forestry sector effectively

(2) Acting agencies on behalf of the government

National Forest Corporation, local governments and local inhabitants establish effective partnership for the management of forest reserve.

(3) Provincial Forestry Services

Local government, extension officers and farmers organize the improved forestry services

(4) Private sector development

Private sector develops the effective and profitable forestry business.

(5) Urban tree planting

Public organization/groups ensure expanded tree growing in urban areas.

(6) Forestry research

Research institutions provide fresh information and technology needed by foresters and consumers

(7) Forestry education

Curriculum formulation to include forestry for primary and secondary education, capacity building of school teachers to be able to teach forestry, strengthening forestry education at the university level, and forestry education for females are to be promoted.

CHAPTER II. DEVELOPMENTAL TRENDS IN AGRICULTURE AND FORESTRY

1. Environments and Farming Systems

1) Natural conditions and regional divisions

Uganda is a land-locked country, surrounded by Tanzania and Rwanda in the south, DR Congo in the west, Sudan in the north, and Kenya in the east. The land area is 241,000 km^2, about 1/3 of that of Japan. As the average elevation is 1,222 m, the climate is mild in spite of its location right on the equator. The average air temperature in Kampala, the capital, is almost 22 ºC throughout the year. Two wet seasons, March to June, and October to January, bring the rainfall of about 1200 mm (Fig. II.1.1). Many rivers flow out of the Lake Victoria and Lake Kyoga, and also from Rwenzori Mountains and Mt. Elgon, thus fertile soil is widely distributed.

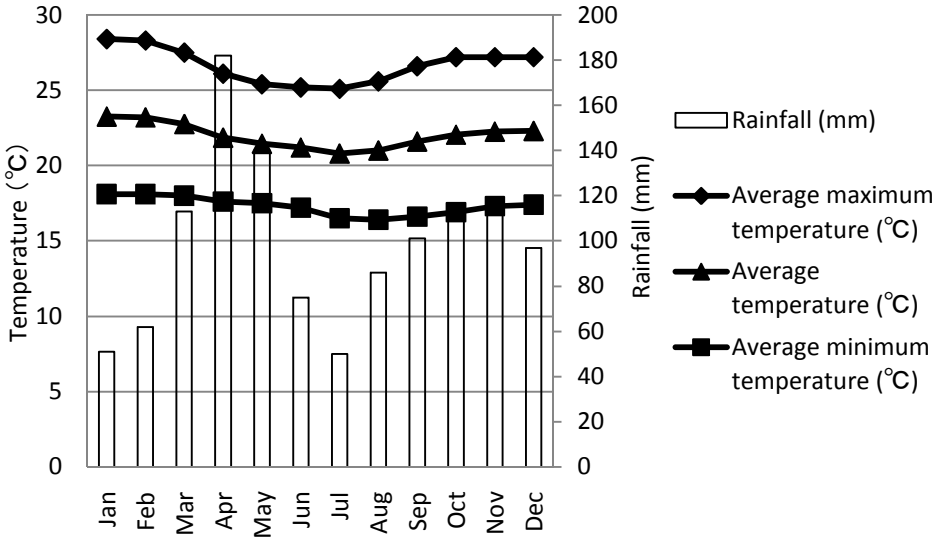

Fig. II.1.1 Air temperature and rainfall in Kampala (1990-2000)
Source: World Cremate Organization.

2) Land utilization and farming systems

In Uganda, the average air temperature throughout the year is almost constant, and two rainy seasons make it possible to grow two crops a year depending on crop species. However, MAAIF classifies the country into seven agro-ecological systems from the standpoint of micro-climate conditions (Fig. II.1.2).

The farming system in each agro-ecosystem is briefly described as follows;

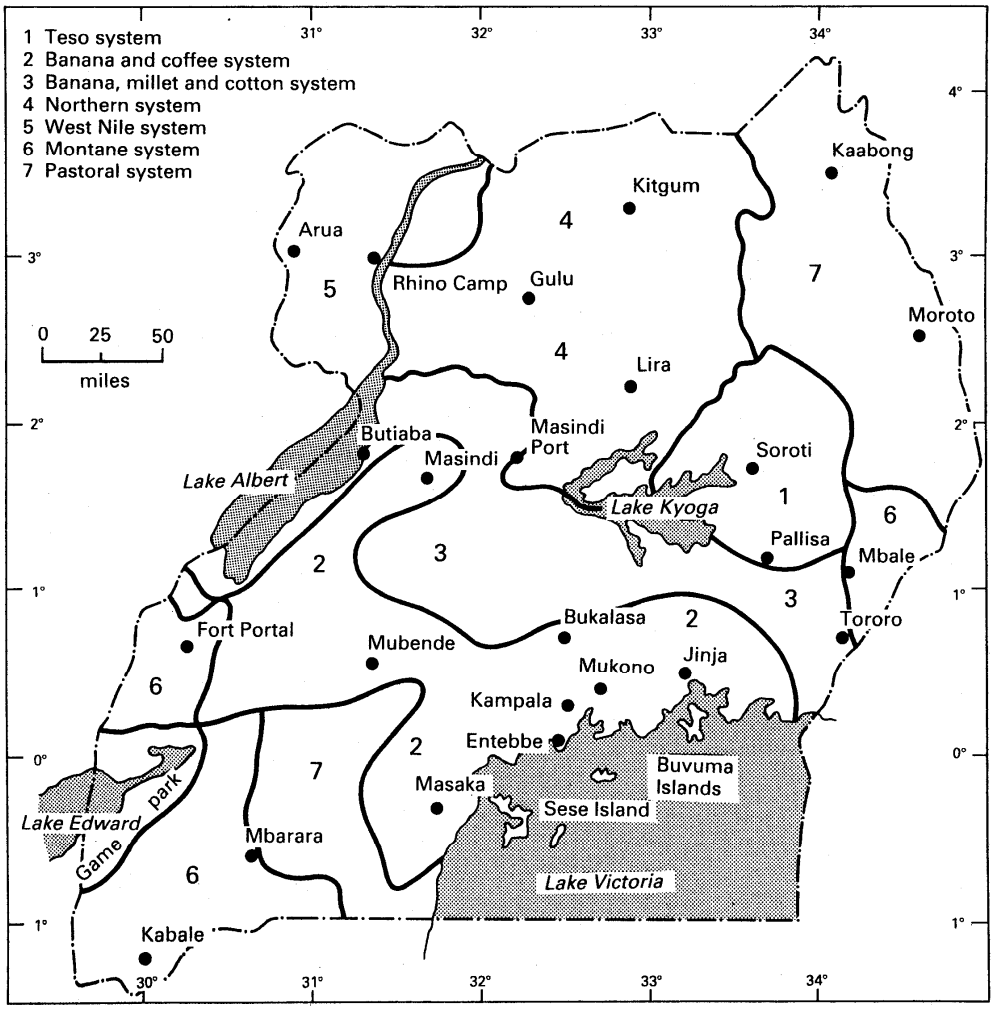

Fig. II.1.2 Distribution of seven farming systems in Uganda

Source: Beinempaka et al. 1989

(1) Teso system: This is observed in the area of Soroti in eastern Uganda, characterized by heavy showers during the two rainy seasons, and prolonged dry season in December to March. The soil is sandy and poor, and cultivated by plow pulled by bulls. Annual crops are maize, millet, sorghum, cowpea, cassava, sweet potato, sesame, and important cash crop is cotton. Rotation is generally observed and the cultivated area per farmer is the biggest compared with other regions. Animals are often stolen by inhabitants of adjacent countries, and prolonged dry season may bring starvation. A decrease in the price of cotton in recent years caused unstable farming income, to be supplemented by products such as honey and shea butter.

(2) Banana and coffee system: The region is in the vicinity of Lake Victoria and the soil is fertile with a mild climate. The main crops are plantain and the representative cash crop coffee. The estate agriculture using perennial crops such as sugar cane or tea is more active than growing annual crops. Tea and cotton, as well as coffee are grown by small farmers as cash crops. Other food crops are maize, cassava, ground nut, sorghum, soybean, and vegetables such as ginger and onion. These cash and food crops other than estate crops are usually cultivated by intercropping. As this region is densely populated, the land area owned by individuals is small, but marketing of agricultural products is much easier as cities such as Kampala, Jinja, Mukono, Masaka, and Entebbe are located in this area. The problem here is destruction of forests for developing farmlands, and degradation

of soil fertility due to overuse of fields.

(3) Banana, millet and cotton system: The area with this system is located in-between systems (1), (2) and (4), and covers the areas of Tororo, Pallisa, Luwero and others. The main cash crop is cotton. Food crops are plantain and millet, but cultivation of maize is increasing. Cotton and millet are the basis of rotation, and other food crops are sorghum, ground nut, cowpea, cassava, sweet potato, etc. In this area, the dry season is often prolonged and food shortage may occur.

(4) Northern system: This system is from the border of Sudan and spreads to the area covering Gulu, Lira, Apac, Kitgum. Cotton is the cash crop, and sunflower is also increasing. Millet is grown as the main food crop by using bulls. Other food crops are maize, sesame, ground nut, cassava, cowpea, etc. The land is not owned by individuals but by communities, such as Wanga tic in Lango and Wang Kweri in Acholi. The problems in this system are inefficiency of land utilization and difficulty of marketing products due to remote distance to big cities.

(5) West Nile system: The system is found in the border area to DR Congo and Sudan, including Arua, Moyo and Nebbi. Cotton and tobacco are the main cash crops. As lands are on the loan, shifting cultivation is commonly practiced. Traditionally, gender issue clearly exists, and field cultivation is the role of women.

