

ADC/IDEA PROJECT UGANDA

A BASELINE SURVEY ON COCOA PRODUCTION IN
SELECTED DISTRICTS OF UGANDA

(A FINAL REPORT)

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LIST OF ACRONYMS

ADC.	Agri-business Development Centre.
BOU.	Bank of Uganda.
CDP.	Cocoa Development Project.
CMB.	Coffee Marketing Board.
CMBL.	Coffee Marketing Board Limited.
EPAU.	Export Policy Analysis Unit.
FAO.	Food and Agriculture Organisation.
FOR.	Free On Road.
FOB.	Free On Board.
GDP.	Gross Domestic Product.
ha.	Hectare.
ICC.	International Trade Council.
IDEA.	Investments in Developing Export Agriculture.
MAAIF.	Ministry of Agriculture, Animal Industry and Fisheries.
MFEP.	Ministry of Finance and Economic Planning
NEI.	Netherlands Economic Institute.
NRM.	National Resistance Movement.
UNDP.	United Nations Development Programme.
NTAE.	Non-traditional Agricultural Export crops.
SDR.	Special Drawing Rights.
UCDA.	Uganda Coffee Development Authority.

Executive Summary

Uganda Government's policy for agricultural development mainly focuses on increasing food production for self reliance and diversification of agricultural export crops with the purpose of increasing national and farm household revenues. In addition to the traditional export crops (coffee, tea, cotton and tobacco), non-traditional agricultural export (NTAE) crops are currently being utilized to expand the export base. Among the NTAE crops that have received emphasis from government include maize, beans, vanilla and cocoa.

Agri-Business Development Centre (ADC) in collaboration with USAID through her IDEA project undertook the leading role of promoting maize, beans, vanilla and cocoa, among other crops, as non-traditional agricultural export (NTAE) crops targeted to expanding the export base of Uganda. Studies were recently undertaken by private consultants to establish the impact of the ADC/IDEA project in the promotion of these NTAE crops in Uganda. Development Management Consultants International (DMCI) was one among the many consultants contracted to conduct the studies on behalf of USAID. Development Management Consultants were assigned the duty of reviewing the status of the cocoa crop in Uganda, assess its profitability, competitiveness, and evaluate the contribution of ADC/IDEA project in the promotion of the crop. The study was conducted with the following objectives; i) determine income levels and expenditure patterns of men and women involved in cocoa growing, trade and export; ii) determine employment and wage bill distribution of men and women with focus on the labour utilisation and participation in decision making; iii) obtain area under cocoa, levels of production, productivity and economies of producing and exporting cocoa with focus on the level of technology and husbandry practices; iv) obtain the number of men and women impacted by the ADC/IDEA project; v) determine the social welfare, nutritional status and assets owned by households involved in the growing, trading and exporting of cocoa; vi) obtain quality and value of cocoa produced and exported and the extent of ADC's contribution; vii) obtain backward, forward linkages and multiplier effects associated with cocoa; viii) determine the effects on the environment caused by the promotion of cocoa; ix) compare the above with baseline information previously generated and assess the sustainability of cocoa.

The study was conducted in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo where cocoa is grown. The study selected a sample consisting of cocoa growers, trader/buyers and exporters. Since the numbers of these growers, traders and exporter are variable and could not allow complete random selection, a stratified random selection was followed to identify and chose the study respondents. From each district, a study sample consisting of 40 (Iganga), 20 (Jinja), 40 (Mukono), 20 (Hoima) and 40 (Bundibugyo) respondents was selected bring the overall study sample to 160 respondents. Data from the districts was collected with the use of structured questionnaire, group discussions schedules, personal observations and by formal and informal consultation.

The results showed that farmers rely on family labour. Most of the work is done by adults, although in some cases, children below the age of 18 year are employed. Hired labour was utilized in cocoa shambas at a small scale. Much of this hired labour was employed during the peak harvesting periods and post-harvest operations. The land allocated to cocoa in the five districts is approximately the same as that allocated to all the other crops (coffee, bananas, maize, beans, cassava, etc), which gives an impression of the importance of cocoa to farmers in these districts. None of the farmers surveyed used chemical fertilizers and pesticides, mainly because they could not afford them and in some cases they lacked the necessary equipment required in the application of these chemicals. The average costs incurred by each farmer per hectare per year in cocoa plantations in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts, are Ug.sh 270,425, 350,312, 213,618, 536,516 and 107,592, respectively. The average cost incurred by farmers in growing other crops in the above mention districts are Ug.sh 114,353, 670,344, 123,234, 140,060 and 254,693, in the order. Generally, the farmers spend more money in cocoa than in other crops. The average net profit margins from cocoa on each of the visited farms in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo were found to be Ug.sh. 471,075, 626,388, 1,246,082, 663,855 and 1,208,900, respectively. Net margins from other crops in these districts were in the order of Ug.sh 2,017,547, 474,756, 1,413,206, 823,920 and 460,527. As can be observed, the net margins from other crops were higher than those from cocoa in some of the surveyed districts in this study. The profit margin values indicate that cocoa is more profitable crop in Mukono and Bundibugyo districts.

At the exporter level, the profit margin of cocoa is currently Ug.sh 323 per kilogram of cocoa beans exported. The export competitiveness of cocoa in Uganda was found to be 1.5 which shows that the net output value of cocoa is higher than the domestic cost of producing and exporting one kilogram of dry cocoa beans. The export competitiveness was higher than in the previous four years where it ranged from 1.0 to 1.36.

Majority of the cocoa farms surveyed were found to be old (11 years and above) and in good working conditions. From their long time experience, most farmers were found to have adequate knowledge in the growing and processing of cocoa. This means that little investment will be required in training farmers in the skill and technologies employed in cocoa production. Most farmers exhibited healthy appearances which was an indicator of their nutritional status.

The forward, backward linkages and multiplier effects associated with cocoa production in Uganda indicate that the country is currently benefiting from the present level of the cocoa sub-sector, but there is need to improve on the sub-sector to expand the avenues from which benefits can be accrued in the sub-sector. It is important that Uganda as a country ceases to exporting cocoa beans in their raw form, but rather in the intermediate or final consumer product forms, by encouraging the private sector to establish processing plants. To-date, the cocoa sub-sector employs up to 120,000 individuals, which is a significant contribution to alleviating the unemployment problem in this country. Environmentally, cocoa was found not to have significant negative impacts on the farming ecosystems and the general climate.

On roles of ADC/IDEA project in the promotion of cocoa production, the farmers were not aware of the ADC/IDEA project, but were aware of the existence of CDP which they considered to have contributed little so far. The farmers were tired of the many surveys that have been conducted on their cocoa farms by government and private researchers from which no tangible outcomes have been registered.

It is therefore their solemn wish, that whatever comes through at government level concerning the promotion of cocoa, should focus more on the provision of inputs, subsidies and soft loans to enable the farmers fully achieve their production potentials and alleviate some of the problems and constraints they face. In addition, it is necessary that government strengthens the capacity of

CDP, a body which is familiar with the farmer rather than introducing a completely new entity that may adequately understand the farmer's situation. Therefore, the role of ADC/IDEA project in the enhancement of cocoa production in Uganda can best be achieved through the Cocoa Development Programme.

The farmers as well as some local officials associated with the cocoa industry were however disgruntled by the manner in which government policy addresses this industry. Despite the current interest by government, the cocoa industry has received dismal attention, particularly in the last five years since the sector was liberalised.

The report is arranged in four chapters. The first chapter deals with the general introduction to the cocoa industry; chapter two handles the study methodology; the third deals with study findings and situation on the ground, while the last chapter covers conclusions, recommendations and possible areas in which the ADC/IDEA project should intervene.

1.0 INTRODUCTION

1.1. General Introduction to the Study.

1.1.1. Agriculture in Uganda

Agriculture is the backbone of Uganda's economy. Up to 90% of the population depend on agriculture for their livelihood. The agriculture sector contributes 71% of GDP and 95% of the total foreign exchange revenues¹. Livestock products account for 17% of the GDP, while export crops, fisheries, and forestry contribute 5%, 4% and 3% to GDP respectively. Only 33% of the food crop output is marketed compared with 66% of livestock products. At present, about 56% of agricultural real GDP consists of subsistence crops from own consumption and non-monetized. This agriculture output originates almost exclusively from 2.5 million small holders, 80% of whom have less than 2.0 ha of land (World Bank, 1993).

In the past, Uganda's export revenues were over dependent on coffee, cotton, tea and tobacco whose prices fluctuate widely on the world market. The dependency on these 4 crops provided a narrow base for government revenue that affected the degree to which government provided for social services. This limitation of a narrow base was not largely realized in the 1960's and early 1970's, because the policy then did not adequately encourage diversification of the economic base beyond the agricultural sector. To date, however, the population has increased to between 17 - 20 million people, which unlike in the 60's and 70's can no longer be sufficiently supported based on these four crops. There is need to find alternative revenue sources to meet the requirements of this ever increasing population. The narrow economic base in the past was aggravated by the political and economic turmoil that the country went through in the mid 70's and early 80's resulting in significant pressure on government that then monopolized social services and the economy. Consequently, there was a decline in the performance of the economy and living standards of the people. Export agriculture was significantly shrunk as a result of the political and economic instability the country experienced then, leaving coffee as the dominant foreign exchange earner. Farmers retreated back into subsistence as incentives to produce surpluses for the market disappeared (IGADD, 1990). This led to decline in household incomes and eventually to poverty.

¹. Source: Ministry of Agriculture, Animal Industry and Fisheries.

Poverty by definition means the failure of basic human capabilities. The single most important item in an appropriate strategy to reduce poverty and hunger in Uganda is the promotion of sustainable agricultural development, because without this promotion, broad-based growth will not be achieved. A broad-based growth is believed to significantly contribute to the overall development of a nation, as long as it takes into account rural emancipation.

The development/emancipation of rural areas hinges around the activities directly or indirectly related to agriculture with both forward and backward linkages and multiplier effects. Rural development can not occur unless demand and supply linkages are designed to nurture rural artisanry, on-farm input supply, processing, marketing of products including the export linkages and supply of basic consumer goods and services. This nurturing can best be achieved by the private sector, if promoted to directly relate with rural communities, and as the incomes rise in both urban and rural areas, the demand for goods and services, including those locally produced, increases. This increase in demand for goods and services generates employment and leads to economic diversification/development.

The poorest people in Uganda are typically those who have diversified least into activities other than agriculture. It is important to diversify as it offers households and the nation at large the opportunity of ridding themselves of poverty. In order to strengthen and encourage rural diversification/development, the following are necessary:-

- Encourage establishment of agro-based processing and marketing enterprises in the rural area by the private sector.
- Alleviate the constraints/problems associated with rural production, processing and marketing.
- Provision of inputs and services related to rural commercial enterprises.
- Encourage rural infrastructure commercial service enterprises.
- Introduction of income generating and high quality and/or value added agricultural production enterprises.

In 1987, the NRM Government introduced an economic recovery programme supported by the World Bank and the International Monetary

Fund (IMF). Since then a number of conventional structural adjustment and economic stabilization policies have been or are being implemented. Among these are market liberalization and privatisation policies within which the Government has given relative priority to export crop production and encouraging the private sector to take a leading role in economic development. This is evident in the number of agricultural based projects that are underway in the public and private sectors since 1990. Some of these projects in the public sector include the Coffee Rehabilitation Project, The Emergency Cotton Programme and the Cocoa Development Project. The Cocoa Development Project (CDP) was initiated to supplement coffee, cotton, tea and tobacco crops, and thus diversify Uganda's narrow export base and incomes at the small holder farm level in an attempt to alleviate poverty.

Therefore, in view of poverty alleviation, USAID in collaboration with the Ugandan government initiated an IDEA project in 1995 with the basic objective of increasing rural incomes through the promotion of non-traditional agricultural export (NTAE) crops. The project is executed by Agri-Business Development Centre (ADC) composed of both foreign and local professionals. The ADC has in the last two and a half years provided assistance to agri-business firms, associations and growers. Since then (1995), as a result of the assistance, the beneficiaries have expanded production and marketing of NTAE crops and their products.

Recently, studies were undertaken to measure the impact of the IDEA project on the ADC clients who consist of producers, traders/buyers and exporters of three commodities, namely; maize/beans (combined), Vanilla and cocoa. This particular study focused on cocoa.

The cocoa study, being a baseline study, was to form a basis for evaluating the impact of IDEA project interventions. The overall objective of the study was to provide the ADC with a complete structure of the producer-exporter chain, geographic spread, socio-economic and agronomic aspects. The study also monitored, among others, cocoa productivity, crop husbandry practices, post harvest handling, farm storage, input usage at the farm level, and women participation, income utilization, differences between male and female growers, forward and backward linkages and multiplier effects, and environmental impacts and sustainability.

1.2. Study Objectives

The study had the following objectives;

- i) Determine income levels and expenditure patterns of men and women involved in cocoa growing, trade and export.
- ii) Determine employment and wage bill distribution of men and women with focus on the labour utilisation and participation in decision making.
- iii) Obtain area under cocoa, levels of production, geographic spread, productivity and economies of producing and exporting cocoa with focus on the level of technology and husbandry practices.
- iv) Determine the location, number and capacity of cocoa processing facilities.
- v) Determine the social welfare, nutritional status and assets owned by households involved in the growing, trading and exporting of cocoa.
- vi) Obtain quality and value of cocoa produced and exported and the extent of ADC's contribution.
- vii) Obtain backward, forward linkages and multiplier effects associated with cocoa.
- viii) Determine the effects on the environment caused by the promotion of cocoa.
- ix) Compare the above with baseline information previously generated and assess the sustainability of cocoa.

1.3. A Brief on the Cocoa Industry in Uganda

1.3.1. Evolution of cocoa in Uganda

Cocoa was introduced in 1901 from Britain and planted in Entebbe Botanical Gardens. Later on, it was introduced on commercial estates owned by Europeans and Asians. By 1917, cocoa was being exported. However, estate production of cocoa was rendered uneconomical due to poor management, pests and diseases, as well as lack of foresight and planning. By 1924, compounded with the falling market prices, growing of cocoa was abandoned.