(6) Montane system: This system is found in the area around Rwenzori and Elgon, and also in Kasese, Busyeni, Mbarara, Rukungiri, Kabale, Mbale, and Kapchorwa around Mt. Karisinbi. Main cash crops are coffee and tea, and the food crop is plantain in general, but sorghum is the staple food in Kabale. Principally perennial crops are grown, but annual crops are also grown; maize, millet, sweet potato, potato, cassava, yam, cowpea, ground nut, soybean, and vegetables such as cabbage, onion, carrot and cauliflower. As lands are mostly on slopes, crops are usually grown in terraced fields but soil erosion is a great problem. The land area per farmer is narrow, thus continuous cropping is commonly practiced. Many animals are kept in various manners, extensive and intensive. Destruction of forests for expansion of fields is also a serious problem.

(7) Pastoral system is observed in the north-eastern area such as Moroto and Kotido on the border of Kenya, and also in a part of south-western region. Inhabitants are only nomads. Cattle is traditionally Zubu with long horns and Ankole, and other animals are sheep, goats, donkeys, and camels, fed extensively with natural grass and weeds. Land is managed by community, and each individual equally has the right of pasturage. Crop cultivation is not common, and done by women. Millet and maize are obtained by selling milk and butter from animals. Over-grazing is serious and leads to soil erosion as well as the destruction of forests. Strives often break out within or between tribes over pasturing area, or source of water supply.

2. Agricultural Production: Present Situation and Prospects

1) Production of food crops

Although Uganda is located on the equator, various crops from tropical to temperate regions can be grown in the country. Staple food crops are plantain, cassava, sweet potato, potato, maize, millet and sorghum. Table II.2.1 shows the average data for cultivated area, production and yields of these crops in the years 1961-63 and 2001-03, clarifying increases in many cases during this term. Plantain was the leading staple food crop both throughout the two periods. Among the cereal crops, millet was most widely grown in the 1960s, but maize took over the position in the 2000s, with the area under

cultivation and production increasing by four and six times respectively. The production of millet and sorghum increased but the areas decreased. Rice was grown on a small area, which rapidly expanded in the 2000s as much as more than 33 times. The areas are still expanding and have exceeded 100,000 ha in 2007.

Table II.2.1 Cultivated area, production and yields of major crops (Averages of 1961- 63 and 2001-03)

Staple crops	Area harvested (×1000ha)		(%)	Production (×1000t)		(%)	Yield (kg/ha)		(%)
	1961-63	2001-03		1961-63	2001-03		1961-63	2001-03	
Maize	170	679	400	195	1,230	630	1,154	1,811	157
Finger millet	526	395	75	427	605	142	812	1,531	189
Rice	2	81	3,360	3	122	4,136	1,222	1,512	124
Sorghum	294	286	97	278	424	152	947	1,483	157
Cooking Banana	657	1,644	250	3,967	9,773	246	6,038	5,947	98
Cassava	289	398	138	1,105	5,363	485	3,838	13,486	351
Sweet potato	157	585	373	550	2,572	468	3,504	4,395	125
Potato	12	77	660	107	537	503	9,141	6,974	76

Source: based on the data of FAOSTAT

As for root and tuber crops, the area and production for cassava and sweet potato increased, especially the yield of cassava increased by more than three times. It is expected that the area and production of food crops, plantain, maize, rice, cassava and sweet potato will further increase. On the contrary, no such increases are expected for the traditional food crops, millet and sorghum. However, as these crops are important for traditional dishes and for brewing, they will be continuously grown, though not on a larger scale.

Table II.2.2 illustrates total and per capita consumption of major crops. Per capita consumption was the highest for plantain, over 180 kg in the 2000s. Consumption of cereals is lower compared with starchy crops; 30 kg for the highest crop, maize, and 5 kg for the lowest crop, sorghum. Consumption of rice is rapidly increasing more than five times during these 40 years. But it is to be noticed that the population of Uganda increased four times in 40 years, reaching over 3 million.

Table II.2.2 Total yearly consumption and per capita consumption of major crops (Comparison of averages in 1961- 63 and 2001- 03)

Staple crops	Total annual consumption (×1000t)		(%)	Per capita annual consumption (kg)		(%)
	1961-63	2001-03		1961-63	2001-03	
Maize	115	772	671	16	30	194
Finger millet	288	418	145	39	16	42
Rice	11	156	1,411	1	6	567
Sorghum	84	135	160	11	5	44
Cooking Banana	798	4,508	565	110	180	164
Cassava	780	2,582	331	107	103	96
Sweet potato	468	2,172	465	64	87	136
Potato	77	368	480	10	14	140

Source: based on the data of FAOSTAT

The production and consumption of traditional crops, millet and sorghum, are not increasing, while

those of maize, rice, and starchy crops increased rapidly. In markets and local restaurants, maize, plantain, rice, cassava and sweet potato are always served, while millet and sorghum are rarely served. However, these are popular as the raw material for brewing traditional wine called 'Malwa', and will continue to be cultivated.

The outline of production of major crops is described as follows.

(1) Cooking banana

This most important food crop in Uganda was cultivated on 1.65 million ha in 2007, and producing 9.23 million t, yielding 5.5 t/ha. The production decreased in later 1970s, but thereafter continued to increase, exceeding 10 million t in some years (Fig. II.2.1). The principal group of plantain grown in Uganda is *Musa acuminata* (AAA), which is classified as a subgroup of East African Highland Banana. This is further classified into five clone sets (1 for brewing, and 4 for staple food), and each set includes many clones as shown in Fig. II.2.3. Plantain is grown widely except the northern region, and production is especially high in the south-western region. When the rainy season starts, a sucker of about 1 m length is dug out from mother hills and transplanted with a spacing of 3–4 m. Manure is rarely applied, and bear fruits in 1–2 years after planting. The season of harvest is dependent on the timing of planting, but not definite throughout the year. Plantain is generally utilized as staple food after heating, and cooked as 'Matooke'. The method of cooking differs by region. In some areas, just boiling is enough, while steaming and then mashing are preferable methods in other areas. In the case of steaming, plantain is wrapped mostly with banana leaves. Some of the known drink varieties include Omubisi (juice), Tonto (brew) and Waragi (liquor). Liquor is sold in markets, but also manufactured by farmers for earning cash.

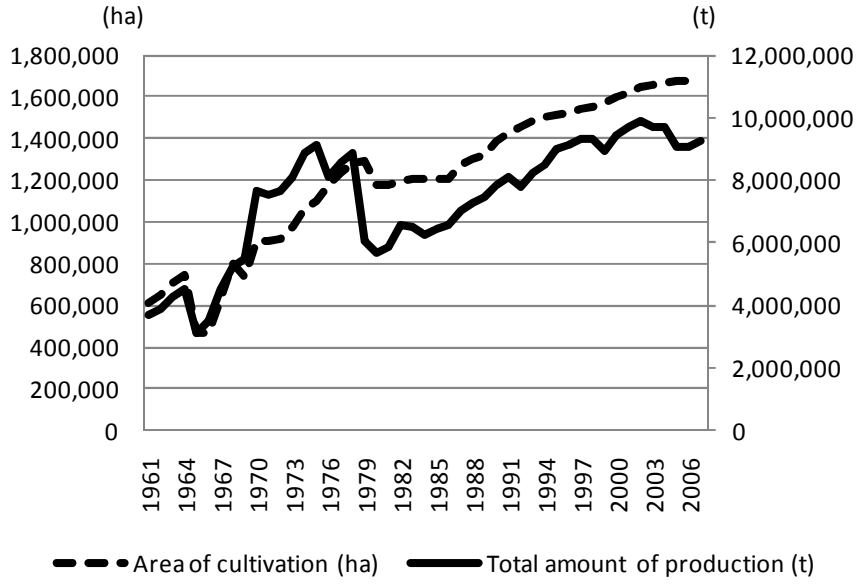

Fig. II.2.1 Changes of cultivated area and production of cooking banana
Source: based on the data of FAOSTAT

Table II.2.3 Clone sets and their characteristics of plantain in Uganda

Clone set	Used for:	Main traits	Clones (Varieties)
Mbidde	Alcohol	The flesh is bitter astringent	Namadhi, Nalukira
Musakala	Staple food	Fruit cluster is large, and fingers are sparsely	Muvubo, Musakala
Nakabululu	Staple food	Fingers are short, precocious and good taste	Nakabululu, Kazirakwe
Nakitembe	Staple food	Fingers are medium, precocious and good taste	Mbwazirume, Nakitembe-Nakamaali
Nfuuka	Staple food	Fingers are medium, late variety and bad taste	Entukura, Nassaba

Source: National Agricultural Research Organization 2001

(2) Maize

This is an important food crop which has rapidly increased in production and consumption in recent years. In 2007, it was grown on 870,000 ha, producing 1.26 million t with a yield of 1.5 t/ha. Both the area and production have drastically increased, reaching 4–5 times that of 1960s (Fig. II.2.2). Introduction of hybrid varieties and increase in consumption lie in the background of the increase of production. The present major varieties are Longe 1, Longe 2, and Longe 3 which were released in 1987, and are resistant to major diseases and insect pests. They mature in 110–115 days and farmers can maintain the seeds of these varieties. The first hybrid varieties were released in 1998. They are UH981 and UH982 with resistance to major diseases and pests, can be harvested in 125 days, yielding twice as much as Longe 1. Maize will maintain its position as a main food crop in Uganda.

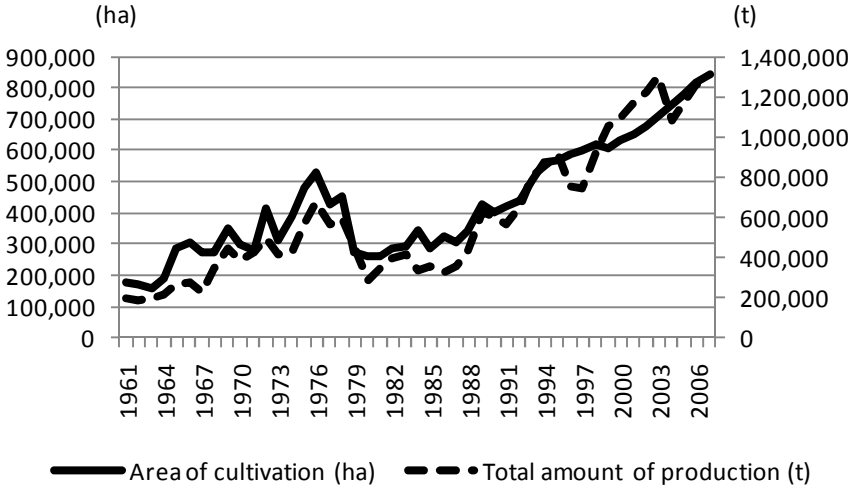

Fig. II.2.2 Changes of cultivated area and production of maize
Source: based on the data of FAOSTAT

(3) Cassava

This is also an important food crop rapidly increasing its production and consumption in recent years just like maize. In 2007, cassava was grown on 370,000 ha, producing 4.46 million t, with a yield of about 12 t/ha. The cultivated area had the peak in 1970s, and thereafter the area did not show marked fluctuation, but production increased remarkably since later 1990s (Fig. II.2.3). Cassava is a new crop introduced in 1969s–70s through Tanzania, and became widely grown because of its easiness of cultivation and various ways of utilization. From 1970s, diseases and insect pests spread, and cultivation stagnated for nearly 20 years. Cassava Mosaic virus caused the most serious damage, and breeding for disease resistance succeeded in releases of mosaic resistant varieties after the late 1990s.

The typical early varieties, with the growing period of around 12 months, are Nase 1, Nase 2, Migyera81, Migyera16, etc.

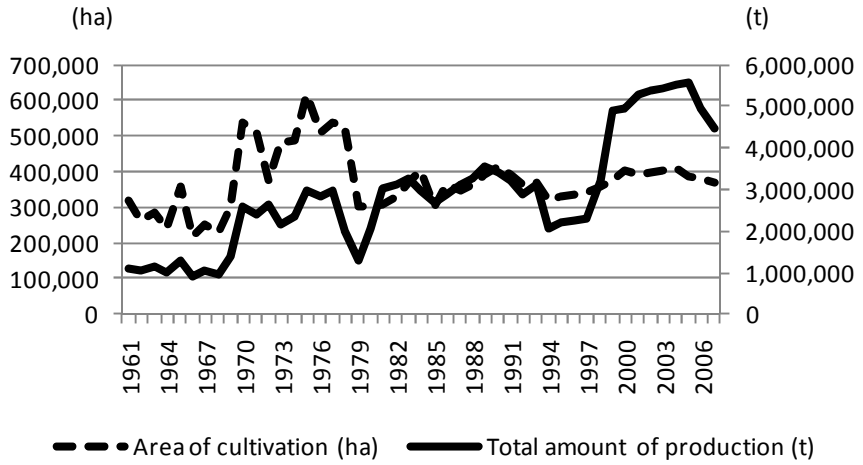

Fig. II.2.3 Changes of cultivated area and production of cassava
Source: based on the data of FAOSTAT

(4) Millet (Finger millet)

This is the second important cereal crop following maize, with the cultivation area of 440,000 ha, production of 730,000 t, and yielding 1.7 t/ha. Major growing regions are eastern, northern and south-western Uganda. Local varieties occupy 90 % of cultivation. However, new varieties are increasing recently, with high yielding capacity and resistance against *Pyricularia grisae*, etc. Five varieties released from Serere Agric. Animal Research Institute (SAARI) are Engenyi (1969), Gulu E (1970), Serere 1 (1985), PESE 1 and PESE 2 (1995), all of which mature in 100 days, and PESE varieties have a yielding capacity of 2,000–3,500 kg/ha. Recently, a very early variety Seremi 2 which can mature in 70–90 days was released.

Millet is grown generally in the first rainy season in eastern and northern regions, and in the second rainy season in the south-western region, using a seed density of 4–8 kg/ha, with the spacing of 30 cm × 2–3 cm, without fertilizers. After harvesting, panicles are piled up for several days to allow fermentation, in order to make it easy to thresh. The area and production decreased after 1970, but increased again gradually after 1980s.

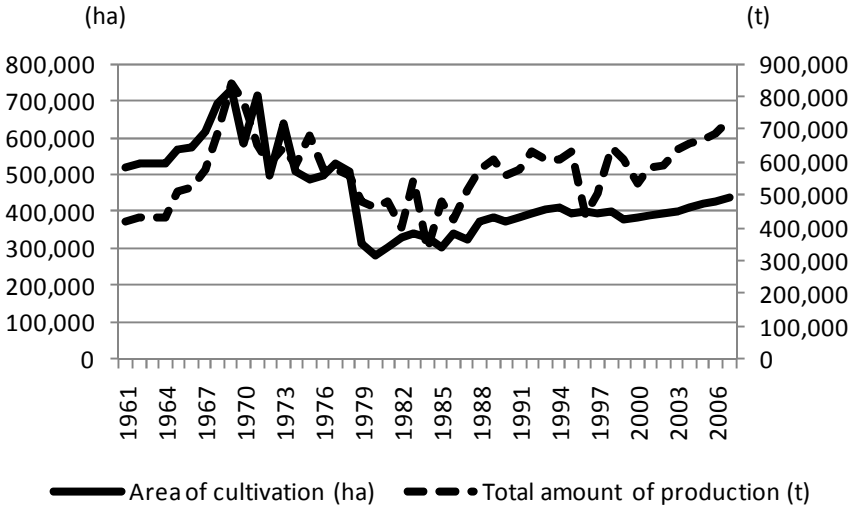

Fig. II.2.4 Changes of cultivated area and production of millet
Source: based on the data of FAOSTAT

To use millet for food, grains are milled and served as Ugali (hard porridge), or Uji (porridge). For brewing Malwa, beer of low alcohol percentage, grains are germinated to activate amylase and change starch into saccharide, then dry up, roughly mill, and mix in a small amount of water. This material, contained in a can or pot, is preserved in the soil for 7–10 days. Then, after roasting in a pan, the material is dried under the sun. Adding yeast and water in a pot, the beer can be good to drink in 3–4 days.

Substituted by maize, the demand for millet as a source of food has almost been lost, but is still popular for making porridge and for brewing. Therefore, millet will keep its position as an important cereal crop.

(5) Sorghum

This is the second important cereal crop next to millet, with the cultivated area of 310,000 ha, production of 460,000 t, yielding about 1.5 t/ha. Originating in Africa like millet, sorghum has been grown as a traditional crop long time before maize, banana, and cassava were introduced. Varieties released since 1960s are Serena (1966), Lulu (1972), Seredo (1982), Sekodo (1995), and Epuripur (1995). Also, hybrid varieties have been bred for a long time. Hijack (1969), Himid (1969), Hibred (1972) were released, but are not widely grown. Production is not increasing (Fig. II.2.5), and consumption is directed not for food, but mainly for brewing.

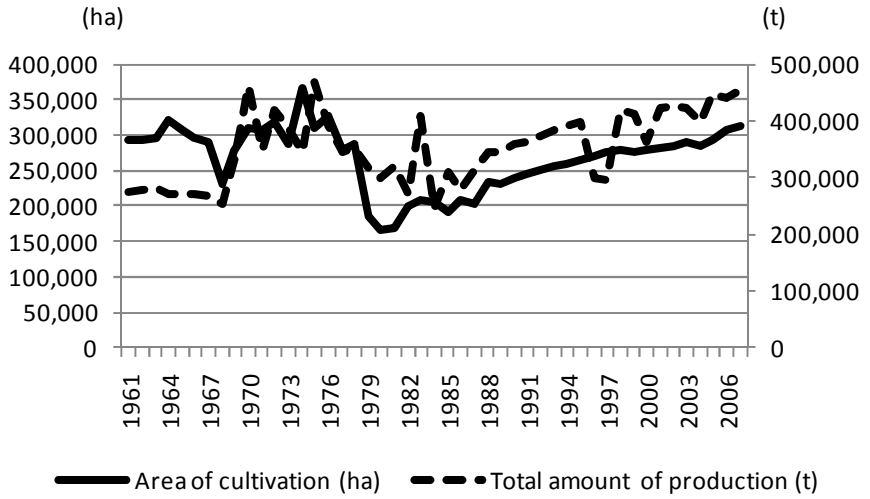

Fig. II.2.5 Changes of cultivated area and production of sorghum.
Source: based on the data of FAOSTAT

2) Agricultural products for exportation

Apart from electric power, cobalt, gold and petroleum, other items exported from Uganda are traditional agricultural products such as coffee, cotton, tobacco, and tea. Recently, sugar, cacao bean, flowers have been added to the list. In 2008, the amount of exported coffee was 200,000 t with a value of about US$ 265,000, and representing more than 20 % of the total value. Following coffee are the Marine products, tobacco, tea, sugar, maize, flowers, and cotton (Table II.2.4).