Following the realisation of the uneconomical nature of estate cocoa growing, the crop was abandoned and only re-introduced in 1955 on small holder farms for the same reason today, to diversify foreign exchange earnings and farmer incomes in the "Robusta" coffee growing areas with suitable cocoa growing conditions. A total of 461 ha had already been planted by 1965 in Mukono, Bundibugyo and Hoima districts. Kituuza Research Station, currently the coffee research centre, was a nucleus from which agronomic practices for cocoa growing in Uganda were developed. Different production technologies were formulated to overcome the problems farmers faced in producing cocoa. As a result, these technologies lead to increased cocoa yields considerably.

The Cocoa Development Project (CDP) was established and became fully operational by 1972. The project was then charged with the responsibility of promoting the cocoa industry in Uganda in terms of increased yields and improved quality, and make it favourable on the world market. Its immediate objectives and function were to;

1. diversify agricultural production for exports in the "Robusta" coffee growing areas,
2. regulate and control production as well as marketing of cocoa,
3. maintain high quality standards in cocoa production,
4. improve standards of the existing plantations,
5. open up cocoa nurseries to raise seedlings for gap filling and expansion of acreage to meet farmers demands,

6. introduce improved planting materials and provide enough production inputs,
7. train and upgrade cocoa extension workers to the point where they are able to teach producers improved husbandry practices, plus on-farm processing, grading and storage, and
8. continue, and if necessary, set up applied research work on cocoa.

By 1978, a total of 14,000 ha had been planted on small holdings in the districts of Jinja, Mukono, Kamuli, Iganga, Hoima, Masindi, Bundibugyo, Mpigi, and Luwero. All aspects of cocoa production, marketing and export were carried out by CDP on the 10 fermentries established in the growing areas. However, the political and economic turmoil of the 70's and early 80's drastically affected the cocoa industry to an extent that all processing facilities in these areas broke down, and farmers payments were not regular or not there at all. This resulted in the abandonment and subsequent reduction in the acreage of cocoa.

To make matters worse, the 1981 recovery programme of the Ugandan economy excluded the cocoa industry. The Government of Uganda, in 1986, requested FAO and UNDP for assistance to review the state of the cocoa industry then. They, (FAO/UNDP), found that due to neglect and abandonment of cocoa plantations (shambas), only 10,000 ha of mature cocoa were still productive with yields of 100 kg of dry cocoa beans per hectare, as compared with 14,000 ha with dry cocoa bean yielding of up to 300 kg per hectare in 1978.

Bundibugyo district was found, by the FAO/UNDP programme, to have the highest yields of 300 kg/ha of dry cocoa beans, and considered to have greatest potential for high cocoa production. Mukono and Bundibugyo districts were found to have more land allocated to cocoa compared with the other six cocoa growing districts; namely Iganga, Hoima, Jinja, Kamuli, Mpigi, Masindi and Luwero (Table 1). Only 13.3% of area suitable for cocoa growing in the country was found to be utilized for growing the crop, thus expressing the potential cocoa has in this country. It was, therefore, recommended by the UNDP/FAO review that this cocoa potential should be exploited with much emphasis on increasing the volume and value of production for export. As a result, a preparatory assistance project was initiated.

Table 1. Cocoa distribution in Uganda (1997).

District	Suitable area (ha)	Area under production (ha)	Percentage area Utilized by cocoa (%)
Mukono	54,000	6,299	11.6
Bundibugyo	5,600	2,030	36.3
Iganga	8,000	980	12.3
Hoima	4,900	820.6	16.7
Jinja	4,500	752	16.7
Kamuli	3,100	424	13.6
Mpigi	1,600	510	31.9
Masindi	1,100	388	35.3
Luwero	800	273	34.0
Total	93,600	12,476.6	13.3

Source: Cocoa Development Programme, Cocoa year 1996/1997 Report.

The project established cocoa nurseries in the cocoa growing areas and an isolated unit on Damba Island on Lake Victoria (30 km from Ggaba shoreline) for the reception of all imported materials for quarantine purposes. Some high yielding varieties were obtained from Ghana and South America in 1987 and planted on the island. These varieties consisted of Criollo, Forastero and Trinitario hybrid groups of cocoa. Some CDP staff were trained in the identification of insect pests, disease, rehabilitation and maintenance measures.

With the help of consultants, a three year master plan was drawn with the purpose of strengthening CDP, making it are more efficient and reliable institution capable of developing the cocoa industry into a self perpetuating entity. This master plan was however not implemented, because the government then had no clear policy on cocoa production, marketing, pricing and research. Nevertheless, the Uganda government continued to implement the activities which had been initiated in the preparatory stage of the project. These activities included i) rehabilitation of plantations, ii) training of staff and farmers, iii) monitoring the performance of the quarantined imported high yielding materials on Damba Island, iv) raising cocoa seedlings for farmers, and v) formulation of clear government policy on the cocoa industry.

In 1988, the cocoa processing and marketing functions were transferred to the Coffee Marketing Board (CMB) with the main purpose of improving cocoa marketing, farmer morale and participation, since CMB had then the

capability and capacity to adequately carry out these functions. In the short-run, the cocoa industry registered a positive impact following the transfer of these cocoa functions to CMB. However, due to the inefficiency that cropped up in CMB following this transfer of functions, the farmer payments were no longer prompt, which again negatively impacted cocoa production at the farm level, leading to some farmers cutting down part of the originally re-established shambas to create more land for subsistence crops.

1.3.2 Performance of Cocoa in Uganda's Economy

Cocoa has been and is still an insignificant crop in the Ugandan economy. As previously reported, it was introduced way-back in 1901, but has failed to take off. For years it has been established through consultancy studies that have indicated that Uganda has a great potential for cocoa production. Other developing countries that started growing the crop much earlier or later than or at the same time as Uganda, have since benefited from the cocoa industry. For example, Brazil, Ecuador, Ghana, Cote d' Ivoire, Jamaica, Sao Tome and Principe have been successful in the cocoa industry. One wonders why Uganda has failed in this industry, yet the country grows "Robusta" coffee, a crop that grows in the same environment as cocoa, but unlike cocoa, has been a success and is still the major foreign exchange earner for the country.

There are over one million small hold farmers growing coffee on about 270,000 ha as compared with 8,450 cocoa farmers growing the crop on approximately 12,000 ha of land. In addition, as a result of the Government's promotions, there has been a supply response in coffee production from 2.7 to 3.5 million 60 kilogram bags (equivalent to rise from 162,000 MT to 210,000 MT) generated between 1990 and 1997 in contrast to a change of 1000 to 2700 MT for cocoa in the same period (Table 2).

Table 2. Cocoa and Coffee Production (1990 - 1997)

Year	Cocoa (MT)*	Coffee (MT)
1990/91	1,000	162,000
1991/92	1,396	132,000
1992/93	1,300	174,000
1993/94	1,500	192,000
1994/95	2,000	198,000
1996/96	2,200	200,000
1996/97	2,700	210,000

*MT = metric tonnes. Source: UCDA, Annual Report 1995; 1996 & 1997. CDP.

Although cocoa has existed in Uganda for long and has never gained importance of other beverages like coffee and tea, its contribution to the country's GDP has been increasing since 1990, except in 1992 when exports declined (Table 3). Cocoa exports were worth US\$ 504,000 in 1990 and increased to over US\$ 728,000 in 1993, further expressing the potential of the cocoa crop in Uganda's economy.

Table 3. Cocoa and Coffee Exports (1990 - 1997)

Year	Quantity (tonnes)		Value (,000. US\$)		% of total exports	
	Cocoa	Coffee	Cocoa	Coffee	Cocoa	Coffee
1990	396	141,489	504	140,384	0.28	79.02
1991	492	127,438	374	120,794	0.20	65.38
1992	1,200	122,882	150	98,087	0.20	65.00
1993	1,313	114,169	728	106,775	0.36	53.06
1994	623	194,325	586	343,289	0.13	74.64
1995	509	168,858	442	384,122	0.08	68.51
1996	2,200	200,000	3,164	353,314	0.38	72.0
1997	2,700	210,000	4,201	370,986	0.40	76.38

Source: Background to Budget (1990-1997. MFEP.

The recent liberalization of cocoa marketing has contributed to increased cocoa production and exports. This was attributed to the present prompt payment of cocoa farmers by private exporters who buy the crop (CDP, 1997), that has incited more farmer attention to the crop. A similar view about the cause of the increased cocoa production had earlier-on been expressed by the World Bank Report (1993) which revealed that there was increased production in perennial export crops in response to liberalisation, and mainly as a function of improved husbandry levels and production incentives. Cocoa exporters in Uganda were found to be making profit even when prices on the world market were falling (UCDA, 1996/97), suggesting that Uganda has a strong positive comparative advantage in contrast with other cocoa producing countries.

However, the growth of Uganda's export sector depends to a large extent on the relative profitability of the agricultural export crops. And unless the commodities produced and exported are competitive and financially profitable, the domestic producers and exporters will not have the incentive to produce and export them, even if Uganda has a great potential to grow these crops.

1.4. Government Policy on Cocoa Production

In 1990, the government of Uganda formulated new policies to correct past mistakes regarding the coffee and cocoa sub-sectors. Marketing of these crops was liberalised resulting in the disbanding of CMB and its marketing monopoly and its final conversion into the Uganda Coffee Development Authority (UCDA) that took on promotional and monitoring roles. All aspects of cocoa production, processing and marketing were, in collaboration with CDP, retained by the private sector.

The new policies made in 1990 were aimed at removing production, processing, rehabilitation, storage, research and marketing constraints that were impeding development of the cocoa industry in Uganda. These new policies are being jointly implemented by CDP and the private sector. In the new policy, all issues concerning cocoa processing, marketing, storage and export were privatized. Farmers process their cocoa and sell to dealers who buy at negotiable prices determined by market forces. The dealers sell to private exporters who export the dry cocoa beans to either France, Germany or the United Kingdom, which are major markets for Uganda's cocoa. Like UCDA, CDP took on promotional and monitoring roles, ensuring inspection of all cocoa consignments destined for international markets, rehabilitation of cocoa plantations, research, and quality maintenance.

2.0 STUDY METHODOLOGY

2.1. The Study Areas.

The study covered the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo (See Map in Annex 1). The districts were selected based on the following;

- i) having been the pioneer areas (Mukono) where cocoa was grown on small-hold farms way-back in 1958.
- ii) being the areas in the country where cocoa is to some extent still grown today (Iganga, Jinja, Hoima, and Bundibugyo).

These five districts cover 85% of the 12,767 hectares grown to cocoa. Cocoa in some of these districts (e.g Bundibugyo) is more important to the farmers than coffee. In the other districts where cocoa and coffee are grown, the value of cocoa is increasing. With the exception of Bundibugyo district where cocoa is the main cash crop, it is considered the third largest income earner after bananas and coffee in the other districts.

2.2. Sample Selection and Sample Size

In collaboration with district and village level administrators, the cocoa farmers/producers, traders and exporters that were interviewed were selected from records at the district and village level. But, because the number and distribution of cocoa producers, traders and exporters is variable in each district, different numbers of respondents from each category in each district were selected, in order to achieve the objectives of the study and make it manageable. A stratified random sampling procedure was employed.

Cocoa is grown in only one county (Kagoma) in Jinja district. Of the 200 growers, 4 traders, 2 exporters, 2 Cocoa Development Programme staff and employees identified in the district, 20 growers, 2 traders, 1 exporter, 2 CDP staff and employee were selected for the study, thus constituting a study sample of 25 respondents from the district. A similar selection strategy was employed in the other 4 districts of Iganga, Mukono, Hoima and Bundibugyo.

Out of the six counties in Mukono district, Buikwe, Nakifuma, Najjembe and Kasawo counties where cocoa is grown were selected. The study

sample selected from these 4 counties consisted of 37 growers, 2 traders and 1 exporter, constituting 40 respondents. The number of Cocoa Development Programme (CDP) staff and employees in Mukono district were only 2, and therefore all were interviewed in addition to growers, traders and exporters.

In Iganga district, the counties of Bunya, and Luuka, grow cocoa and were selected out of a total of 6 counties. Iganga district was found to have no traders and exporters. The growers transported their cocoa beans to Jinja for sale. The number of growers, CDP staff and employees selected in Iganga district were 37, 2 and 1 respectively.

Cocoa in Hoima district is grown in the counties of Kigorobya and Buhimba. From these counties 18 growers, 1 trader and 1 Agricultural Extension staff were identified and selected as respondents for the study.

Like in Jinja district, cocoa in Bundibugyo district is grown in one county (i.e Bwamba) in which the town council is situated. The number of respondents selected from the county for the study consisted of 34 growers, 1 trader, 3 exporters, 1 CDP staff and 1 Agriculture Extension officer. The sample size from Bundibugyo district was 40 respondents.

In general, the total sample of respondents/households selected for the study in the five districts was 167.

2.3. Data Collection Methods

The study mainly used primary data collected from farms during farm-visits, personal observation, interviews with cocoa farmers, exporters and other intermediaries. Secondary data was obtained from district records. The secondary data consisted of previous cocoa production profiles of the districts surveyed. Questionnaires (Annexes 2 & 3) were employed in the interviews to collect primary data from the farmers and exporters.

Primary data requirements included production data such as i) land planted to cocoa and other crops, inputs prices, yields, labour and labour costs, etc, ii) marketing data consisting of cocoa prices at the farm and export levels and marketing chain, iii) processing and storage (if any) costs, and iv) problems and constraints hindering increased cocoa production.

Secondary data was collected from a number of sources including the Ministry of Agriculture, Animal industry and Fisheries, Ministry of Finance and Economic Planning, Cocoa Development Project (CDP), Bank of Uganda, Department of Agriculture Economics, Makerere University, Export Promotion Council, Food and Agriculture Organisation and Kawanda Agricultural Research Station. Studies undertaken by individuals were also utilized.

2.3.1 Questionnaires

Two structured questionnaires were used in the study. The first questionnaire (Annex 2) which was in two parts (Alternative A & B) was targeted to the producers (growers) and exporters, while the second one (Annex 3) was administered to the CDP staff in the surveyed districts, selected employees, traders and exporters. Annex 4 is a focus groups discussion control format.

The first questionnaire was aimed at collecting background information on cocoa growing farms with respect to amount of land allocated to cocoa and other crops, condition and age of cocoa shambas, agronomic aspects of cocoa growing, methods and technologies employed in cocoa, labour and labour costs, yields of crops, prices of cocoa at the farm level, revenues generated from cocoa and other crops, profit margins, contribution of cocoa on farm incomes, number of women labourers, decision making on income expenditure at the household level, socio-economic and nutritional status of farm household, problems and constraints faced by cocoa farmers,

The purpose of the second questionnaire was to obtain information at a macro level, on the geographic spread of cocoa farms, numbers of cocoa producers, proportion of women involved in cocoa production, past and projected production trends, volumes of exports and earnings, number of jobs created by the current cocoa industry and its projected potential, comparative advantage of cocoa, forward, backward linkages and multiplier effects of cocoa production, marketing chain from farmer to exporter, peoples' opinions on the role of ADC/IDEA project and projected interventions necessary to improve their performance in cocoa production, and environmental impact of cocoa production.

2.3.2. Focus Groups Discussions

Focus group discussions were used to obtain non-record data considered unique to cocoa. One focus group discussion was held at local community centres (where they exist) and any LC II office in each of the cocoa growing sub-counties in the survey area. The discussion groups consisted of cocoa growing farmers, traders and exporters selected in the study. A discussion control format was employed and it consisted of the following issues;

- i) production levels and factors influencing them;
- ii) the entire farming system and production methods;
- iii) labour utilization by gender;
- iv) costs involved in the production of cocoa;
- v) relative profitability;
- vi) marketing chain from the farm-gate to the export point;
- vii) household income levels; income utilisation;
- viii) share of household incomes attributed to cocoa;
- ix) the socio-economic situation of the cocoa producers;
- x) the nutritional situation of the cocoa producers;
- xi) the environmental situation;
- xii) problems and constraints the cocoa producer face and possible interventions required.

2.3.3. Formal and Informal Consultations

Formal and informal consultations were made in order to obtain diverse information sets related to cocoa production. Informal discussions were subjected to people not necessarily producing or trading cocoa, but to people living in the cocoa growing areas. Formal consultations were held

with officials of the Cocoa Development Programme (CDP), people employed in the sector, traders and exporters in and out of the study area.

2.3.4. Field Visitations/Observations

Visits to cocoa production fields, marketing and export outlets were conducted to obtain background and first hand information. Efforts were made to observe matters related to area under cocoa, status and age of trees, agronomic characteristics, production methods, marketing chain, social and nutritional status of the cocoa producers, environmental situation of the areas where cocoa is planted, and constraints and problem faced by the cocoa producers.

2.4. Methods Used in Analysing Data.

The data obtained was verified, pooled and simple statistical computations performed with the help of a simple hand calculator. The qualitative and quantitative data obtained were summarized into total, mean, frequency and percentage tables. The quantitative data was later used in further computations to determine total acreage of cocoa and other crops, average labour and labour costs incurred, total and average cocoa yields, average incomes and profit margins from cocoa and other crops, and export competitiveness of the crop.

Quantitative data analysis employed the crop budgeting and gross margin analysis tool to establish the cost of production and profitability of cocoa at the farm level in comparison to competing crops like coffee and bananas, which are perennial crops identified as competing crops for labour and other resources on the farm. The competitiveness index (CI) and profit margin or net financial benefit (NFB) were used for empirical analysis of profitability of cocoa as an export crop. The measures are detailed below.

2.4.1. Cost of production

Cost of production was estimated using partial crop budgets. The key factors considered in the estimation of cost of production were average costs of farm inputs, rural wage rates, number of man²-days used for various farm activities, yields and producer prices. The crop budgets provided an itemised list of both physical and financial estimates for

². Man refers to both male and female

various cost components and yields on a hectare basis. Total costs were divided by the yield to give estimated unit cost of production per kilogram. Perennial crops like cocoa come into production many years after investment is done for establishment or rehabilitation. Therefore, the cost of production includes amortisation of establishment/rehabilitation cost. Depreciation of implements was done based on a straight line method and annual depreciation costs included as the non cash costs of inputs. Three forms of hired labour were identified in the study area; permanent, contract and casual labour. Casual labour was the most common form employed by farmers and an average casual labour wage rate of U.sh 1,800 per man-day was used for valuing the labour input when estimating the cost of production.

2.4.2. Gross margins analysis

In this study, the methodology used to determine gross margins was adopted from that used by Bank of Uganda, Agricultural Secretariat. Gross margin analysis shows the relative profitability of various crops grown by farmers using partial budget approach. It measures at the farm level, comparative advantage of crops to the farmers in terms of income and returns to family labour. It provides a measure of competitiveness of crops in a given farming system in terms of relative profitability. The concept is equivalent to net income which reflects returns to factors of production. However, since the farmer is more interested in farm income available to him as returns to family labour rather than net income, there is need to deduct hired labour wage costs which is an outlay in farmer's cash flow from net income (BOU, 1993). The gross margin (GM) was computed as follows;

$$GM = \text{gross value of output/ha} - \text{variable costs} \dots\dots\dots (i)$$

In this case variable costs include total inputs costs and hired labour wage cost. The variable do not include a charge for family labour used in production.

In addition, the Net Margin (NM), Returns to Family Labour (RFL), unit cost of production (Cp) and output/input ration (R) were estimated as:

$$\text{Net margin} = \text{gross margin} - \text{fixed costs} \dots\dots\dots (ii)$$

where fixed cost = F (family labour costs & depreciation costs).

To compute the net margin per ha, family labour input was valued at the opportunity cost of labour which is the average casual wage rate of Ug. sh 1800 per Man³-day.

$$\text{Return to family labour} = \text{Gross margin} \div \text{Family labour} \dots\dots\dots(\text{iii})$$

$$\text{Unit cost production} = \text{total cost of production} \div \text{output} \dots\dots\dots(\text{iv})$$

$$\text{Output/input ratio} = \text{gross revenue} \div \text{total cost of production} (\text{v})$$

To establish the competitiveness of cocoa at the farm level, its costs of production, gross margin, net margin, returns to family labour, and output/input ratios, has been compared to those of coffee and matooke.

2.4.3. Valuation of On-farm Cost Elements.

The following approaches were used in the evaluation of the on-farm cost elements:

- a). All variables were computed on per hectare basis.
- b) Material inputs were valued at prices ruling in the rural markets.
- c) Valuation of labour inputs was based on man-day employed and the prevailing wage rate.
- d) The labour requirements per activity performed were computed for both hired and family labour as follows;

$$\text{Labour/activity} = (\text{hrs worked per day} \times \text{no. of persons} \times \text{days worked} \times \text{labour units}) \div 6 \dots\dots\dots(\text{vi})$$

In this study, labour was quantified by an method proposed by Spencer (1975) and used by Tollens (1975) and BOU (1993). Six hours of adult work was considered as one man-day irrespective of sex. Children below 18 years were considered to work for half the time of adult labour.

2.4.3.1. Depreciation

Depreciation of equipment was estimated at replacement costs and a straight line method was employed. For frequently used tools like pangas, hoes and slashers, a use life of three years was adopted, while five years was taken for the less frequently used tools. The depreciation cost was

³. Man refers to both male and female

adjusted for crop acreage. This was based on the assumptions that implements are used equally in a different crop enterprises.

2.4.3.2. Yields

This is a measure of total output obtained per unit area. Total output obtained by farmers was converted to per hectare basis.

2.4.3.3. Amortisation of establishment/rehabilitation costs.

This was based on costs of land preparation, planting, weeding and pruning in terms of man-days labour involved per activity for the non productive years of the crop. The cost for three years was estimated for cocoa, coffee and bananas, and then this cost was spread over a period of 30 year productive life for both crops. Amortisation (Amt) was computed as;

$$\text{Amt} = [C_3 (1.0 + I)^n - C_0 (1.0 - I)^n] \div C_0 (1.0 - I)^n \dots\dots\dots(\text{vii})$$

whereby C_3 = cost of establishment/rehabilitation over a three year period.

C_0 = Annual costs incurred in establishment/rehabilitation.

I = interest rate charged on the cost (loan to establishment). An interest of 18.5% was charged based on the current Bank of Uganda treasury bill rate

n = number of productive years.

2.4.4. Export Competitiveness

The competitive index (CI) and profit margin or net financial benefit (NFB) was used for the emperical analysis of the export competitiveness of cocoa. Competitiveness index was computed as

$$\text{CI} = (\text{Export price of cocoa} - \text{local cost of production and marketing}) \div \text{Local cost of production and marketing} \dots\dots\dots(\text{viii})$$

2.4.5. Profit Margin Analysis.

Profit margin analysis (PMA) or net financial benefit (NFB) was estimated as the difference between realisable export price and cost of export at market prices. The cost of exports included the price the exporter pays to the supplier, storage, processing and marketing costs.

$$PM = Px - (Lc + Fcx) \dots\dots\dots(ix)$$

where

PM = profit margin

Px = international price x prevailing exchange rate

Lc = domestic costs

Fcx = foreign costs.

3.0. STUDY FINDINGS/SITUATION ON THE GROUND

Introduction

3.1. The cocoa plant and its environment

Botanically, the cultivated cocoa plant is called *Theobroma cacao*.L and belongs to the Sterculiaceas family and genus *Theobroma* which contains some 22 species. The plant is considered indigenous to many native areas and therefore has no specific single origin. The most important of these native areas is the Amazon river basin from which one of the three cocoa groups, the **Amazonian Forastero**, originates. The other two members of the cocoa groups are the **Criollo** and **Trinitario** types. All three cocoa groups are interfertile and can be crossed resulting in many hybrids/cultivars, some of which cultivars are today used in commercial plantations.

The Forastero group is very variable and is found in indigenous and semi-indigenous forms in Peru, Ecuador, Colombia, Brazil and the Guyanas. They are used widely in plantations throughout the producing countries. The pods are green before ripening and have more less flat seeds. The cotyledons are dark purple and yield a cocoa with a relatively bitter flavour and often with acid taste. Almost all production and exports from Brazil, West Africa and South-East Asia consist of Forastero types. These types include the Ameronado varieties from West Africa, Maranhao, Commun and Para types from Brazil.

The Criollo group of cocoa trees were domesticated by the Maya Indians for a very long time. They are mainly cultivated in Mexico, Nicaragua, Guatemala, Colombia, Venezuela, Madagascar, Srilanka, Indonesia, and in the Comoro and Samoa Islands. This group has pods that are green and red before ripening and vary in shape. The beans are plump, almost rounded in cross-section, and have white or very slightly pigmented cotyledons. The Criollo type has a strong aroma and only slight bitterness, making a more desirable form of cocoa. The trees are, however, less vigorous compared with the other types, thus causing them to be less favourable on commercial farms. Currently, these Criollo types are being replaced with more vigorous types on most farms.

The Trinitario group was originally selected in Trinidad, and hence the name. They consist of very heterogeneous and different types considered

to result from a cross between the Forastero and Criollo types. The botanical characteristics of this group have all intermediate qualities of the Forastero and Criollo types. The Trinitarios are grown in all countries where the Criollos were formerly grown as well as in many African and South-East Asian countries. In Uganda, all the three (Forastero, Criollo & Trinitario) varieties are grown. It is difficult to draw a distinct boundary of where these cocoa varieties are grown in Uganda, because these varieties are grown in mixed variety plantations. However, the most common cocoa varieties in plantations in Uganda are the Forastero and Criollo types.

3.2. Morphology and Biology of the Cocoa Plant

Mature cocoa trees attain a height of 12 to 15 m in the wild. This tree height, together with leaf area and spread of branches, depend largely on the available space. Narrow spacings (less than 4 m by 4 m) result in short trees with narrow branch and leaf spread. The spacing usually left between the plants (4 m by 4 m) when planting allows the adult trees to attain an average height of 5 to 7 metres. When raised from seed on plantations/shambas, the cocoa tree becomes fully developed at about the age of ten years, a time when it begins to attain its full production potential. However, during the early years of growth the plants begin to bear flowers and a few fruits by the third year, becoming economically viable after 6 to 7 years of growth.

The cocoa plant has a dimorphous root system with a tap-root which also becomes fully developed by the tenth year of growth. Lateral roots emerge from the sides of the tap-root, but are more prevalent in the upper (1 m deep) soil profile, and may cover a radius of 5-6 metres around the tree. The tap-root system is capable of penetrating 0.8 to 2.0 m of soil depth.

The tree trunk grows vertically and the stem grows in height in successive elongation phases up to the age of 18 months. The terminal buds then degenerate and the first horizontal branches develop as whorl/fan. These fan form the main frame-work of the tree referred to as a Jorquette and form the basis for cocoa fruit production. Axillary buds from leaf axils immediately below the Jorquette develop and produce a large number of vertical shoots which behave like the main stem and grow vertically. The most vigorous axillary buds are retained. The remaining buds are then allowed to grow as branches, causing the whole tree to increase in height. At this stage, the first Jorquette gradually dies off.

In the plantation however, the cocoa tree is pruned to a single stem at the level of the second jorquette by systematically removing all the surplus vertical shoots which appear on the trunk. The secondary branches grow in successive growth stages called flushes. Each flush results in production of 5 - 6 alternate leaves.

When the physiological, soil and climatic conditions are suitable, flowers develop on the barks of trees from axillary buds formed after leaves have fallen off. These flowers appear 2 to 3 years after the stem has become lignified. The axillary buds from which the inflorescence develop retain this function of producing flowers permanently. The development of flowers on the same bark site each year produces cushions and a succession flowering occurs on these sites depending on environmental conditions and the physiological status of the plant. Flowers are produced simultaneously on all flower cushions, enabling the cocoa tree to uniformly produce fruit. The flowers are pollinated by insects mainly midges (*Forcypomyis. sp*), ants (*Crematogaster.sp*), Diptera Flies (*Cocidomyiidae.sp*), thrips and leaf hoppers. In addition to environmental factors, the number and activity of pollinating insects greatly influences cocoa fertilization.

The fruit which is formed is first referred to as a cherelle during its early stages of development. It becomes a pod when it has attained its final size and is considered to be mature by the 5th to 6th month depending on the species/cultivar and origin (Mossu, 1992). The pods contain on average 30 to 40 seeds. At maturity and depending on cultivar, pod length varies between 10 to 35 cm, while pod weight ranges between 200 g to 1.0 kg. However, pod weight is on average 400 - 500 g.

3.3. Factors influencing cocoa production

Cocoa production like any other crop depends on technical, ecological and natural, economic and political factors. The technical factors refer to the application of suitable husbandry practices/technologies, use of productive varieties or cultivars that determine the yield, and use of appropriate post harvest handling procedures. These technical applications do exist, but to a limited scale in Uganda, and therefore, there is need to improve upon them, if there is going to be meaningful increase in cocoa production.