Table II.2.4 Changes of amount and value of exported agricultural products

Exported items	2003		2004		2005	
	($1000)	(t)	($1000)	(t)	($1000)	(t)
Total value of export	**534,106**		**665,090**		**812,857**	
Coffee	100,233	146,299	124,237	159,983	172,942	142,513
Marine products	88,113	26,422	103,309	31,808	142,691	39,201
Tobacco	43,042	24,669	40,702	27,843	31,486	23,730
Tea	38,314	36,669	37,258	36,874	34,274	36,543
Sugar	N/A		N/A		N/A	
Maize	13,724	60,298	17,896	90,576	21,261	92,794
Flowers	22,080	5,636	26,424	6,092	24,128	6,162
Cotton	17,755	16,762	42,758	29,293	28,821	30,403
Cacao bean	7,001	4,328	6,801	5,155	9,638	7,600
Vanilla	13,546	91	6,120	71	6,135	234
Exported items	2006		2007		2008	
	($1000)	(t)	($1000)	(t)	($1000)	(t)
Total value of export	**962,193**		**1,336,668**		**1,724,300**	
Coffee	189,830	126,887	265,853	164,540	403,179	200,640
Marine products	145,837	36,461	124,711	31,681	124,436	24,965
Tobacco	26,964	15,794	66,301	26,384	66,448	29,042
Tea	50,874	30,584	47,629	44,015	47,222	46,022
Sugar	N/A		33,451	77,772	N/A	
Maize	24,114	115,259	23,816	101,233	18,250	66,671
Flowers	20,987	4,984	22,782	5,267	28,790	5,349
Cotton	20,474	18,480	19,571	16,230	13,214	7,960
Cacao bean	10,016	7,632	15,936	9,404	22,834	8,982
Vanilla	4,808	195	6,262	422	3,039	192

Source: based on the data of UBOS 2009 Statistical Abstract

Among agricultural crops for export, tea and sugarcane are cultivated in plantations operated by large scale enterprises, while coffee, cotton and tobacco are grown by small scale farmers in inefficient manners. Two species of coffee are well-known: *Coffea arabica* for regular coffee, and *C. robusta* for instant coffee. For most of the coffee produced in Uganda, the most important crop for export is *Coffea robusta.* International prices of coffee and cotton often fluctuate and have been falling down drastically in recent years. Demand and consumption of tobacco is remarkably decreasing due to world-wide movements of 'No smoking'. Prospects for marine products are also not bright because of movements for conserving marine resources. For these reasons, not much increase can be expected of the proportion of exported agricultural products in future.

3. Rice Cultivation: Present Situation and Prospects

1) Historical aspects

Rice is supposed to be originally introduced into Uganda around 1904 by Indian traders (Candia Alphonse 2008). Importation of rice was in the form of rough rice, and cultivation was limited to a very small area. Only Indian households consumed rice milled by stone mills.

In 1942, rice was grown for supplying soldiers in Asian battlefields in the World War II, and rice cultivation was gradually expanded mainly to eastern Uganda as self-supporting food for farmers. In the 1950s, development in rice cultivation was observed, as seen in introduction of Engelberg rice mill. In 1966, the government developed irrigated rice fields with the assistance of the People's Republic of China in the Kibimba area, and in 1976, 1,000 ha in Doho area. The Kibimba Project was later sold to an Indian private company, then owned by the present TILDA, producing the highest ranking brand rice. On the other hand, the Doho Project is still under the control of the Ugandan government and 4,000

farm households enroll in 1,000 ha. Rice cultivation in Uganda developed from these two models of irrigated rice gradually by farmers of nearby areas. Systematic research, training and extension started only after the year 2000 by "The Study on Poverty Eradication through Sustainable Irrigation Project in Eastern Uganda", and the dispatch of JICA experts for disseminating NERICA.

Rice cultivation, mostly upland rice, in the western regions (Hoima and other districts) was recently introduced by immigrants from the eastern regions. Introduction of NERICA rice rapidly increased the cultivated area, and the number of rice mills. Table II.3.1 indicates that the rice production in Uganda increased from 3,000 t in 1960 to 162,000 t in 2007. As the statistics does not include upland rice production in the north-western districts, the total production is estimated to be nearly 250,000 t as seen in Table II.3.3.

Table II.3.1 Progress of rice cultivation in Uganda

Year	Production (Rough rice, t)	Year	Production (Rough rice, t)
1960	3,200	1990	54,000
1970	11,400	2000	109,000
1980	17,000	2007	162,000

Source: FAOSTAT

2) Present situation of rice cultivation

(1) Demand and supply of rice

As Table II.3.2 indicates, total rice consumption in Uganda is 220,000 t (2008), out of which 60,000 t was imported, and 160,000 t (250,000 t in the form of rough rice) was domestically produced. Rice consumption per capita of 8 kg/year is not high compared with 25 kg for the average of sub-Sahara African countries, but consumption is increasing in the urban areas, due to easiness in cooking and good nutritional value.

Table II.3.2 Forecast of rice production, consumption and importation

Year	Production (Milled rice, t)	Population (Million)	Per capita consumption (kg)	Total consumption (t)	Importation (t)
2008	163,150	28	8.0	224,000	60,850
2013	345,150	33	10.2	334,560	-10,590
2018	509,600	38	13.0	499,200	-10,400

Source: UNRDS 2009

Types of rice preferred by the wealthy Indians and others in high class supermarkets in Kampala are imported Basmati, or rice produced by TILDA, while japonica rice produced in South Africa is also popular by the brand name of 'Sushi-rice'. In rural markets, people generally prefer sticky rice as the Japanese, and lowland rice called 'Supa' is most preferred, followed by lowland rice 'K-85' and NERICA. Price is not remarkably different among these varieties, but it differs according to the degree of mixture of small stones or husks, or by the percentage of broken rice.

Rice is generally grown, excluding the case like TILDA, by small farmers under rainfed conditions without applying fertilizers, not for self-consumption but rather as a cash crop. In the case of NERICA, a family can manage 1 acre (0.4 ha) and earn 1 million U-shillings (about 50,000 yen), assuming a yield of 1 t/acre, which is nearly equivalent to a 5-month salary of elementary school teachers. If the farmer can grow two crops a year, the income will be equivalent to the annual salary, making it very attractive to small farmers. In case of lowland rice, when properly managed, labor force is much needed but the yield would be 2 t/acre without fertilizers, and more stable than in upland and good for small farmers.

The average yield can be estimated as 1.6 t/ha since the production of 250,000 t is from an area of 160,000 ha (data from MAAIF). The amount of production is almost well estimated, but the data on area differs by the source. Therefore the estimation of yield is not reliable (land area of individual farming household is not available at MAAIF).

(2) Principal cultivated varieties

Supa and K-85 from lowland rice, and Nerica-4 from upland rice occupy a greater part of the cultivated area. Supa, a large grain variety originating from Surinam, is higher tillering, high-yielding, of good taste and more voluminous when cooked. These traits are attractive both to producers and consumers, but its cultivation period is as long as 160 days. The origin of K-85 is not clear but probably selected from an old IRRI line as one of K- series selections in Kibimba. Its cultivation period is rather short, and adapts to the double cropping system. Other lowland varieties are K-5, K-9, WITA-9, Basmati, Pakistan, Supa-China, Supa-America, etc. Varieties other than Supa group are sometimes collectively called 'kaiso', but its meaning is unknown. Out of 60 lowland NERICAs named by WARDA, 9 are being tested at NaCRRI, but not yet recommended for lowland rice cultivation.

As for upland rice, NERICA-4 was named as a recommended variety in 2003. NERICA-1 (aromatic rice) and NERICA-10 (early rice) were added in 2007 and were expected to expand in area. NARIC-1 (ITA257), NARIC-2 (ITA325), SUPERICA-1, etc., introduced before NERICA-4, are also grown and sometimes cause problems of seed contamination.

(3) Methods of cultivation

Farmers depend on family members for activities (not limited to rice) such as cultivating, weeding, and harvesting using manual labor. A very limited number of them use machinery and animals. Only 5 % of farmers use cattle traditionally for farming, and there were 4,700 tractors as of 2006 (FAO 2006), owned by farmers who are owners of large scale estates (only 1 %).

TILDA, the company of Indian capital, practice direct seeding of rice on dry or unpuddled wet lands using large tractors. The Uganda government bought Kubota-tillers from Thailand, and machinery shops in Kampala sold tillers made in China and India, although those machinery were rarely observed in the fields. However, rice cultivation in Uganda cannot be operated with only manpower, and farm mechanization would be one of the issues to be addressed in the near future.

Lowland rice is generally broadcasted on moist lands, or randomly transplanted in wet paddy fields, and upland rice is broadcasted or row-seeded in fields. In some areas, a special pattern of line transplanting, 'namiki-ue' in Japanese (wide and narrow line spaces alternatively) can be observed. In the Sustainable Irrigation Agricultural Development (SIAD) project, which JICA started in 2008 in eastern Uganda, demonstration farms were established in model farm households in 22 districts, to diffuse land levelling, construct levees, introduce line planting of younger seedlings and rotary weeders.

In most cases, both lowland and upland rice cultivation depend on rainfall. Especially, rainfed lowland has its potential but, on the other hand, tends to suffer from drought and floods. It is necessary to establish technologies that can adapt to such environments of inland low/wet fields, not necessarily transferring the lowland rice system from Japan. It is also important to diffuse water-harvesting technologies in upland fields, such as digging of water reservoirs, or construction of terraces. Present situation of lowland and upland rice cultivation and standard cultivation methods to be recommended are as follows.

(i) Lowland rice

Seedlings are grown usually in wet beds, but too many seeds cause leaf yellowing. The desirable amount of seeds would be 3.5–4 g/m^2. In most cases, farmers randomly transplant over-aged and tall seedlings as deep as 10 cm, but SIAD recommends regular planting distance of 30×15 cm, to the depth of 3–4 cm, after cutting off leaves to shorter sizes. Hand weeding is commonly practiced, but SIAD tries to introduce rotary weeders in regularly transplanted fields (Photo II.3.1).