3.3.1. Ecological and natural factors

The ecological and natural factors may include conditions, features and forces which influence the healthy growth, fruiting, ripening and general well being of the plant, such as nature of the soil, weather and climatic conditions, disease and pests, age of cocoa trees, area planted to cocoa, and use of hybrids.

Uganda's environment provides comparatively fertile soils, conducive weather and climate, and vast pieces of land suitable to cocoa. The environment is, however, also conducive to many pests and disease causing organisms that may infest/infect cocoa, which therefore implies that a lot of effort is needed to protect the crop when grown.

3.3.1.1. Planting materials

The most important inputs in any cropping systems are the planting materials, which if are of poor productive quality, may render the enterprise uneconomical and not worth any investment.

The profitability of any perennial crop enterprise is pre-determined at the nursery level, most especially cocoa. It is, therefore, imperative that all nursery activities be properly and timely implemented in accordance with the recommended agronomic practices.

Profitable planting materials are those that grow fast enough to begin yielding as soon as possible, are high yielding in order to maximise revenue and profits, can tolerate specific local conditions such as severe dry seasons, strong winds and acidic soils, and be able to produce many high weight beans per pod.

Good quality planting materials for cocoa are still limited in Uganda, not because they are unavailable, but due to the fact that most of the nurseries recently established by CDP are located far from many farmers or the access roads between the farmer and the nurseries are impassable by vehicle. Consequently, forcing farmers use locally available planting materials, which often are of poor quality. It is advisable, therefore, that cocoa nurseries be located nearer to the farmers and access links/roads improved.

3.3.1.2. Age of cocoa trees

The age of cocoa trees is reported to influence the yield (Wood and Lass, 1985; Mossu, 1992). The older the trees the better are their yields. An individual cocoa tree growing on fertile soil is capable of remaining productive for 100 years. However, soils in most plantations are not continuously fertile, therefore it is a rare occurrence for a cocoa plantation to remain economically productive for 100 years without replacement of trees. Loss of trees in a plantation may be due to diseases and pests or physical damage in addition to low soil fertility. The highest cocoa yields are normally obtained within 15 to 25 years, while its profitable life span stretches up to 50 years. However, after the 26th year, the costs of production begin to increase. Most of the plantations in Uganda are less than 20 years old and hence considered to be productive and profitable. All they (plantations) require is an improved husbandry.

3.3.1.3. Rainfall

The variation in cocoa yields from year to year are governed to large extent on the variations in rainfall. Cocoa trees have been reported to be very sensitive to water deficiencies, particularly when they are in competition with other plants such as shade trees or casual weeds (Mossu, 1992), a common occurrence in cocoa shambas. For proper growth of cocoa trees, an annual rainfall of 1500 mm to 2000 mm well distributed throughout the year is suitable (Wood and Lass, 1989). The cocoa plant requires that, in the dry season which should not exceed 3 months, a minimum of 100 mm of rainfall is received. A short dry spell was found to prevent the build up of *Phytophthora* pod rot disease to epidemic levels in cocoa plantations (Wood and Lass, 1989).

3.3.1.4. Temperature and Altitude

Cocoa plants respond well to relatively high temperature with a maximum annual average of 30 - 32 ° C and a minimum average of 18 - 21 ° C. The absolute minimum day time temperature is 10 ° C, a temperature below which the leaves suffer damage. Temperatures in Uganda lie in the range of 18 ° C to 28 ° C. The altitude at which cocoa can grow is governed by temperature. Most cocoa lies within 300 metres above sea level, although there are some cases where cocoa grows at higher levels. For example, Uganda and Colombia have cocoa growing at 1200 m and 1400 m respectively.

3.3.1.5. Relative Humidity

The relative humidity considered suitable for cocoa is 100% at night and 70 - 80% during the day. Normally, steady dry and fast winds cause a sharp drop in humidity and they may physically damage the cocoa leaf or induce premature leaf drop, which affects the productivity of the tree. It is, therefore, important to limit these wind speeds, probably a reason why cocoa trees are grown as intercrops with other tree species.

3.3.1.6. Soil requirements

Cocoa can grow on a wide range of soils, but usually grow best in soils that are deep, well drained/aerated and fertile. Large amounts of organic matter are necessary in top soils for the healthy growth of cocoa plants. Cocoa trees can tolerate soils with soil pH levels ranging from 5.0 (acidic) to 8.0 (alkaline). Any pH levels beyond these (5-8) limits lead to reduced plant development, especially at the establishment stage. Loam and sandy-loam soils originating from metamorphic and/or volcanic rocks and with pH of 6.5 are considered the most appropriate for cocoa growing. On average, the pH in the five districts (Iganga, Jinja, Hoima, Mukono & Bundibugyo) ranges from 5.0 to 6.8 (Tumuhairwe and Isabirye, 1993⁴; Bazira, 1997⁵).

3.3.2. Harvesting cocoa

Harvesting of cocoa in Uganda is done by removing ripe pods from trees and opening them to extract the wet beans. The pods are harvested by making a clean cut through the stalk with a well sharpened blade. A machete or other short handled knives are used for pods within easy reach and special harvesting knives on long poles used for pods on higher branches. Harvesting commences 2 weeks after the on-set of rains and peaks 1.5 months after. Harvesting is done for a period of 3 months that overlaps part of the dry season. Uganda is blessed with a bimodal rainfall pattern, which therefore offers cocoa farmers two major harvesting periods each year. The rain often occurs during the months of March-May and August-November with dry spells in June-July and November-January.

⁴. Unpublished Paper presented in The First Annual Crop Science Conference, 1993. Kampala, Uganda.

⁵. Bazira, M. H. (1997). M. Sc. Thesis. Faculty of Agriculture, Makerere University, Kampala. Uganda.

The harvesting time is not critical, because pods that are not fully ripe can ferment satisfactorily and ripe pods may remain on the tree for 2 - 3 weeks without necessarily affecting the quality of the beans. However, the ripe pods are susceptible to pod diseases like those caused by *Phytophthora* fungi and predators. In addition, a very long delay in harvesting may lead to germination of beans within the pods, which is undesirable in commercial cocoa production. Harvesting at regular intervals of 10 - 15 days is recommended (Mossu, 1992). These harvesting intervals should, however, never exceed 3 weeks. Clean cuts during harvesting are recommended to avoid damaging the flower cushions, allow the development of the subsequent cocoa fruits, and prevent excessive damage to the bark which may provide easy entry of pathogen.

After the pods are removed from the trees, they are piled in a suitable location (preferably near fermentation sites) at which the pods will be opened using wooden clubs. Wooden clubs instead of cutting tools are used to avoid damaging the beans, as this may compromise the quality of beans on the market. Pod breaking must be completed within a period less than 6 days after harvesting to minimize losses due to diseases (Wood and Lass, 1985; Mossu, 1992).

3.3.3. Processing of cocoa

When the beans are removed from the placenta, they are then fermented in either woven traditional baskets, pits, fermentation boxes and/or fermentries, and later dried and roasted to achieve the forms preferred in the market. The fermentation, drying and roasting processes allow the beans to attain the desirable flavour, taste and colour. Fermentation is recommended to last a period of 6 - 8 days with continuous turning at every three days interval. In Uganda, however, fermentation is sometimes stretched to 10 days. During fermentation, the pulp surrounding the fresh beans is removed, the embryo is killed to prevent its germination, and complex biochemical reactions are initiated within the beans that develop the desired chocolate flavour, taste and colour obtained in the cocoa beans after drying and roasting. Drying and roasting are also done to reduce the moisture content to 6 % or 7% for safe storage and avoidance of pest and fungal attack while in store. Most of the processing is done on the farm.

There are 10 government run fermentries located atleast in each of the cocoa growing areas, which unfortunately, are no-longer functional, a reason probably why most farmers now process their cocoa on their farms. Only one large farm, Sembule Investments, located in Mukono has a

relatively modern processing unit. The reliance on locally made fermentries/processing units that often are of low standards, may explain why most farmers are still unable to produce high quality cocoa beans for export. There is need for these government fermentries to be rehabilitated to enable production of uniform quality cocoa beans.

According to Wood and Lass (1985), the best quality cocoa is one which has a chocolate brown colour, minimal bitterness, is soft to bite and lacks blemishes caused by disease and storage pests. Defective beans are regarded as those which are flat, germinated in the process of fermentation, broken and contaminated with soil or rodent/animal faeces.

3.3.4. Cleaning, bagging and storage of commercial cocoa

After processing, the defective beans as well as any foreign materials are removed manually at the farm level. But, where grading machines are available (like at Sembule Investments Farm), cleaning is achieved with a reciprocating/rotary drum facilitated by a fan that blows away any dust, remaining flat beans and shell particles in the cocoa batches. From the farm, the cleaned cocoa batches consist of whole beans of varying sizes. However, in order to meet market demands, the beans must be sorted out according to size, and then packed in new bags made of Jute and stored waiting to be exported. The cocoa for export is packaged in 62.5 kg units giving 16 bags to a tonne (ITC, 1987).

In the tropics where there is high humidity and temperatures, cocoa is more likely to be affected by mould and storage pests. It is therefore important that proper storage conditions are maintained by controlling the temperatures and humidity in stores. This moisture control is not easily achieved on rural farms, so it is important that the cocoa beans do not stay long on the farms as they are prone to getting spoilt. It is recommended that cocoa be kept for not more than 3 months where proper storage facilities are lacking, because it is a fragile commodity that easily develops off flavours and pick up moisture fast. The recommended storage conditions are 70% ambient humidity, raise bags at least 7 cm off ground leaving 60 cm between bags and away from the wall. Periodic inspection of moisture in each cocoa batch and provision of rodent/pest controls are necessary.

3.3.5. Importance of cocoa

Cocoa is liked for the production of chocolate which is either eaten in forms of sweets, chocolate bars, cocoa butter, cakes or taken as a drink and other confectioneries. It is to a lesser extent valued for its stimulating effect attributed to the presence of Theobromine, a chemical widely used in drugs. It provides precursors used in perfumeries, cosmetics and pharmaceuticals. The Theobromine in cocoa is converted into caffeine, thus using it as a beverage. Since its aromatic properties and other qualities can not easily be reproduced in laboratories, there is a limit to the use of cocoa substitutes in processing industries (Mossu, 1992).

3.3.6. Cocoa production world wide

Compared with sugar cane, tobacco and cotton, cocoa has never been a major player on the world market. By 1995, Africa accounted for 61.6% of the world's cocoa production, North, Central and South America produced 20.9%, while the Asian countries contributed 17.5% to the world market, implying that Africa has greater competitive advantage over the other continents (Table 4).

In Africa, the leading cocoa producing countries are Cote d' Ivoire, Ghana, Nigeria and Cameroon (in that order). World wide, the leading cocoa producing country is Cote d' Ivoire with an annual average of 850,000 tonnes by 1995, followed by Ghana (309,000 t), Indonesia (240,000 t), Brazil (208,000 t), Nigeria (143,000 t), Malaysia (120,000 t) and Cameroon (108,000 t).

Table 4. World production of cocoa beans, 1987-1995 (Thousand Tonnes*)

Continent and countries	Annual average 1987/88 - 1991/92	1992/93	1993/94	1994/95
1. AFRICA	1337 (56.4%)	1281 (53.8%)	1401 (56.8%)	1436 (61.6%)
Cameroon	122	97	98	108
Cote d' Ivoire	760	697	884	850
Ghana	264	312	255	309
Nigeria	149	145	135	143
Sierra Leone	9	3	3	3
Togo	8	3	4	4
Others**	25	24	22	19
2. NORTH,	628 (26.5%)	577 (24.2%)	550 (22.3%)	489 (20.9%)

CENTRAL & SOUTH AMERICA				
Brazil	345	309	207	208
Colombia	51	50	52	30
Dominican Republic	49	52	60	56
Ecuador	92	67	80	80
Mexico	43	50	38	43
Peru	11	11	11	11
Venezuela	14	16	18	17
Others**	23	22	21	22
3. ASIA & OCEANIA	406 (17.1%)	524 (22.0%)	517 (20.9%)	409 (17.5%)
Indonesia	119	240	260	240
Malaysia	227	225	205	120
Papua New Guinea	39	39	31	29
Others**	21	20	21	20
World Total	2,371 (100%)	2,382 (100%)	2,468 (100%)	2,332 (100%)

* Rounded to nearest thousand.

** Countries which individually produce less than 10,000 tonnes per year.

In importance, cocoa ranks with coffee and tea on the world market for beverages, but unlike coffee and tea that are consumed in both developing and developed countries, cocoa is mainly consumed in developed countries. It has been and is still a major commodity in industrial countries since the development of milk chocolate in the 18th century.

From the producer-consumer point of view, it is interesting to note that the leading producers of cocoa beans are not the major consumers and that they (producers) continue to export cocoa in the raw form. Cocoa beans are exported to consuming countries where they are processed either for domestic use or for re-export as intermediate cocoa products. This trade of cocoa in raw form by the producing countries minimizes the revenues they earn from the crop. It would be recommendable that such producer countries (like Uganda) develop capacities to process the cocoa beans into intermediate or final consumer products in order to earn more foreign exchange, particularly now when prices of the raw cocoa beans fluctuate widely on the world market compared with finished products, and new producers are coming into the cocoa trade.

World cocoa production has increased at a rate of about 2.5% per annum since the middle of the last decade. But consumption has only increased by

1.0% (ICCO, 1996)⁶, which is bound to negatively affect cocoa prices on the world market.

In 1993/94, there was a cocoa deficit which continued beyond the growing season resulting in an upward surge in prices. The deficit and rise in prices were attributed to a prolonged dry weather in West Africa and black pod disease in Brazil, the leading cocoa producing countries, and thus causing buyers to anticipate low cocoa supply in the subsequent years, hence forcing prices up. In addition, the entry into the market of other cocoa consumers, particularly, the former Soviet Union block in the later half of the 1980's, significantly contributed to the increased cocoa price and world consumption. Consequently, this increase in cocoa consumption and price resulted in a substantial rise in producer incomes by 1994 (ICCO, 1994).

3.3.7. Cocoa projections

World cocoa consumption consecutively exceeded production through the 1990 - 1995 period (Table 5), while prices continued to fluctuate (although not widely) on the world market (Table 6). The prices showed states of both weakness and strength during this five year period and were unable, on the overall, to significantly cause a cocoa recovery as was expected in 1993 (ICCO, 1996). In the 1994/95 period, despite the production deficits that caused reduction in world cocoa stocks in the previous four years (Table 5), there was a slight fall in prices from SDR 968 to SDR 954 per tonne (Table 6), which was responsible to the failure of cocoa to recover from an economic depression. A similar downward trend of prices was released in the first half of 1995/96 period. It was suggested by the ICCO (1996) that a price of SDR 1,100 per tonne would be sufficient to induce a recovery in the cocoa industry.

Table 5. World cocoa bean production and grindings (1990-1996).

Parameter	Cocoa year					
	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96
Gross crop (t)	2507	2278	2352	2468	2332	2664
Net crop (t)	2482	2255	2358	2443	2309	2637
Grindings (t)	2335	2322	2407	2493	2532	2627
Surplus/Deficit (t)	147	-67	-49	-50	-223	+10
Total stocks (t)	1565	1498	1449	1399	1176	1186

⁶. International Cocoa Organisation. Newsletter. 1996.

Free stocks (t)	1323	1265	1219	1120	1048	1109
Total stocks/grinding ratio	67%	64.5%	60.2%	56.1%	46.4%	45.1%
Free stocks/grinding ratio	56.7%	54.5%	50.6%	48.9%	41.4%	42.2%

Source: ICCO, Cocoa Newsletter. No. 11, May 1996.

Table 6. Cocoa bean prices in current and constant terms 1989 - 1996

Currency	Cocoa year						
	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96
	Current Terms						
<u>ICCO diary</u>							
Prices							
SDR/tonne	902	863	831	751	968	954	932
US\$/tonne	1,193	1,193	1,166	1,051	1,370	1,440	1,378
	Constant 1994/95 terms						
SDR/tonne	1,044	956	892	794	989	954	917
US\$/tonne	1,403	1,336	1,267	1,125	1,409	1,440	1,342
<u>Terminal prices</u>							
London futures \$/tonne	750	694	689	739	977	970	938
New York futures US\$/lb	52.1	52.6	50.8	45.0	57.8	61.1	59.5

SDR = basket of currencies in which the dollar is 42%, Deutschmark 19%, Yen 15% French franc 15% and Pound sterling 12%

Source: ICCO, Cocoa Newsletter. No. 11, May 1996.

The 1994 to 1996 price behaviour (Table 6) was attributed to many factors, among which were the expectation of a fourth consecutive production deficit and speculation about its size on the world market; late port arrivals from major cocoa producing countries; a slow start of the cocoa season in Ghana and Nigeria; worries about technical limitations in tendering cocoa and a possible squeeze on the European stock exchange; concern about bad weather in Brazil, Malaysia and Indonesia; and an anticipation of a huge main crop from west Africa and better than expected world grindings in 1996.

If the state of a narrow price fluctuation realized in 1994 to 1996 was to be maintained, it is reasonable to assume that the amplitude in price fluctuations would eventually stabilize and cause a substantial recovery in the cocoa industry in the long-run, provided consumption improved. The price to-day is US\$ 1,385 per tonne of cocoa beans.

Unlike the market structure for cocoa beans where there are many buyers/sellers, that of processed and final cocoa products is influenced by the degree of concentration. Over 80% of the added value on cocoa products is contributed by 12 companies world wide (ICCO, 1996), which therefore greatly influence pricing of cocoa. These companies which are mainly located in the developed world would probably wish to maintain the "status quo" where few cocoa processing industries are involved to retain significant control on prices of raw cocoa beans. But, such international cocoa processing and trade monopolies discourages development of cocoa processing industries in the cocoa growing countries that are developing, thus condemning these developing countries to remain perpetually producers of raw cocoa. It would be recommended that cocoa growing countries add value to the crop and export either as intermediate or final cocoa products.

Cocoa production world wide was projected to increase by 1.5% annually and lead to an output of 2.8 million tonnes by the year 2000, while the share of African countries was to remain unchanged (ICCO, 1996). The contribution of Eastern Asian countries was projected to increase from 13% in the late 1980's to 28% in the year 2000. The growth rate in developing countries is estimated to be higher at 4.3%, although their total consumption is expected to remain low at 14% of the total in the year 2000.

Consumption of cocoa has been projected to grow by 2.3% each year, and at this rate, it was projected to reach 2.7 million tonnes in the year 2000. Imports by developed countries from developing countries were projected to be 1.1% annually, which is a substantial fall from the 4.5% growth rate of the 1980's (FAO, 1994). The FAO (1994) report, however, suggested that world trade of cocoa will continue to increase. But, with the slackened growth in world consumption and the unprecedented level of world cocoa stocks, the production deficits recently realised would be offset, reaching an approximate market balance by the year 2000.

It is therefore important that if Uganda is to gain from the cocoa industry, the country should penetrate and stabilize her self in the industry before

this year 2000. Prices of cocoa are not expected to rise significantly until the end of the decade in 2000. Towards the end of the decade, cocoa exports from developing countries are expected to continue to be in the form of beans, while the benefits of cocoa processing in adding value will continue to be reaped by consuming countries of Europe, North America, and the former USSR where processing has traditionally taken place.

3.4. Descriptive Analysis of Cocoa Production in Iganga, Jinja, Mukono, Hoima, and Bundibugyo.

Simple descriptive statistics were analysed for some selected parameters of cocoa production, so as to obtain basic background information to help understand the cocoa production structure in Uganda. These parameters included socio-demographic, technological and production characteristics.

3.4.1. Iganga District

Table 7 shows the ages of family members and proportion of members involved in farm activities in Iganga district. The results show that 44 % of the family are above 18 years of age (adults), while 56 % are below 18 years (i.e. children).

Table 7. Distribution of farm family members engaged in farming activities by sex and work duration (man-days per month)

Category	Age (years)	Full Time		Part Time		Total	%
		Male	Female	Male	Female		
Adult	18 and above	17	17	0	0	34	44
Children	12-17	19	13	0	0	32	42
Children	10 or less	7	4	0	0	11	14
Total		43	34	0	0	77	100

Source: Survey Data.

Fourteen percent of the farm labour are children of 10 years and below and therefore considered unable to perform heavy farm duties. Of these family members, only 86% are capable of doing work and are engaged full-time on the farm. Thirty four out of 77 individuals in the cocoa growing households in Iganga district are females constituting 44.2%.

Table 8 shows the manner in which labour and time (man-days/month) are allocated to the different activities on cocoa growing farms. The average family consists of 8 persons of which 7 individuals (86%) may be capable of doing work. The cocoa growing farms visited in Iganga were found to rely entirely on family labour. The allocation of the family members to the different activities (weeding, pruning, spraying and post harvest operations) in the plantations were on average 4, 3, 0 and 5 persons,

respectively. In the other crops, however, the operations were performed by 3, 2, 1 and 3 individuals, respectively. In effect, a total of 15 labourers are utilized in cocoa, while 9 are employed in other crops. The women are commonly involved in the weeding, mulching and post harvest operations, in addition to their household chores, and consequently, tend to be overworked.

Table 8. Labour and Time allocation (man-days/month) to cocoa and other crops on the farm in Iganga.

Activity	Cocoa			Other crops		
	No of persons	Av. man-days/month	Av. Hours/month	No of persons	Av. man-days/month	Av. Hours/month
Weeding	4.0	3.2	19.2	3.0	7.6	45.6
Pruning	3.0	10.5	63.0	2.0	2.5	14.4
Fertilizer	0.0	0.0	0.0	0.0	0.0	0.0
Mulching	1.0	1.0	6.6	no data	no data	no data
Spraying	2.0	3.0	18.0	1.0	2.3	13.8
Post-harvest operations	5.0	3.5	21.0	3.0	7.5	45.0
Total	15	21.2	127.8	9	20	118.8

1 man-day is equivalent to 6 working hours in the five surveyed districts of Iganga, Mukono, Hoima Jinja and Bundibujyo.

Source: Survey data.

The average working duration in cocoa when weeding, pruning and processing were found to be 3.2, 10.5 and 3.5 man-days per month, respectively. The man-days utilized in other crops like coffee, maize, bananas, cassava, beans, etc, were found to be 7.6 weeding, 2.5 pruning, 2.3 spraying and 7.5 for post-harvest processing. The higher working duration in pruning (10.5 man-days) was probably because majority of the farmers in Iganga were re-establishing their previously neglected plantations, and therefore, a lot more work was required to bring the plantations into suitable productive forms. In addition, pruning of cocoa trees tends to take a long time as the tools (pangas & secateurs) often used in pruning, the woody nature of the trees, and the caution that must be taken to avoid excessive damage of trees tend to limit fast operation. No hired labour was found to be employed by cocoa growing farmers in Iganga district. From Table 8 it is clear that, farmers allocated more labour to cocoa plantations compared with other crops.

Farmers in Uganda rarely apply chemical fertilizers in their plantations, because they can not afford them. The farmers mainly depend on organic mulches, which in cocoa consist of residues from cocoa processing (pods), weeding, and other on-farm refuse. However, even this mulching is to a limited scale. Although many Ugandan farmers find chemical inputs expensive, cocoa growing farmers in Iganga were found to invest more in spraying of cocoa trees in contrast to other crops.

3.4.2. Jinja, Mukono, Hoima and Bundibugyo Districts

The results of Jinja, Mukono, Hoima and Bundibugyo Districts are summarized in Tables 9 and 10. Table 9 shows the distribution of family members to the various farm activities in the above 4 districts. As was the case with Iganga, in the above mentioned districts, most of the work on the farm was done by the adults (male & female). In Jinja, 38.5% of the work was performed by males and 21% by females. The children (less than 18 years) both male and female contributed to only 35.7 % of the work on the farms. Out of 51 children, 26 were girls.

Table 9. Distribution of farm family members engaged in farming activities by sex and work duration (man-days per month) in Jinja, Mukono, Hoima and Bundibugyo Districts.

Jinja District.

Category	Age (years)	Full Time		Part Time		Total	%
		Male	Female	Male	Female		
Adult	18 and above	55	30	4	3	92	64.3
Children	12-17	0	0	17	17	34	23.8
Children	10 or less	0	0	8	9	17	11.9
Total		55	30	25	29	143	100

Mukono District

Category	Age (years)	Full Time		Part Time		Total	%
		Male	Female	Male	Female		
Adult	18 and above	111	32	1	0	144	97.3
Children	12-17	4	0	0	0	4	2.7
Children	10 or less	0	0	0	0	0	0
Total		115	32	1	0	148	100

Hoima District

Category	Age (years)	Full Time		Part Time		Total	%
		Male	Female	Male	Female		
Adult	18 and above	35	50	6	0	91.0	44
Children	12-17	25	12	3	0	40.0	19
Children	10 or less	0	7	35	34	76.0	37
Total		60	69	44	34	207	100

Bundibugyo District

Category	Age (years)	Full Time		Part Time		Total	%
		Male	Female	Male	Female		
Adult	18 and above	65	119	10	0	194	58
Children	12-17	11	15	34	10	70	21
Children	10 or less	0	0	36	35	71	21
Total		76	134	80	45	335	100

Source: Survey data:

There were more males (n=115) in Mukono district involved in farming activities than in other districts. In Hoima and Bundibugyo districts, farm work was predominantly performed by the women and children (both boys & girls) in the family. Together, the women and children provided over 70% of the labour on the farms in Hoima and Bundibugyo districts.

The allocation of labour both family and hired/casual to weeding, pruning, fertilizer application, mulching, spraying, and post-harvest operations in the districts of Jinja, Mukono, Hoima and Bundibugyo are presented in Table 10. The results indicate that, the farmers in these districts do not utilize inorganic fertilizer supplements in their plantations. Very few farmers mulch their gardens. Mulching was performed mainly in other crops, but not in cocoa shambas. The reason is that cocoa shambas generate large quantities of leaf litter that the farmers find no reason why they should add extra mulch. They consider the leaf litter sufficient to meet the crops nutrient demands.

Spraying of cocoa to prevent or kill pests and diseases was only found to be practiced in Jinja and Mukono districts. This was probably because these districts are near Kampala the capital city and administrative centre of Uganda, and therefore had easy access to cocoa related information and other extension services compared with other cocoa growing districts.

All farmers surveyed in the five districts allocated labour to weeding, pruning and post harvest operations in cocoa. However, the other crops (coffee, bananas, maize, cassava, etc) generally received less labour. Much of this labour was employed during harvest and post-harvest operations.

On average and across the five districts, cocoa received 2.0 to 5.0 labourers working for a minimum of 3.7 man-days to a maximum of 11.3 man-days, with the less working duration sighted in Jinja district and the longest in Hoima district. The short working duration on cocoa farms in Jinja and the long duration in Hoima were attributed to the fact that most of the cocoa shambas in Jinja were in good condition, while those in Hoima were in bad states and farmers were just beginning to re-establish them, implying that more work was necessary.

One man-day in each of the district was found to be equivalent to 6 working hours of the day. Assuming that farmers do not work during the weekends, it then implies that 22 working days are available to the farmer in one month. Comparing the man-days allocated to the different farm activities in cocoa and other crops (Table 10), it is obvious that farmers work in each of these crops for lesser days than 22. This implies that on the other days when they are not working they are engaged in other activities such as attending ceremonies. In total, the farmers spent 15.4 to 30 man-days working in the two crops.

Table 10. Labour and Time allocation (man-days/month) to cocoa and other crops on the farm in Jinja, Mukono, Hoima and Bundibugyo Districts.