Photo II-3.1 Weeding in lowland rice field by a rotary weeder

Important weeds are: *Echinochloa crus-galli* (L.) P. Beauv., *E. colonum* (L.) Link, *Paspalum distichum* L., *Cyperus iria* L., *C.difformis* L., *Pistia stratiotes* L., *Commelina* spp., *Eclipta prostrata* L., *Sagittaria guayanensis* H.B.K. ssp. *lappula* , *Marsilea crenata* Presl, *Sphenoclea zeylanica* Gaertn., etc.

(ii) Upland rice

The amount of seeds is 50–60 kg/ha, and row-seeded with 30 cm distance between rows, considering weeding by hoe. For dibbling, 7 grains per hole of 3–4 cm depth with a planting distance of 30×12.5 cm is recommended. When seeded beyond 5 cm deep, germination and plant growth is hindered. It is recommended to weed twice by hoe at 3 weeks and 6 weeks after germination (Photo II.3.2). Principal weeds are: *Cyperus rotundus* L., *Echinochloa colonum* (L) Link, *Commelina* spp., *Sphenoclea zeylanica* Gaertn, *Amaranthus spinosus* L., *Ageratum conyzoides* L., etc. Parasitic weed *Striga* infects upland rice in eastern Uganda (Photo II.3.3).

Photo II.3.2 Weeding in upland rice fields

Photo II.3.3 *Striga* in upland rice fields

As for herbicides, Agro-Supanil 60EC (Thiobencarb 40% + Propanil 20%) is the commonly used herbicide. At present, only a limited number of farmers apply fertilizers. In JICA's NERICA Rice Promotion Project, application of 50 kg/ha each of DAP (18-46-0) and urea (46-0-0) on 20 days after germination (DAG), followed by 50 kg/ha of urea on 60 DAG is recommended as the standard practice. Some farmers apply organic material in their backyards such as chicken dung.

(4) Major diseases and insect pests

Due to the rather new history of rice cultivation in Uganda, no serious damages are caused by diseases and pests at present. However, development in the future will call for research on the problems and establishing pest control systems.

(i) Major diseases

Rice Yellow Mottle Virus (RYMV), Blast, Brown spot, Grain rot, Leaf scald, Sheath rot, and False smuts are all observed, but the damage is not serious except the first two. RYMV is rampant in lowland rice in eastern Uganda (Photo II.3.4), especially Supa is sensitive and sometimes completely destroyed. Removing infested plants, appropriate management of ratoon plants, and direct seeding is recommended but it is difficult to prevent the disease completely. Adoption of resistant varieties is effective but all of the present recommended lowland rice varieties of Uganda are susceptible. Resistant varieties so far certified are japonica rice such as upland NERICA 6, NERICA 7, NERICA14, ITA 267, ITA 325, etc. All of the lowland NERICA 1–60 varieties are susceptible. WITA-9, released in West Africa as resistant, was susceptible in Uganda by artificial inoculation. For the area of serious RYMV, introduction of NERICA 6 is being examined.

Photo II.3.4 Symptom of RYMV

(ii) Major insect pests

Rice hispa (*Diclahispa armigera*) attacks lowland rice seedlings and sometimes the whole seedbed can be destroyed after transplanting. Spraying carbofuran has been found to be effective (Photos II.3.5, II.3.6).

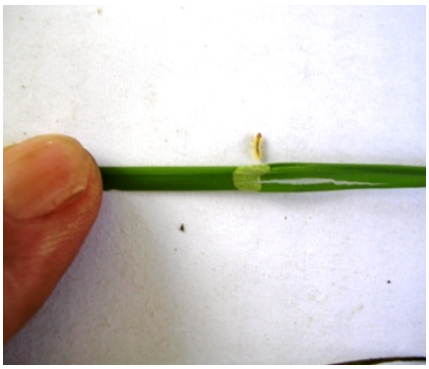

Photo II.3.5 Nymph of rice hispa

Photo II.3.6 Damage in the nursery by rice hispa

African rice gall midge is observed lowland rice in eastern Uganda, but the damage is not serious (Photo II.3.7). Stalked-eyed flies attack both lowland and upland rice, and dead heart is observed at the tillering stage (Photo II.3.8, II.3.9). Stem borers infest both lowland and upland rice. Dead hearts and white heads are observed but the damage is not serious. Rice mealy bugs attack upland rice, and leaf yellowing observed at early vegetative stage is an indication that the basal stems are infected. The damage is often observed in the fields where organic material such as compost was applied. The bugs usually stay at the plant base and the top soil, and insecticides are not effective because of a waxy substance covering their body (Photo II.3.10). Locust feed seedlings after germination, and leaves at the growth stages, but damage is not serious. White ants attack upland rice when the moisture content of plants becomes lower. They feed on stems near the ground and drought induces severer damage by ants. Dry plant residue left on the ground is used as their nests. The group of rice bugs and stink bugs damages rice grains at the milky stage and black spotted grains are noticed on milled rice grains.

Photo II.3.7 Rice plants attacked by African rice gall midge

Photo II.3.8 Nymph of stalked-eyed fly

Photo II.3.9 Adult of stalked-eyed

Photo II.3.10 Rice mealy bug

(5) Post-harvest handling

Rice is harvested by panicles, or by cutting stems above the ground. In the former case, panicles cut by knife are squeezed by hands. In the latter, plants are hit against a rock or a log on vinyl sheets spread on the ground, or bundles of rice is hit on stems in the case of easy shattering varieties. JICA is introducing threshers manufactured in local ironworks, but its dissemination is likely to take some time.

Rice grains are sun-dried, but rapid handling causes over-drying and breakage of grains. Sometimes, drying on the road often contaminate grains with other materials such as sand. Self-consumption of rice is not common as in West Africa, but in Lira and Kaberamaido in northern districts, some farmers polish a small amount of rice (for example 2 kg), using a mortar and wooden pestle (used for producing butter from peanuts). But in most cases, farmers bring rough rice to rice mills and sell milled rice to middlemen.

The rice mill first introduced was Engelberg type, because of easier access to spare parts, and disseminated from eastern Uganda to other districts. In the 1990s, Chinese and Indian importers started to import Milltop types (not made in Japan, but cheaper copies produced in China), and used in the central regions, Hoima and Gulu districts, before extending to the eastern regions.

As the larger scale rice mill, the Payello Rice Mill introduced modernized facilities with paddy cleaner, destoner, and grader in Gulu city. In 1988, Mr. Moro introduced a similar plant in the Mbare Industrial Park. The plant was installed by Satake of Japan, but it is not operating now due to lack of technicians and spare parts. In spite of such setbacks, large scale rice mills have been established since 2000, with the set of rice mill, destoner, and grader. The greatest among these is TILDA's in Kibimba, which has a milling capacity of 6 t per hour. In 2006, Upland Rice Miller was established in the Jinja district with the Plasma Rice Miller in the Palina district in 2007, although both are on a smaller scale

compared to TILDA. Rwenzori Rice Mill in Fort Portal, Sunrise and Kilimanjaro Rice Mills in Kampala are also smaller than TILDA.

A total of more than 600 rice mills (small and large scale) are found in Uganda. The Engelberg type in the eastern and Milltop type in the western region dominate because of their historical backgrounds. Recently, it has been observed that some middlemen buy rice in farmers' fields and bring it to large scale rice mills.

3) Research and extension systems

Research on rice is conducted by the Cereal Crops Division of NaCRRI under NARO. Until 2004, when JICA sent Mr. Tatsushi Tsuboi to Uganda as rice expert, no rice researchers existed there. Mr. Tsuboi brought up his counterpart and, based on his efforts, the "NERICA Rice Promotion Project" started. Two long-term experts and several short-term experts were dispatched, and several Ugandan researchers were invited to Japan to transfer rice technologies. In 2010, the Regional Rice Research and Training Center for East and South Africa is scheduled to be completed in NaCRRI, but more time and efforts will be needed to breed Ugandan scientists.

In Uganda, National Agriculture Advisory Service (NAADS) extends services to agricultural sector through 'agricultural officers' (AO) assigned to districts, who guide model farmers selected in each district on technology transfer and organizing farmers groups. Extension of rice cultivation is also conducted on this line. However, AOs have neither experience nor knowledge on rice cultivation, and the efficiency cannot be high in using seeds and fertilizers distributed to model farmers through the program. Therefore, SIAD Project of JICA conducted training at NaCCRI for AOs and model farmers of 22 districts in eastern Uganda, and also on-the-spot training in fields of the model farmers, expecting further diffusion of rice cultivating methods to nearby farmers. In the NERICA Rice Promotion Project, demonstration fields were set up at each of nine ZARDI throughout the country, and on-the-job trainings were conducted for researchers, so that researchers themselves could train farmers and extend NERICA. In addition to this, among JOCV members for rural development, 10 youths are assigned to NERICA extension, and others are also trained at NaCCRI to be able to cooperate on the grass-root level.

4) Rice promotion strategy of Uganda

In June, 2009, MAAIF announced the National Rice Development Strategy to double (practically, triple) the rice production in 10 years by 2018. The strategy was prepared by the government along the Coalition for African Rice Development (CARD), which was proposed by Japan and other donors, at the Fourth Tokyo International Conference on African Development (TICAD-IV) in Yokohama in May, 2008.