Jinja District

Activity	Cocoa			Other crops		
	No of persons	Av. man-days/month	Av. Hours/month	No of persons	Av. man-days/month	Av. Hours/month
Weeding	3.00	3.50	21.3	4.00	10.0	60.0
Pruning	2.00	6.00	36.0	5.0	9.0	54.0
Fertilizer	0.0	0.0	0.0	0.0	0.0	0.0
Mulching	0.0	0.0	0.0	2.0	3.0	18.0
Spraying	1.0	1.0	6.00	0	0.0	0.0
Post-harvest operations	6.0	11.80	71.0	1.0	8.0	48.0
Total	12	22.3	134.3	12	30.0	180

Mukono District

Activity	Cocoa			Other crops		
	No of persons	Av. man-days/month	Av. Hours/month	No of persons	Av. man-days/month	Av. Hours/month
Weeding	3.0	4.20	25.2	3.0	17.80	106.8
Pruning	2.0	6.90	41.4	-	-	-
Fertilizer	0	0.0	0.0	0	0.0	0.0
Mulching	0	1.50	9.0	-	-	-
Spraying	1.0	2.50	15.0	1.0	-	-
Post-harvest operations	4.0	12.70	76.2	4.0	9.30	55.80
Total	10	27.8	166.8	8	27.1	162.6

Hoima District

Activity	Cocoa			Other crops		
	No of persons	Av. man-days/month	Av. Hours/month	No of persons	Av. man-days/month	Av. Hours/month
Weeding	3.00	10.0	60.0	4	11.6	70.0
Pruning	1.00	2.0	12.0	0	0	0
Fertilizer	0	0	0	0	0	0
Mulching	0	0	0	0	0	0
Spraying	0	0	0	0	0	0
Post-harvest operations	10.0	10.0	60.0	4.0	3.8	22.80
Total	14	22	132	8	15.4	92.8

Bundibugyo District

Activity	Cocoa			Other crops		
	No of persons	Av. man-days/month	Av. Hours/month	No of persons	Av. man-days/month	Av. Hours/month
Weeding	2.0	8.0	48.0	6.0	9.0	54.0
Pruning	1.0	7.0	42.0	7.0	10.0	60.0
Fertilizer	0	0	0	0	0	0
Mulching	0	0	0	0	0	0
Spraying	0	0	0	0	0	0
Post-harvest operations	8.0	9.0	54.0	3.0	9.0	54.0
Total	11	24.0	144	16	28	168

1 man-day is equivalent to 6 working hours in the five surveyed districts of Iganga, Mukono, Hoima Jinja and Bundibugyo; and one working month = 22 days.

Source: Survey Data.

3.4.2.1. Agronomic characteristics of Iganga, Jinja, Mukono, Hoima and Bundibugyo

The agronomic and socio-economic characteristics of the five cocoa growing districts of Uganda; namely Iganga, Jinja, Mukono, Hoima and Bundibugyo are summarized in Table 11. The agronomic characteristics indicate that in the districts of Iganga, Jinja and Mukono 96%, 100% and 60% of the cocoa farms respectively are 11 years and above. This is so because these were districts in which cocoa growing was first introduced. Cocoa growing is more recent in the districts of Hoima and Bundibugyo each respectively with 60% and 52.5% of the cocoa shambas between 6 and 10 years of age.

Table 11. A summary of the agronomic and socio-economic characteristics of cocoa growing farmers in Uganda.

1. Agronomic aspects	Districts				
	Iganga	Jinja	Mukono	Hoima	Bundibugyo
a) Age of cocoa trees (years)					
< 5	0% of farms	0%	10%	10%	32.5%
6-10	4%	0%	30%	60%	52.5%
11+	96%	100%	60%	30%	15%
b) Condition of cocoa shambas					
1. V. Poor	0% of farms	5%		16%	0%
2. Poor	31%	67%	6%	22%	15%
3. Fair	12%	20%	27%	40%	20%
4. Good	42%	8%	66%	18%	60%
5. V. Good	15%	0%	1%	0%	5%
c) Farm Size (ha)					
1. < 0.5	29.3%	55%	5%	5%	7.5%
2. 0.5 - 1.0	47.8%	30%	55%	80%	12.5%
3. 1.1 - 1.9	12.2%	0%	27.5%	0%	45%
4. 2.0 - 5.0	0%	10%	0%	0%	18.8%
5. > 5.0	0%	0%	0%	0%	2.5%
d) Farming system					
1. Intercropping	100%	100%	100%	100%	100%
2. Spacing (m)	4 x 4	4 x 4	4 x 4	4 x 4	4 x 4
3. Plant population (ha)	1210	1210	1210	1210	1210

e) <u>Production skill endowment</u>					
1. Lack skills	0% of cocoa	0%	0%	0%	0%
2. Little skills	farmers	0%	0%	5%	5%
3. Adequate skills	0%	100%	100%	95%	95%
4. All required skills	100%	0%	0%	0%	0%
f). <u>Production methods used in cocoa</u>					
1. Prune/desucker	100% of farmers	100%	100%	100%	100%
2. Intercropping	100%	100%	100%	100%	100%
3. Mulching	23.0%	0%	0%	0%	0%
4. Weeding	100%	100%	100%	100%	100%
5. Pest control	27.0%	0%	36%	0%	0%
6. Home processing	96.0%	100%	100%	100%	100%
7. Fermentry	4.0%	0%	18%	0%	0%
8. All (1-7)	4.0%	-	20%	-	-
2). Socio-economic					
a) <u>Labour</u>					
1. Inadequate	8.0% of farmers	15%	9.0%	0%	0%
2. Adequate	81.0%	72%	90%	95%	96%
3. Others	11.0%	13%	1.0%	5%	4%
b). <u>Living standards</u>					
1. Very Poor	0%	0%	0%	0%	0%
2. Poor	42.0% of farmers	50%	45%	40%	23%
3. Fair	58.0%	50%	55%	60%	75%
4. High	0%	0%	0%	0%	2.0%
5. Very High	0%	0%	0%	0%	0%
c) <u>Nature of farmer</u>					
1. Subsistence	27.0% of farmers	20%	22%	25%	25%
2. Commercial	0%	0%	7.0%	0%	0%
3. Both (1 & 2)	73.0%	80%	70%	75%	75%
d) <u>Nutritional status</u>					
1. V. Poor	0% of households	0%	0%	0%	0%
2. Poor	4.0%	10%	1.0%	1.0%	5%
3. Fair	34.0%	30%	9.0%	67%	20%
4. Adequate	62.0%	60%	90%	32%	75%
5. High	0%	0%	0%	0%	0%

Source: Survey Data.

The condition of cocoa trees ranges from poor to very good. The scales used to classify a farm as poor or good were as follows;

- A farm that had cocoa trees but was unable to produce 30 - 150 kg/ha/yr of cocoa beans was considered to be very poor;
- A poor farm was one where 151 - 300 kg/ha/yr of cocoa beans were produced.
- A yield of 301 - 1500 kg/ha/yr was considered to be from a good and well managed farm, and
- A farm producing 1501 kg/ha/yr and above was considered to be very good.

The proportion of cocoa growing farms in good condition in the five districts were Iganga (42%), Jinja (67%), Mukono (66%), Hoima (40%) and Bundibugyo (60%). This indicates the existence of good management practices on these farms. Only 5% of the cocoa farms were found to be in very poor state in Jinja (Table 11), while 15% in Iganga, 1.0% in Mukono and 5% in Bundibugyo were in very good state.

Majority of the farms surveyed were less than 5 hectares. Only one farm owned by Mr. Yafesi Muliwabi in Bundibugyo districts was 13.2 hectares (Annex 2). The largest number of farms in Iganga, Mukono and Hoima districts were in the range 0.5 - 1.0 hectares (Table 11). Fifty five percent of the farms in Jinja are less than 0.5 hectares, while 45% in Bundibugyo have farms of 1.1 to 1.9 hectares in size. All the farmers in the five districts practiced intercropping, planted their cocoa plants at 4 m by 4 m wide spacings and maintained a population of 1,210 plants per hectare.

All farmers in Jinja and Mukono and 95% in Hoima and Bundibugyo had adequate production skills and knowledge required for proper husbandry and processing of cocoa. In Iganga, however, all farmers considered themselves ill equipped with cocoa production skills and knowledge and therefore required guidance in this matter. Five percent of the farmers in Hoima and Bundibugyo reported having little skills and knowledge in raising and processing of cocoa. The group of farmers with limited cocoa production skills in the districts will require training in the methods and techniques of producing and processing of cocoa, in order to improve their confidence and performance.

The cultural methods employed in cocoa production at the farm level include pruning, intercropping, mulching, weeding, pest control and home processing. Home processing involves use of pits, hips and home made fermentries to ferment the cocoa. This study established that while the other cultural methods were practiced by all the farmers, mulching was practiced by 23% in Iganga and none in the other 4 districts; pest control was carried out by 27% in Iganga and 36% in Mukono only; home processing was done by all the farmers in the four districts except in Iganga where it was practiced by 96% of the farmers. Use of fermentries was predominant in Mukono (18%) where the only existing government fermentry is still functional.

3.4.2.2. Socio-economic characteristics of Iganga, Jinja, Mukono, Hoima and Bundibugyo

a) Labour

Of the farmers surveyed, most of them did not find availability of labour a problem. Labour was considered adequate by 81%, 72%, 90%, 95% and 96% of the cocoa growing farmers in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts, respectively (Table 11). The average labour allocation in man-days per month at the regional level is presented in Table 12. The results show that on average farmers in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts assign 4.0, 7.0, 2.0, 5.0 and 8.0 labourers in cocoa shambas per activity per farm respectively, and 2.0, 3.0, 1.0, 3.0 and 3.0 labourers in other crops. At regional level, farmers in the five districts allocate more labour to cocoa, meaning that cocoa is increasingly becoming an important crop in these district. This shift in labour allocation from other crops with emphasis to cocoa may be attributed to the relatively higher prices for cocoa and its productivity compared with other crops grown in the districts.

Table 12. Average labour and time allocated (man-days/month) to farm activities in cocoa and other crops on 161 selected farms in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts.

District	Cocoa			Other crops		
	Av. No. of Persons	Av. man-days/month	Av. Hours/month	Av. No. of Persons	Av. man-days/month	Av. Hours/month
Iganga	4	5.70	34.40	2	5.00	20.00
Jinja	7	3.00	20.00	3	6.00	36.00
Mukono	2	4.50	27.80	1	4.50	27.10
Hoima	5	5.70	24.8	3	5.10	30.90
Bundibugyo	8	3.00	18.00	3	7.40	44.00
Regional Average	5	4.40	25.0	2	5.60	31.60

One working month = 22 days; Adopted from Tables 8 and 10

Source: Survey Data.

In economic importance, cocoa is now almost at parity with coffee in the five districts. It is believed that with continued promotions and enlightenment of rural farmers on the value of cocoa, the cocoa crop will become one among the major export crops of Uganda in a few years to come.

b) Living standards

The scale employed to assess the quality of the living standards was based on the availability of an iron sheet roofed/tiled house, adequate clothing, eating at least three balanced meals a day, having a pit latrine, sufficient water for cooking and bathing from either a tap or protected spring/well, appropriate and well located household waste disposal site (e.g a garbage pit), ability to access medical treatment and meet its costs whenever required.

i) Homesteads with a shelter (grass thatched), but lacking in all other requirements above were considered to live very poor lives;

ii) Households with shelter (grass thatched), but lacking in any four of the other requirements were classified as poor.

iii) Farm families with an iron roofed shelter, adequate clothing, eat two meals (not necessarily balanced) a day, have a pit latrine, sufficient water for cooking and bathing from a protected spring/well, and limited refuse

disposal site and access to medical services were considered to have fair lives.

iv) Families with an iron roofed shelter, adequate clothing, eat two balanced meals a day, have a pit latrine, sufficient water for cooking and bathing from a tap, suitable waste disposal site and access to medical services were regarded as having good standards of living.

v) Homes with an iron sheet roofed/tiled house, adequate clothing, eat 3 balanced meals a day, have a pit latrine, sufficient water for cooking and bathing from a tap, suitable waste disposal site and access to all necessary medical treatment were regarded as having very high living standards.

The living standards were found to be fair in 58%, 50%, 55%, 60% and 75% of the cocoa growing households in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts, respectively (Table 11). Only 2.0% of the farm households visited in bundibugyo were considered to have high living standards. The rest of the households in Iganga, Jinja, Mukono and Hoima were classified as living fair lives. These farms with high living standards had well established cocoa plantations and earned substantially from cocoa by directly dealing with exporters. This suggests that dealing with middlemen (buyers/traders) is disadvantageous to the farmer. Middle-men are more likely to pay farmers low prices that are economically unrealistic. It is imperative therefore that the cocoa trade linkage between the farmers and exporter is narrowed by allowing them to deliver directly to exporters.

c) Nature of the farmer

Majority of the cocoa growing farmers practice both commercial and subsistence farming (Table 11). Commercial in the sense that they produce cash crops like coffee and cocoa and produce large surpluses from subsistence crops grown for home consumption purposes which they sell.

d) Nutritional status

From the farm visits and personal observation, the nutritional status of cocoa growing farmers was found to be variable ranging from poor to adequate (Table 11). Classification of the nutritional status of households into very poor, poor, fair, adequate, high or very high was based on their ability to have balanced meals every day. A balanced meal was considered as that in which carbohydrates, protein, vitamin from fruits and vegetables are eaten at each meal. The carbohydrates considered consisted of fruit,

stem and root crop sources. The protein considered consisted mainly of legume and animal sources.

Families eating 3 balanced meals (breakfast, lunch and supper) each day were considered to have an adequate nutritional status, while those eating three major meals (balanced) with two snacks in between were regarded as having a very high nutritional status. Individuals having 3 meals a day that are not necessarily balanced were considered to have a poor diet. A very poor nutritional status was one in which individuals received insufficient and unbalanced meals.

Majority of the farmers exhibited an adequate nutritional state (Table 11), which was associated with the incomes they earned from their produce and type of food crops grown. Most farmers were found to grow beans, maize, cassava and matooke and reared livestock which consisted mainly of poultry, goats and cattle. These food sources were frequently utilized and are capable of maintaining good health.

e) Land

The total land area cultivated to cocoa in the 11 districts growing the crop in Uganda is currently 12,767 hectares. The land area under cocoa and other crops in the five districts surveyed in this study are 10,881.6 ha and 907,538 ha, respectively (Table 13), giving a total of 918,420 hectares. The area cover by cocoa in the five surveyed districts constitutes 85.23% of the total land area under cocoa in the whole country. Mukono and Bundibugyo districts have the largest area under cocoa.

Table 13. Total land area cultivated to cocoa and other crops in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo in the year 1997.

District	Area under cocoa (ha)*	Area under other crops (ha)**	Total cultivated area (ha)**
Iganga	980	238,856	239,836
Jinja	752	140,000	140,752
Mukono	6299	162,112	168,411
Hoima	820.6	231,800	232,620
Bundibugyo	2030	134,770	136,800
Total	10,881.6	907,538	918,420

Source: * Cocoa Development Project, 1997; ** District Agricultural Offices.

Under the other crops category, the crops considered were coffee, bananas, maize, beans and cassava regarded as competing crops for time

and labour. The yields, areas and prices of the selected competing crops with cocoa in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo are shown in Table 14.

Table 14. Annual yields, area and prices of other selected crops in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts.

District	Coffee	Bananas	Maize	Beans	Cassava
Iganga					
a) Yield (kg/ha)	4,700	7,000	2,800	1,200	10,800
b) Area (ha)	12,200	7,200	40,387	11,000	31,000
c) Price Ug.sh/kg	1,500	210	80	250	50
Jinja					
a) Yield (kg/ha)	1,650	4,130	1,860	1,000	5,000
b) Area (ha)	2,424	2,421	2,419	1,000	1,000
c) Price Ug.sh/kg	1,500	200	100	300	150
Mukono					
a) Yield (kg/ha)	1,600	1,640	2,010	380	10,900
b) Area (ha)	35,493	14,630	7,277	4175.4	12,406.7
c) Price Ug.sh/kg	1,500	250	150	400	150
Hoima					
a) Yield (kg/ha)	1,000	1,500	1,600	1,800	7,000
b) Area (ha)	4,100	3,465	6,463	21,767	15,384
c) Price Ug.sh/kg	1,500	150	80	200	100
Bundibugyo					
a) Yield (kg/ha)	500	1,600	1,200	1,800	4,500
b) Area (ha)	2,500	4,700	4,000	2,000	2,460
c) Price Ug.sh/kg	1,500	150	80	200	150

Source: District Agricultural offices in the five districts.

It is evident in Table 14 that the yields, area and prices (except for coffee) of the selected crops in the five districts are very variable. The yields are a reflection of the productivity of the land in districts with respect to the crops. The area, in a way, shows the crop of interest. Based on the cultivated area, the apparent most popular crop in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts are maize (40,387 ha), coffee (2,424 ha), coffee (35,493 ha), beans (21,767 ha) and bananas (4,700 ha), respectively.

The allocation of land to cocoa and other crops on the 161 farms visited in the study is presented in Table 15. The results show that farmers who grew cocoa allocated on average the same amount of land to other crops (0.87 ha) as compared with cocoa (0.84 ha). This land allocation is a reflection of the importance of cocoa to the rural farmers in Iganga, Jinja, Mukono,

Hoima and Bundibugyo districts. From these results, it is obvious that cocoa is of great importance to farmers in these five districts.

Table 15. Allocation of land to cocoa and other crops on selected farms in Iganga, Jinja, Mukono, Hoima and Bundibugyo.

District	Cocoa (ha)	Other crops (ha)	Overall (ha)
Iganga (n= 41)	25.4	33.9	59.3
Jinja (n= 20)	16.5	11.6	28.1
Mukono (n= 40)	28.1	38.0	66.1
Hoima (n= 20)	12.4	19.1	31.5
Bundibugyo (n= 40)	52.9	38.0	91.0
Total (n= 161)	135.3	140.6	275.9
Average	0.84	0.87	1.70

2.42 acres = 1 hectare.

Source: Survey Data.

Total production of cocoa and other crops on the selected farms in the five districts are shown in Table 16. The total production of other crops on the selected farms was determined by multiplying the area under other crops (Table 15) with the average yield per hectare of the five selected crops in the district (Table 14).

Table 16. Gross production of cocoa and other crops on selected farms in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts.

District	Cocoa (kg/year)	Other crops (kg/year)
Iganga (n= 41)	42,062.4	180,200
Jinja (n= 20)	29,155.5	31,644.8
Mukono (n= 40)	54,204.9	125,628
Hoima (n= 20)	19,899.5	49,020
Bundibugyo (n= 40)	106,000	72,960

Source: Survey Data.

Of the five districts, Bundibugyo ranked highest in production of cocoa (Table 16). It however ranked lowest in production of other crops. Hoima exhibited the lowest cocoa production levels, while Iganga district produces more of the other crops.

3.4.3. Comparative Analysis of Cocoa Production

Comparative analysis was conducted to assess the profitability of cocoa at farm level. Its competitiveness relative to competing crops in addition to its profitability as an export crop were determined.

3.4.3.1 Cost of production and gross margins

a) *Labour*

Labour shortage leads to untimely farming activities which consequently affects output. Labour is one of the major inputs in cocoa production and its efficient use is therefore essential. In all districts, family was found to be the most common labour source. Some farmers supplemented family with hired labour during periods of peak labour demand. The labour requirements varied with type of farming activity. For more labour intensive activities of harvesting and further on-farm processing (collection and breaking of pods, fermentation and drying) more labour was employed. Generally, in all the 5 surveyed districts, labour was not limiting. Therefore, factors other than labour availability do limit crop production in these visited districts.

In reality, family labour is not paid for directly. It is, however, considered paid for indirectly through the benefits that accrue from the grown crops. For the purposes of this study, a charge for family labour incurred in cocoa and other crops in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo (Tables 17 & 18) was determined at the same wage rate paid for hired labour. Labour and its costs incurred in cocoa and other crops by the farmers (family labour costs inclusive) are presented in Tables 19 & 20.

Farmers in Hoima district were found to spend more money per hectare annually (Ug.sh 536,516) on cocoa than other crops (Table 19). The reason for these high annual costs in Hoima district was mainly due to most of the cocoa shambas being in the re-establishment phase after having been abandoned since the 70's. In Jinja, however, more time and money is invested in other crops, because the latter crops have been (and still are) of greater importance to the farmer as a food and money source than cocoa which has only recently received promotion from the cocoa sector of government. On the other hand, Bundibugyo district with the largest cultivated acreage of cocoa (53.0 ha) visited was found to incur the

lowest expenses per hectare annually (Ug.sh 107,592) in cocoa in contrast with the other districts. This low cocoa cost in Bundibugyo was because shambas have remained in relatively good working conditions since the 80's and therefore require minimum investment to rehabilitate or make them fully functional.

Cocoa has completely replaced coffee on plantations in Bundibugyo, while in Iganga it is only a supplemental crop. i.e not as important in Iganga as it is in Bundibugyo.

Table 17. Family labour and its costs incurred in growing cocoa and other crops.

Parameter	Cocoa					Other crops				
	Iganga	Jinja	Muk	Hoima	Bundib	Iganga	Jinja	Muk	Hoima	Bund
No. Of family members working	4	2	2	5	2	2	2	2	3	3
Man-days/month	21.2	22.3	27.8	22	24	20	30	27.1	15.4	28
Cultivated area (ha)	25.4	16.5	28.1	12.4	53.0	34.0	11.6	38.0	19.0	38
Monthly costs (Ug.sh)/ha	6,000	4,865	3,561	15,967	1,630	2,118	9,310	2,567	4,377	3,980
Annual costs (Ug.sh)/ha	72,113	58,385	42,738	191,613	19,562	25,412	111,724	30,808	52,522	47,747

Wage rate Ug.sh 1,800 per man-day; Muk = Mukono; Bundib = Bundibugyo

Source: Survey Data.

Table 18. A summary of costs incurred on family members providing labour in cocoa and other crops annually.

District	Cocoa (Ug.sh)	Other crops (Ug.sh)	Total (Ug.sh)
Iganga	72,113	25,412	97,525
Jinja	58,385	111,724	170,109
Mukono	42,738	30,808	73,546
Hoima	191,613	52,522	244,135
Bundibugyo	19,562	47,747	67,309

Source: Survey Data.

Table 19. Total labour and its costs incurred in growing cocoa and other crops on small-hold farms.

Parameter	Cocoa					Other crops				
	Iganga	Jinja	Muk	Hoima	Bundib	Iganga	Jinja	Muk	Hoima	Bund
Family & Hired labour	15	12	10	14	11	9	12	8	8	16
Man-days/month	21.2	22.3	27.8	22	24	20	30	27.1	15.4	28
Cultivated area (ha)	25.4	16.5	28.1	12.4	53.0	34.0	11.6	38.0	19.0	38.0
Monthly costs (Ug.sh)/ha	22,535	29,193	17,801	44,710	8,966	9,529	55,862	10,269	11,672	21,221
Annual costs (Ug.sh)/ha	270,425	350,312	213,618	536,516	107,592	114,353	670,344	123,234	140,060	254,693

Source: Survey Data.

Table 20. A summary of Labour costs incurred in growing cocoa and other crops annually (including family labour).

District	Cocoa (Ug.sh)	Other crops (Ug.sh)	Total (Ug.sh)
Iganga	270,425	114,353	384,778
Jinja	350,312	670,344	1,020,656
Mukono	213,618	123,234	336,852
Hoima	536,516	140,060	676,576
Bundibugyo	107,592	254,693	362,285

Source: Survey Data.

3.4.3.2. Yields of cocoa on visited farms

The peak harvesting period for cocoa occurs during and towards the end of the rain seasons in the months of March-May and September-November, giving two major harvests in a year, although sometimes farmers can harvest three times in a year. The average cocoa yield was found to be 1656, 1767, 1929, 1605, and 2,000 kg/ha/yr in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts, respectively (Table 21). These yields are higher than those in the previous five years, but they could be better. In the past, however, the yields were a half of what they are today, indicating that there has been a significant improvement in the production of cocoa. This suggests that under Uganda's conditions and given more attention and high yielding varieties cocoa yields would perform better. In Uganda, the varieties are mainly upper Amazon, Ameronado, Criollo and Trinitario all of which belong to the traditional trees. Single variety shambas in Uganda are hard to find, most of them are mixed plantations.

Table 21. Cultivated area, yields and incomes obtained from cocoa and other crops on the farms surveyed in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts

Parameter	Cocoa					Other crops				
	Iganga	Jinja	Muk	Hoima	Bund	Iganga	Jinja	Muk	Hoima	Bund
Area cultivated on surveyed farms (ha)	25.4	16.5	28.1	12.4	53.0	34.0	11.6	38.0	19.0	38.0
Total cultivated area (ha)*	980	752	6299	820.6	2030	101,787 ^a	9,264 ^a	73,982 ^a	51,179 ^a	15,660 ^a
Yield (kg/ha/yr)	1,656	1,767	1,929	1,604.8	2,000	5,300**	2,728**	3,306**	2,580**	1,920**
Farm-gate Price (Ug.sh)/kg	500	600	800	800	700	418**	450**	490**	406**	416**
Income (Ug.sh)/ha	828,000	1,060,200	1,543,200	1,283,871	1,400,000	2,215,400	1,227,600	1,619,940	1,047,480	798,720

Wage rate Ug.sh 1,800 per man-day; Muk = Mukono; Bund = Bundibugyo; * Cultivated by the year 1997; US\$ 1.0 = Ug.sh 1,100; ** Average of the five other crops computed from Table 14; ^a Totals derived from Table 14.

Source: Survey Data.

Table 22. A summary of incomes obtained from cocoa and other crops in Iganga, Jinja, Mukono, Hoima and Bundibugyo.

District	Cocoa (Ug.sh)	Other crops (Ug.sh)	Total (Ug.sh)
Iganga	828,000 (27.2%)	2,215,400	3,043,400
Jinja	1,060,200 (46.3%)	1,227,600	2,287,800
Mukono	1,543,200 (48.8%)	1,619,940	3,163,140
Hoima	1,283,871 (55.1%)	1,047,480	2,331,351
Bundibugyo	1,400,000 (63.7%)	798,720	2,198,720

US\$ 1.0 = Ug.sh 1,100

Source: Survey Data

3.4.3.3. Amortisation of establishment/rehabilitation

Production of cocoa commences three years after planting. This means that the farmer continues to incur tendering costs in the periods prior to production, a reason why amortisation was based on this duration. Amortisation refers to the manner in which the plantation/shamba will pay back the farmer's investment costs. The pay-back duration was spread over 30 years because this is the period by which the cocoa plantation will have attained its maximum production potential. Annual amortisation level of cocoa shambas at an annual discount rate of 18.5% spread over a 30 year period in each of the Iganga, Jinja, Mukono, Hoima and Bundibugyo districts was found to be Ug.sh 221,942.6. This 221,942.6 value is the money the cocoa shamba pays the farmer each year for his investment. This brings the total amount of money the cocoa enterprise is supposed to pay the farmer for the money he invested in it to Ug.sh 6,658,277.7 in 30 years.

3.4.3.4. Contribution of the cocoa crop to household incomes

The contribution of cocoa to farm household incomes in the five surveyed districts are shown in Table 22. The largest contribution (63.7%) of cocoa to household incomes was realized in Bundibugyo district, which is also a reflection of the popularity of the crop in the district. Cocoa in Iganga district generates 27.2% of the household revenues obtained from cultivation, implying that farmers in this district rely more on other crops for their incomes. Cocoa in Hoima is becoming an increasingly important crop in households contributing more than a half of the monies recieved

from farming. In Jinja and Mukono districts, other crops contributed more to farm household incomes.

3.4.3.5. Decision making on household income expenditure

Land in Uganda, in particular farm land, is predominately owned by men. Therefore, all activities that are undertaken on the farm must be commissioned or approved by the man/husband. Women/wives have little or no say on how the monies obtained from farming can be spent, yet they provide the largest labour force. The same scenario occurs on cocoa growing farms. There are very few women (1.0%) who own cocoa farms and therefore make the decisions on these farms. These women who own cocoa shambas have, however, obtained them as a result of death of their husbands.

The lack of land is a significant limiting factor to the emancipation and development of women. It is important that women do own land, if there is going to be any improvement in their lives. To enable women acquire land, government needs to review the land ownership situation within households. Fortunately, to-date, the current government is attempting to alleviate this land problem by putting in place laws, rules and regulations that permit women, wives and girls in homes to inherit land. The liberalised Ugandan economy also allows females to purchase and own land whenever they can afford.

3.4.3.6. Profitability of cocoa at the farm level

Profits are the returns above total cost of production and are widely used as a measure of efficiency of management. Unless a crop enterprise is profitable, it will not be sustainable in the long-run. Gross margins as well as other parameters are compared to establish the profitability of cocoa. The unit costs of production in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts are Ug.sh 163.3, 198.25, 110.74, 334.3 and 53.8, respectively (Table 23). Hoima exhibits the highest production costs, while Bundibugyo has the lowest. These production costs were lower than the reported average cost of Ug.sh 573 quoted by Bank of Uganda (1993). The difference may be due to the fact that growers did not use material inputs like pesticides, herbicides and fertilizers in the study area. Cocoa was found to be profitable in all districts surveyed with net profit margins of Ug.sh 471,075 in Iganga, 626,388 in Jinja, 1,246,082 in Mukono, 663,855 in Hoima and 1,208,900 in Bundibugyo districts. Mukono district had a higher profit margin followed by Bundibugyo. This suggests that

cocoa is relatively more profitable in Mukono and Bundibugyo districts. The profitability of cocoa in Mukono and Bundibugyo districts is because these districts have lower costs of production compared with the other surveyed districts (Tables 19 and 20).