Table II.3.3 Projected rice production 2008-2018 Unit: Area= ha, Production= t (paddy)

Year	Rainfed upland		Rainfed lowland		Irrigated		Total	
	Area	Production	Area	Production	Area	Production	Area	Production
2008	40,000	80,000	65,000	156,000	5,000	15,000	110,000	251,000
2013	80,000	176,000	105,000	315,000	10,000	40,000	195,000	531,000
2018	100,000	240,000	125,000	425,000	15,000	63,000	240,000	728,000

Source: UNRDS 2009

As Table II.3.3 shows, rice in Uganda is principally grown in rainfed lowland, followed by rainfed

upland, and smaller irrigated fields. It is important to increase the land for irrigated rice, but due to limitations of finance and time needed for construction of facilities, emphasis should be laid on upgrading rainfed rice technologies. However, rainfed lowland in Uganda is defined as 'wetlands'. To be harmonized with the environment, their utilization is limited only up to 25% as well as the areas more than 50 m away from the center of the (smallest) stream, by the laws of the National Wetland Policy in 1995 and the National Environment Regulations in 2000.

4. Forest and Forestry: Present Situation and Prospects

1) General situations of Ugandan forests

The total area of forest in Uganda is about 3.97 million ha (FAO 2001), occupying roughly 20 % of the total upland area. Reflecting rather higher amount of rainfall, the ratio of forest is on the high level in east African countries. The forest is composed of tropical high forest (18.7 %), woodland (80.6 %) and plantation forest (0.7 %), as of 1992. Plantation forest is noticed for its very low coverage, and 80 % of the total forests are natural woodlands of low resource accumulation. In spite of a relatively high coverage of the tropical high forest, about 30 % of it is in deteriorated conditions. As these natural forests were degraded in the past, the productive area is roughly estimated to be 0.1 to 0.2 million ha. Also, it is estimated that the present forest stand with harvestable stock is only 50,000 ha, thus good volume stock is quite less than the actual area.

Table II.4.1 Area of forests of different forest aspects (1992)

Classification		Area (ha)
Plantation forest	Broad leaved	17,993
	Needle leaved	15,780
Natural forest	Tropical high forest (normal)	626,171
	Tropical high forest (degraded)	263,949
	Woodland	3,827,526
Total		4,751,419

Source: FAO 2005 (Data modified from Technical Report of National Biomass Study, 1992, using data of Africover Mapping Project, 2001)

(1) Natural forest

Tropical high forest in Uganda is known for its diversity of tree species, and quite rich compared to natural forests in other east African countries. As the composition of trees is greatly different according to altitude and region, forests cannot be simply classified, but it could be divided into four, considering the priority tree species: *Parnari* zone (above 1,400 m, west Uganda), *Celtis-Chrysophyllum* zone (1,000–1,400 m), *Cynometra-Celtis* zone (700–1,200 m), and *Piptadeniastrum* zone (lake side area) (McClanahan and Young 1996).

Photo II.4.1 Tropical high forest remaining in the plain

Photo II.4.2 Tropical high forest with *Celtis mildbraedii* and *Entandrophragna utile* as dominant species

Another way of classification is done by the degree of artificial influence upon the natural resource: forest with normal accumulation, and degraded secondary forest. Woodlands are forests mainly composed of trees of 4 m or taller and bush, and distribute widely from semi- arid to moist lowlands.

About 80 % of Ugandan population is said to be relying on traditional medicinal plants. Therefore, significance of natural forests is recognized as sources of non-wood forestry products. Also, it should be noticed that many natural forests remain in the plain as forest reserves. Some of these are located near urban areas and will maintain their significance as sources for eco-tourism such as sightseeing and recreation sites.

(2) Plantation forest

Conifer forests for timber production and forests for firewood (mainly of eucalyptus) are the two main groups of plantation forest in Uganda. The former was made to be a substitute of precious resource from natural forests, or to supply uniform raw material. *Cupressus lusitanica* form one-third of tree species while the other two-thirds are pine trees (*Pinus caribaea, P. patula, P. oocarpa*, etc.). Eucalyptus (*E. grandis*, etc.) trees are used as timber for construction or firewood, and planted near principal city areas and villages. Hard wood trees such as *Acacia mearnsii, Terminalia superba, Tectona grandis* (teak) as foreign species, and *Maesopsis eminii* as domestic species are used for afforestation.

Afforestation in Uganda started as early as the beginning of the 20th C., but the plantation forests seen today were mainly planted in 1960's–70's, and rarely planted since then. Consequently, this has caused a gap between the age class, and will make it more and more difficult to obtain large diameter timbers. The area of the plantation forests is about 34,000 ha, of which 24,000 ha is under control of the government (2.2 % ofgovernment-managed forests). The others are private or customary owned forests, among which are eucalyptus forests planted by private enterprises for drying and manufacturing tobacco or tea. As management of these forests is not good enough, growing stock is not high in general. The resource is predicted to be entirely consumed within 5–10 years (FAO 2001), and urgent subsidizing measures will be needed for afforestation.

Photo II.4.3 Plantation forest of young Caribbean pine

2) Reduction of forest land area, and its tendency

Reduction of forest land area in Uganda is quite notable, and the rate of reduction is 1.9 % in 1990 – 2000, and 2.2 % in 2000 – 2005, an increasing trend which is remarkable when compared with the corresponding rates of 0.3 % in Kenya, and 1.0 – 1.1 % in Tanzania (FAO 2007). According to an estimate by National Forestry Authority, about 30,000 ha of forest area are decreasing yearly, and the loss per year is estimated as 3.8 – 5.7 million US dollars. The causes of reduction are mainly timber harvesting, firewood collection, and agricultural expansion due to population increase without appropriate industry. Also, trees in forest reserves were cut down neglecting rules and regulations during the disordered period of 1980's. In recent years, activities like indiscriminate cutting and converting forests into farmlands by refugees are problems. Most of these illegal activities are conducted in private and customary forests, while forest reserves are relatively well conserved. Reflecting deterioration and reduction of forests, endangered tree species are counted as: CR (critically endangered) 3, EN (endangered) 4, and VU (vulnerable) 33 (IUCN 2006).

Table II.4.2 Changes of reducing forest land area in Uganda (1000 ha)

	1990	2000	2005
Area	4,924	4,059	3,626

Source: FAO 2005

The forest area per capita is estimated to reduce to 0.1 ha in 2025, assuming a population growth rate as high as 3.5 % (NFA, 2005). In order to fulfill domestic demand for timber, a high productivity plantation forest of at least 65,000 ha is needed. However, only several thousand hectares of forests are planted at the moment, a situation which will lead to a shortage of timber and firewood in the near future.

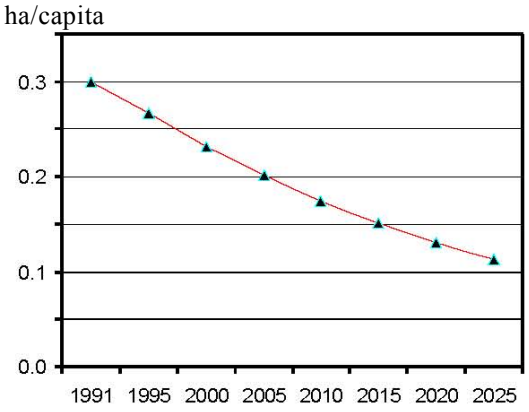

Fig. II.4.1 Changes of forest area per capita

Source: Forest Department of Uganda 2002

3) General situation of forests classified by ownership and management

When classified by ownership and management, Ugandan forests are divided into permanent forests managed by the government, and private-customary forests. The latter occupies 70 % of the total area, and the government manages only 30 % of forests.

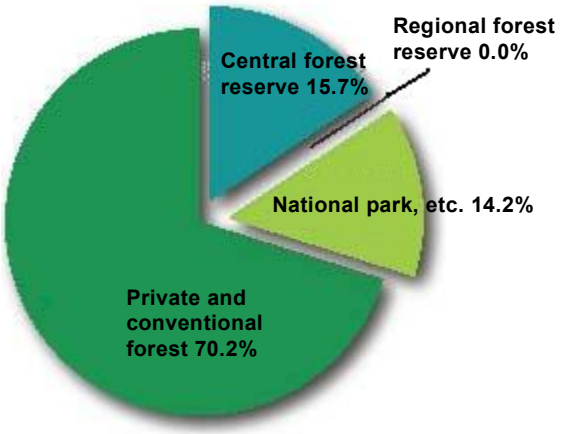

Fig. II.4.2 Percentage ownership of forests by Category

(1) Permanent forest estate

Viewed from the purpose of usage, forests under government management are divided into protected forests and production forests. The former is protected for securing water resource, preserving bio-diversity, ecosystem and landscape, while the latter is used for supplying forest products, and planted and managed for the

future. Permanent forests are also classified from another viewpoint: Central Forest Reserves (CFR) managed by National Forestry Authority, and Local Forest Reserves (LFR) managed by local government, and National Parks and Game Reserves managed by Uganda Wildlife Authority. CFR manages about 1.26 million ha of 506 locations completely managed by NFA. Though some problems exist, such as small scale encroachments and illegal cuttings, fairly good forest conservation is observed in general by introducing CFM (collaborative forest management) in some locations. On the other hand, LFR is feared to be rapidly degrading and decreasing, due to poor management by local government.

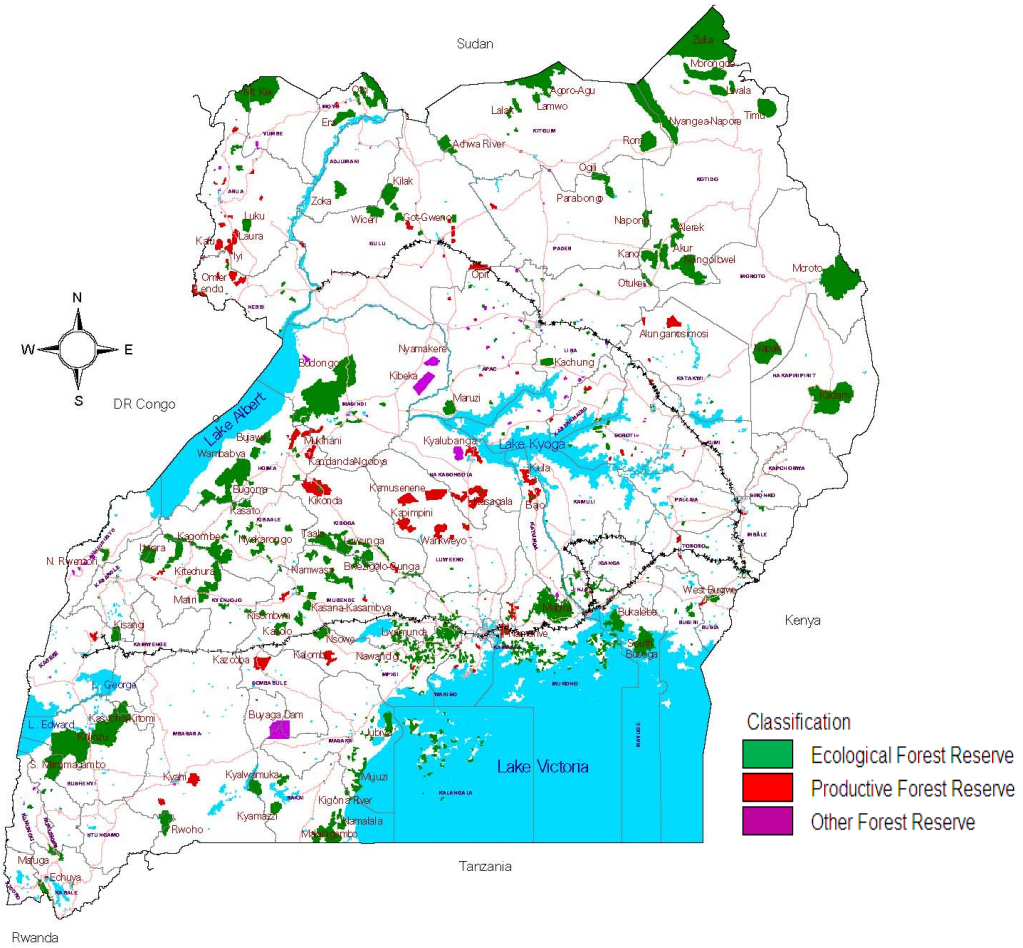

Fig. II.4.3 Locations of forest reserves in Uganda

Source: National Forestry Authority 2005

(2) Private and customary forests

Occupying almost 70 % of natural forest area, though significant in terms of surface area, these are woodlands for producing mainly firewood, and the ratio of valuable high forests producing timbers is not high. Many of the natural forests in private lands were degraded by non-sustainable use or transformed to farmlands, and it became difficult to use subsidiary forest products so far used by neighboring poor people. Lack of definite policy for private and customary forests, contradiction with agricultural policy, existence of many forests of unknown owners, are considered to lead to such problems

The relationship between conservation of forests and traditional customs is very important, especially for conserving diversity of tree species. Once, traditional customs had a special role to conserve specific tree species, or to prohibit the use of specific areas (John et al.), but those traditional customs and sense of value have disappeared, and affected reduction of forests. Especially, customary forests became quite

accessible for everybody due to recent changes into the situation of unclear ownership and the rights of utilization, and this caused severe degradation of forests. The government started to protect customary forests by official registration, but degradation and reduction of forests is progressing quite rapidly due to immigration and utilization by people from other regions.

CHAPTER III. CURRENT SITUATION AND TREND OF DEVELOPMENT COOPERATION ON AGRICULTURE AND FORESTRY

1. Current situation of Development Cooperation

1) General trend

Since 2006, after the election of the President, the Government of Uganda has been considering to depart from heavy dependence on foreign aid, and efforts have been made in this direction. Due to favorable macro economic growth, as national revenue has increased, the ratio of aid to the total revenue has been rapidly declining though the real amount increased a little. Nevertheless, the share of foreign aid in total revenue in 2009 remained at 35 % (total revenue at USh 7,333.7 billion, aid at USh 2,533.5 billion), and about 50 % of the budget for development, excluding running cost for personnel and others, aid from abroad, clearly showing high dependence on aid even now.

In Uganda, aid coordination among donors has been well established and in a number of sectors, sector-wide approaches are taken. There was a period of shifting from project support to budget support, but this approach which might be seen as too radical, is now weakened. On the other hand, development cooperation is going on based on the principle of "division of labor" avoiding duplication among the donors with close communication and coordination. In the meantime, as mentioned earlier, the Ministry of Finance, Planning and Economic Development (MoFPED) had formulated [Debt Strategy] in December, 2007, in which items to be applicable to the loan were restricted to infrastructure, water and agriculture to maintain the balance of loan at the appropriate level, by accurately grasping the current aid position and proper management by the government.

① Selection of prudent debt management policy (establishing ceiling for aid amount a year, etc)
② Compulsory notification of all aid activities and their amount to the Ministry of Finance (including those of NGOs)
③ Strengthening the function of the Ministry of Finance as a liaison office of the aid matters (execution of final screening of aid request by MoFPED etc.).

Major bilateral donors in 2007 include U.S.A. ($192 million), U.K. (80), Denmark (50), Netherlands (45), Ireland (44), Norway (30) and Sweden (28). Japan's contribution in 2007 was $18 million.

As multilateral organizations, World Bank ($339 million in 2007), African Development Bank (86), EC (144) and Group of United Nations Organizations (132) are providing aid to various sectors.

NGO's cooperation activities are also notable in Uganda.

2) Characteristics of cooperation in the field of agriculture and forestry

Though the share of agriculture & forestry to the total GDP has declined to around 30 %, still 85 % of total export and 77 % of the employment depend on agriculture and forestry (UBOS 2005). The ratio of rural population to total population is 86 %. About 96 % of the population categorized as poor are living in the rural area. Therefore, from the current situation, the agriculture sector has two important roles to play; one for the contribution to economic growth of the country by expanded export by ordinary farmers and another for poverty eradication in rural areas by increased production through improved farming technology of the small scale farmers.

Countries extending cooperation with focus on agriculture are Japan, Denmark, Netherlands, Ireland, Sweden, Norway, USA and UK. USA is now exploring a new approach to agricultural cooperation as a

part of the cooperation policy "Revitalization of African Agriculture" by Obama administration. Based on the business model of value chain, such areas of higher added value and more suited to the private sector as post harvest processing, marketing and fostering farm entrepreneurs are being considered, rather than the area of production. As for international organizations, specialized in agriculture, like FAO, IFAD, WFP and WARDA (currently Africa Rice Center), are extending full support with their expertise. NGOs actively working in Uganda include World Vision, SG2000, BRAC and Food for the Hunger.

In general, USA and European countries tend to minimize the involvement of the government to the development cooperation in the field of agriculture, leaving it to the private sector. (There seems to exist the recognition that agriculture is a viable business, and at the same time the notion of estate type farming on tea, cotton, sugarcane, maize and animal industry of the colonial days.)

NAADS (National Agricultural Advisory Services), founded by the common development fund from World Bank, Netherlands, Ireland, Denmark and others, aims at establishing privatized extension services system ultimately, through private sector service providers (including NGOs) together with the provision of input such as seeds, fertilizers and machinery. At the moment, Agriculture Officers and their assistants hold concurrently two posts. In any case, provided services to small farmers tend to be more focused on input rather than technical guidance, and the steady effort by farmers and the technical capacity of service providers to increase productivity is not well recognized.

NAADS has been establishing TDS (technology development site) all over the country as the cores of extension with the supply of the technology from National Agricultural Research Organizations (NARO). However, many researchers of NARO are much concerned about collaboration works (including commissioned or contract research) with international research institutions under CGIAR or universities of developed countries, and show limited interest in new technologies to address small scale farming within the country. At the same time, fund for such research as to support extension activity is not secured for NAADS and NARO.

3) Cooperation by Japan

Based on the policy dialogue of 2006 between the two governments, ①Human resources development, ②Support to the basic human needs, ③Agriculture development and ④ Basic economic infrastructure, were set as priority areas for development cooperation. Strengthening the capacity of governance and rehabilitation of the Northern region were also the issues of priority in response to the aid requirement. Performance of the cooperation is summarized in the Tables III.1.1–III.1.4.

In the field of agriculture, 3 programs are being formulated based on the potentials of agriculture development, technology, experience and advantages of Japanese agriculture. Among these, Rice Promotion is the core of Japan-Uganda cooperation. In 2008, the Minute of Meeting was exchanged between MAAIF and JICA for the cooperation on this program for 10 years. Further, aiming at upgrading the technology of small farmers, application of results of NARO's research and technology development to the level of core farmers was agreed to be strengthened, as a meticulous approach not seen in other donors' cases.

Table III.1.1 Japan's ODA for Uganda (unit: million yen)

Fiscal Year	Technical Cooperation	Loan	Grant	Total
2004	843	-	1,572	2,415
2005	850	-	1,770	2,620
2006	1,080	-	1,920	3,000
2007	958	3,484	3,166	7,608
2008	1,628	-	1,829	3,457

※ Technical cooperation in 2008 includes only that by JICA
Sources: MOFA "ODA Data Book by Country", and Data by JICA

Table III.1.2 Technical cooperation to Uganda

	Fiscal Year				
	2004	2005	2006	2007	2008
Net disbursement (million yen)	806	829	1,058	958	1,628
Acceptance of trainees	86	596	137	101	150
Of whom to Japan	(27)	(59)	(71)	(61)	(85)
Dispatch of experts	4	11	10	17	26
Dispatch of mission	47	22	68	21	53
JOCV	18	47	53	57	98
Other volunteers	0	0	0	3	3
Technical cooperation projects	0	1	3	1	1

Sources: MOFA "ODA Data Book by Country", and Data by JICA

Table III.1.3 Yen loans to Uganda

Fiscal Year	Project title	Amount (E/N basis, million yen)
2003	Debt Relief (structural adjustment program)	6,247
2007	Bujugali Interconnection Project	3,484

Source: MOFA "ODA Data Book by Country"

Table III.1.4 Grant aid to Uganda

Fiscal year	Project title	Amount (E/N basis, million yen)
2004	The Project for Rural Water Supply, Phase II (2/2)	322
	Emergency Grant Aid "Consolidation of Peace" (through UNICEF)	1,020
	Food Aid (through WFP)	200
	Grant Assistance for Japanese NGO Projects (1 project))	5
	Grassroots Human Security Projects (4 projects)	25
2005	The Project for the Improvement of Traffic Flow in Kampala City (1/2)	462
	The Project for the Improvement of Health Facilities and Supply of Medical Equipment in the Eastern Region (1/2)	796
	Food aid (through WFP)	220
	Grant Assistance for Underprivileged Farmers (through FAO)	147
	Grassroots Human Security Projects (17 projects)	145
2006	The Project for the Improvement of Traffic Flow in Kampala City (2/2)	316
	The Project for the Improvement of Health Facilities and Supply of Medical Equipment in the Eastern Region (2/2)	873
	Food Aid (through WFP)	330
	The Project for Protection and Promotion of Rights of Children in Northern Uganda (through UNICEF)	223
	Grant Assistance for Japanese NGO Project (1 project)	9
	Grassroots Human Security Projects (21 projects)	169
2007	The Project for Rural Electrification (Phase II) (1/2)	713
	The Project for Improvement of the Medium Wave Radio Broadcasting Network	1,112
	Grant Assistance for Underprivileged Farmers (through FAO)	150
	Support to Child-Friendly Environments through Community Participation in Northern Uganda (through UNICEF)	537

	Food aid (through WFP)	470
	Grant Assistance for Japanese NGO Project (1project)	11
	Grassroots Human Security Projects (21 projects)	173
2008	The Project for Construction of Rice Research and Training Centre	651
	The Project for Rural Electrification (Phase II) (2/2)	574
	Food aid (through WFP)	460
	Grassroots Human Security Projects (16 projects)	144

Source: MOFA "ODA Data Book by Country", and home page

① Rice Promotion Program in Uganda

a. Duration of the program: 2008 – 2017 (10 years)

b. Target area: all over the country

c. Goal of the program: increased income of rice farmers

d. Output of the program

- Increased productivity, and increased rice production by expanded areas together with quality improvement through post harvest technology and value addition.
- Strengthening research capacity on rice, through the improvement of rice research and development system.

e. Components

e-1 Technical cooperation project:

"*Sustainable irrigated Agricultural Development Project in Eastern Uganda*", 3 years from July, 2008

◆ Major activities

Preparation of training program for project sites in 22 districts of Eastern Region
Preparation of technical manual and text
Land improvement of pilot sites in 22 districts
Implementation of training for technical officers in 22 districts
Support to environmental impact assessment
Implementation of training for model farmers
Support to formation of farmers' groups
Monitoring, evaluation and follow up on activities of farmers' groups

◆ Counterpart agencies

Development Division, Crop Resources Department, MAAIF
Agricultural Office of the concerned Districts

◆ Japanese experts

In addition to 3 long-term experts, several short term experts will be dispatched as the need arises for technology transfer to counterpart.

"*NERICA Rice Promotion Project*" 3 years from September, 2008

◆ Major activities

Introduction of rice breeding technology
Specific characteristic test of NERICA rice varieties
Cultivation technology development of NERICA rice under various natural conditions
Confirmation of appropriate post harvest technology
Establishment of demonstration farms
Development of training materials
Training of extension officers, NGO staff, farmers etc.

Technical training and provision of information to those in other African countries

◆ Counterpart agencies

MAAIF
National Agricultural Research Organization (NARO)
National Crops Resources Research Institute (NaCRRI)
Zonal agricultural Research and Development Institute (ZARDI)

◆ Japanese experts

2 long term experts are dispatched for the technology transfer to counterparts. In addition 10 JOCVs for NERICA will be stationed on fields for the promotion and extension of NERICA rice cultivation at the grass root level.

"*Rice Promotion Project Phase I*" Following the above mentioned 2 projects, 5 years from 2011

e-2 Grant aid

"Construction of Regional Rice Research and Training Centre" Dec., 2009 - March, 2011

e-3. Japan Overseas Cooperation Volunteer

Dispatch of youth volunteers on rice, food crops and community development

② Animal Industry Promotion Program

"*Technical Assistance to Improve the National Diagnostic Capacity for Animal Disease Control*"

a. Outline of the cooperation

To strengthen the system of animal disease diagnosis in Uganda

b. Period of cooperation

March, 2010- March, 2013（3 years）

c. Counterpart Agencies

Diagnosis and Epidemiology Center, MAAIF
Animal resources Institute, Veterinary Faculty, Makerere University

d. Japanese experts

Three long-term experts and a number of short term experts transfer technology to the counterpart personnel

"*Dispatch of JOCV to the Regional Veterinary Offices"*

③ Strengthening/Promotion of Local Industry Program

"*Technology diffusion on sericulture"*

"*Dispatch of JOCV for One Village one Product Movement*"

Activities of Japan Overseas Cooperation Volunteers are the important component in these programs. Apart from these programs, in the last few years, more than 40 JOCVs for community development have been dispatched to Uganda for the grass root works of agricultural extension. These are rewarded with good results from the activities of the experts.

2. Themes of Development Cooperation and their Direction

1) Themes for agriculture/ forestry development

Fostering owner farmers of the appropriate scale would be the most important theme. Currently, the farm size is polarized to two extremes; one for a limited number of very large scale estate farms and the other for so many small scale poor farmers. Self reliant farmers based on their family labor are very limited in number. Small scale poor farmers seldom show the attitude to stand up by themselves, just waiting for physical supports from the administration and/ or NGOs. Many young men living in rural villages work only occasionally at the estate nearby, and spend most of their time at the store front of the village with nothing to do. This attitude to work might be due to the favorable natural environments of Uganda compared to other African countries. At the same time, the history from the colonial days and internal strives after independence might have influenced negatively to encourage the zeal of young people to work hard.

Under the circumstances, it would not be easy to foster self reliant farms based on the family labor in a short period. However, it is important that in addition to the administration and aid from overseas, farmers themselves should be motivated. To realize this, it is important, first of all, that the farm management of owner farmers become stable, and young generation are more attracted to agriculture.

For the stabilization of farm management, improvement of rural infrastructure and maintaining the balance of self sustaining crops such as banana, cassava, maize etc. and cash crops such as rice, vegetable etc.

To attract the interest of young generation, mechanization also needs to be considered, not solely depending on human labor. In general, as for farm implements, farmers have only hatchets called panga and hoes at most. For example, for paddy harvest, farmers pick the ear or use panga, without using sickle and they do not have threshers. In this context, prior to mechanization, introduction of appropriate farming tools is required. Nowadays, there are motor vehicles, which are in all rural villages, though tough secondhand. In addition, repair shops are available. So the basis of mechanization may be considered to be already established.

Existence of estates creates job opportunities in rural areas, and the export of coffee, tea, cut-flower etc contribute to foreign currency. However, productivity of the sector is not necessarily high enough, and there are certain issues to be improved including inappropriate use of agricultural chemicals. The government of Uganda intends to raise the self sustenance by decreasing reliance on assistance from abroad and by increasing private sector investment. However, the ratio of foreign aid in the development budget remains high, and necessity of assistance, both of financial and technical, from abroad for small- scale poor farmers continues to remain high. Further, in areas of infrastructure such as farm road, irrigation and water supply, and of human resources development such as training of extension officers and researchers, continued support from developed countries will still be required to raise the foundation of rural life of small-scale farmers.

2) Direction of Japan's cooperation in the field of agriculture and forestry

In the cooperation of Japan in the agriculture/forestry sector of Uganda, South-South cooperation is a very important aspect. Based on the development strategy of Uganda, together with the collaboration and coordination with other bilateral donors and international organizations, S-S cooperation mobilizes human resources (experts from the third countries), fostered through cooperation activities in the past in Asian and African countries. At the same time, a sector-wide impact at the program level should be carefully considered and not just the implementation of individual projects. Needless to say, cooperation

to human resource development and strengthening organizational structure by the government are main objects.

However, in order to make cooperation projects more effective, human resources development on the part of Japan will be necessary. As the natural features, history and society of Uganda differ very much from those of Japan and other Asian countries, it would be very important to give the opportunity for young generation to gain experience so as to contribute to the development of Uganda. At the same time, there should be a support system to their endeavor.

“Promotion of NERICA rice” is the project of particular emphasis in Africa. In this project, experts from Tokyo University of Agriculture and Japan International Research Center for Agricultural Sciences (JIRCAS) are dispatched on a short term basis for guidance and advice on specialized subjects to the project team and for technology transfer to counterpart personnel of Uganda. In parallel, the project is accepting students of Tokyo University of Agriculture and College of Bioresources Sciences, Nihon University, under the scheme of JOCV as short term volunteers.

Similarly, the “Livestock Promotion Project” is accepting students from of Veterinary Medicine Department of Nihon University as short term volunteers in parallel to the dispatch of experts from the said university to the project. This way of training the young generation will be necessary not only in the agriculture sector facing shortage of manpower but also in other sectors.

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