Gross margin (GM) = Gross value of production/ha - variable costs (input + hired labour wage costs). It does not include family labour costs (Ug.sh).

$$\begin{aligned} \text{GM}_{(\text{Iganga})} &= 828,000 - (270,425 - 72,113) \\ &= 828,000 - 198,312 \\ &= 629,688 \end{aligned}$$

Net margin (NM) = GM - fixed costs (family labour + depreciation costs). Depreciation costs were measured at replacement costs of inputs utilized. The costs of a panga, hoe, slashers, secateurs and wheelburrow are Ug.sh 5000, 4500, 3000, 6000 and 65,000, respectively. These are the costs the family would incur each time they replace these inputs. Family labour input was determined as an opportunity cost they would have earned if employed elsewhere at prevailing wage rates.

$$\begin{aligned} \text{NM}_{(\text{Iganga})} &= 629,688 - (72,113 + 83,500) \\ &= 471,075 \end{aligned}$$

The returns to family labour (RFL) = GM ÷ family labour (FL)

$$\begin{aligned} \text{RFL}_{(\text{Iganga})} &= 629,688 \div 72,113 \\ &= 8.73 \end{aligned}$$

This RFL value means that the farmer benefits approximately 9 times per family labour input.

Unit cost of production (Cp)kg/ha = total cost of production (T_{cp})kg/ha ÷ output (O)kg/ha

$$\begin{aligned} \text{Cp}_{(\text{Iganga})} &= 270,425 \div 1656 \\ &= 163.3 \end{aligned}$$

$$\begin{aligned} \text{Output/input ratio}_{(\text{Iganga})} &= \text{GM} \div \text{T}_{\text{cp}} \\ &= 629,688 \div 270,425 \\ &= 2.33 \end{aligned}$$

The profitability of cocoa in the remaining four districts of Jinja, Mukono, Hoima and Bundibugyo are summarised in Table 23.

Table 23. Profitability of cocoa in Jinja, Mukono, Hoima and Bundibugyo districts.

District	GM	NM	RFL	Cp	Output/input ratio
Jinja	768,273	626,388	13.2	198.3	2.19
Mukono	1,372,320	1,246,082	32.1	110.7	6.42
Hoima	938,968	663,855	4.90	334.3	1.75
Bundibugyo	1,311,970	1,208,900	65.56	53.8	12.2

Source: Survey Data.

The profitability of other crops on farms in the five surveyed districts are summarized in Table 24. In comparison with cocoa (Table 23), other crops (Table 24) are still more profitable in Iganga and Mukono districts. This profitability of other crops in Iganga and Mukono is due to the contribution of coffee and bananas crops commonly grown in the districts. Cocoa was more profitable than other crops in Jinja and Bundibugyo districts.

The returns to family labour were highest from other crops in all surveyed districts, except for Bundibugyo where cocoa offered better returns to family labour (Tables 23 & 24). The cost of production per unit was generally less for other crops compared with cocoa except in Jinja and Bundibugyo districts.

Table 24. Profitability of other crops on selected farms in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts.

District	GM	NM	RFL	Cp	Output/input ratio
Iganga	2,126,459	2,017,547	83.7	21.6	18.6
Jinja	668,980	474,756	5.99	245.7	0.99
Mukono	1,527,514	1,413,206	49.58	37.3	12.4
Hoima	959,942	823,920	18.3	54.3	6.85
Bundibugyo	591,774	460,527	12.4	132.7	2.32

Source: Survey Data.

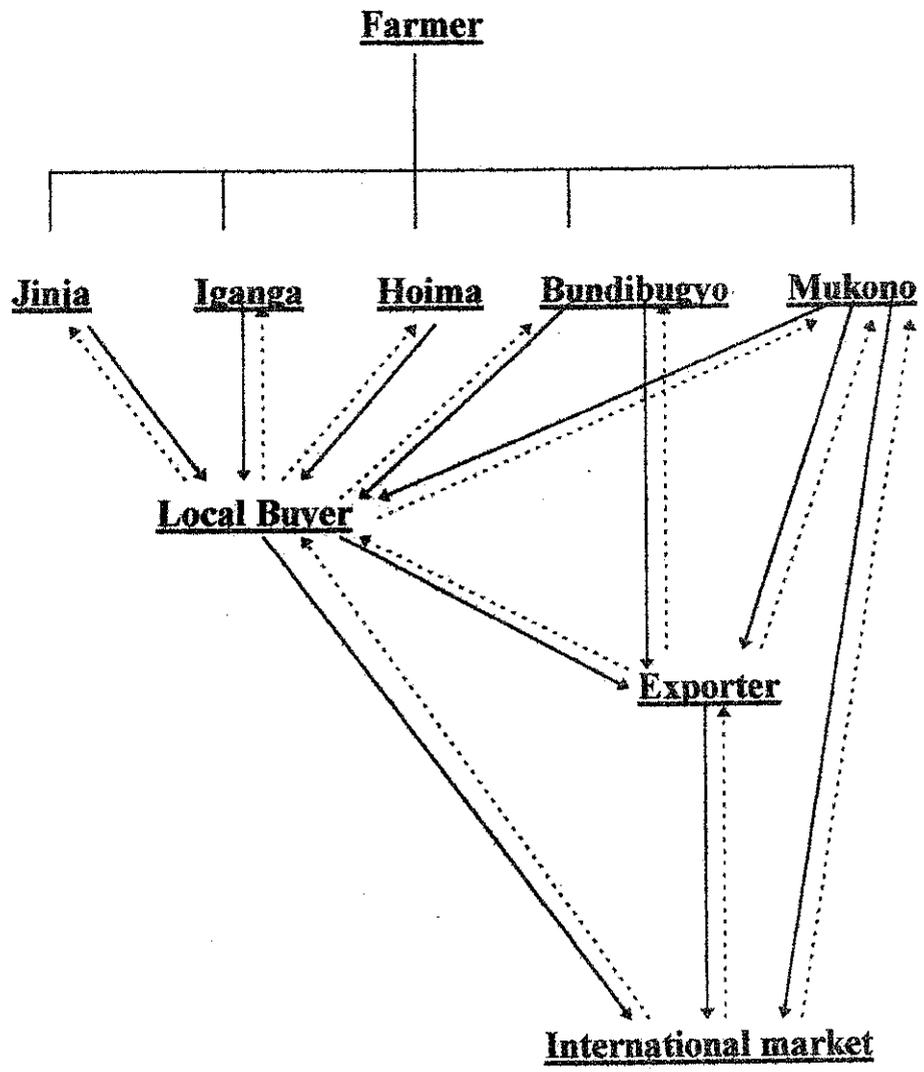
3.4.4. Marketing chain

The marketing chain between the farmer and exporter was reviewed. It was found that majority of the farmer (over 90%) sold their cocoa for cash at the farm gate to local buyers who move from village to village collecting the beans and buying at variable prices where the farmer is ignorant or buying at prices determined by market forces. In general, the price at the farm-gate ranges between 500 and 750 Uganda shillings per kilogram of dry cocoa beans. The buyers then sell to exporters. The price fetched by the buyers from the exporters is in the range of 800 to 1,000 Uganda shillings. The export border price is also variable depending on market forces of quality, supply and demand. The export prices ranges from Ug.sh. 1,200 to Ug.sh 1,500 per kilogram of fair average quality dry cocoa beans.

Since the farmers sell at the farm gate, they do not incur transport costs and this has raised their morale and enhanced their interest in the crop, despite receiving about 20% to 30% of the export value. This revived interest in cocoa on the Ugandan market is reflected in the efforts farmers are applying to rehabilitate their long forgotten cocoa shambas.

There are fewer exporters of cocoa in Uganda who have limited capital. There are currently only five registered exporters of cocoa exporting cocoa on a regular basis and situated in Kampala city the capital of Uganda. Therefore, their capacity to exhaust the farmers potential is very limited, which may still be a factor contributing to the slow growth of this cocoa sector. It is important that many more exporters are encouraged to enter the business so that the farmers do not get frustrated and abandon the crop again. Below is Figure 1.0 showing the market linkage between the farmer and the international market chain.

From Figure 1.0, it is clear that a larger proportion of cocoa from farmers in Iganga, Jinja, Mukono, Hoima and Bundibugyo is sold through local buyers who later sell their goods to exporters. Some farmers are, however, capable of selling their cocoa beans directly to exporters, particularly, in Bundibugyo and Mukono districts. Only one farmer, Sembule Investments, exports cocoa onto the international market. Marketing of cocoa is largely influenced by supply and demand that are facilitated by the flow of market information from the buyer to the producer and vice versa. The flow of market information is also represented in Figure 1.0.



Key
 Transaction of cocoa beans —————>
 Flow of market information ·······>

Figure 1.0. Shows the market chain followed by cocoa beans from the farmer through the local trader/buyer and exporter to the international market.

3.4.5. Problems and constraints at the farm level

3.4.5.1. Insufficient Knowledge and Skills

Since most farmers have been growing cocoa for quite a long time (over 11 years), one would assume that they have gained experience in the production of the crop and that this has spill over effects on the quality and yield. Previous reports showed that much of the consistency in quality and production was achieved after considerable experience the farmers and traders had gained. However, this is not so with cocoa growing farmers in Uganda. The major problem cocoa growing farmers face in this regard is insufficient exposure to information/knowledge and skills required to grow the crop.

3.4.5.2. Limitation of Land

The land planted to cocoa will fix a ceiling on the farmer's production no matter how effectively and intensively the land is used. The area planted to cocoa was reported to be a major factor influencing the supply of cocoa in the short and medium term (ITC, 1987). It is therefore important that more land is cultivated to cocoa if this country and the farmers are to benefit from growing the crop.

3.4.5.3. Inadequate Tools

In the districts surveyed, it was found that there was an over reliance on traditional tools like hoes, pangas, axes, etc in managing of cocoa shambas. These tools are often old and worn out. The use of these low input tools invariably limits the productivity of cocoa plantations. There is general lack of pruning equipment whereby 60% of the farmers interviewed had no secateurs and pruning saws. This affects cocoa yields in that pruning is untimely and is done poorly leaving the flower cushions badly damaged. Most farmers lack spraying equipment, which compounded with the problem of pests, diseases and expensive chemical sprays, harvesting tools (wheel burrows and other accessories) have limited cocoa production on farms.

3.4.5.4. Limited Harvest period

Harvesting of cocoa is done throughout the year with peak season occurring in the months of May and October. The farmer can therefore only realize his/her production potential during this period. Failure to

harvest during this period would consequently lead to low output and hence incomes. The farmer must by all means ensure that there is adequate labour during the months of May and October to achieve his/her objective in cocoa. But, the fact that there are small harvests throughout the year, imply that farmers have cocoa to sell at most times of the year. In many cases the farmers are compelled to store the beans for longer times than is necessary.

3.4.5.5. Low cocoa quality standards

The primary processing involve pod breaking, fermentation, drying and storage. These processes are often limited by the quality standards maintained on-farm, therefore they often have a bearing on the final quality of beans produced.

Although CDP is supposed to carry out compulsory inspection of all cocoa consignments destined for the international market to ensure consistency in grade of cocoa exported, it is currently unable to carry out these duties. They only inspect when the exporter contacts them. The inability of CDP to control the grades of exported cocoa beans is attributed to the lack of compliance from the private sector, which is currently the major player in cocoa export, for inspection by CDP. Many private businesses involved in cocoa trade, export cocoa beans whose quality is not certified by CDP officials mandated to ensure that good quality cocoa is exported. There is need to strengthen the legislative powers of CDP in this regard, to enable CDP enforce cocoa inspection. And also linking the project to other government ministries and departments like the Bureau of standards, Customs and Excise, Uganda Revenue Authority and other related institutions, so that they (CDP) can ensure compliance to inspection by the cocoa exporters.

3.4.5.6. Marketing of cocoa beans

Farmers face the problem of marketing their produce and are often forced to store the cocoa beans for longer periods than is recommended. This is mainly attributed to lack of market information regarding to who buys what and when, what the prices of products are on the market, what area offers a better price.

Like with the other agricultural crops, marketing of cocoa is in general not well planned. It relies on individual buyers/traders who often are limited in number and handicapped in information and capital. It is therefore

important that private marketing agencies and businesses are encouraged to enter the business, so as to streamline the cocoa trade.

3.4.6. Problems and constraints at the Buyer/trader and exporter levels

Like with the farmers, the buyers/traders and exporters of cocoa also face problems in marketing of cocoa beans. The problems are associated with the availability of good quality cocoa beans from the farmers, information about which farmer has good quality cocoa beans ready for sell, and sufficient funds to purchase the large consignments often requested by the international market.

The buyers/traders are often limited by transport related problems (e.g breakdown of vehicle during transit, poor accessibility to cocoa farms, delay at port links, etc), the inevitable bureaucratic delays with the Tax officials, and unscrupulous importers who may delay payments or cheat the local exporters, thus limiting their turnover. In addition, these buyers/traders and exporters are largely affected by the fluctuating international prices of cocoa, which is indirectly shifted to the farmers. Most of these problems are rather difficult to solve, but efforts by the concerned parties (Government officials, buyers/traders and exporters) should employ the necessary legislative tools to minimize such problems.

3.5. Macro National level Economics of Cocoa

3.5.1. Export competitiveness of cocoa

Cocoa has contributed to the incomes of farmers in areas where its grown. Export competitiveness of the crop was measured based on the net financial Benefit (NFB), profit margin (PM) and competitiveness index (CI). These NFB, PM and CI parameters determine the potential of cocoa as a source of income to the country and individual producer as a whole. The measures also help to assess the viability of Uganda's export capacity based on prevailing world prices and domestic resource costs. To an exporter, the competitiveness of an export commodity depends on the net financial benefits after subtracting the costs incurred in exporting the commodity. The exporter is interested in finding out how much financial costs he/she will incur to earn a shilling of foreign exchange.

Labour was a non-traded domestic resource and was measured using its opportunity cost which is the rural labour wage rate. All other costs were divided into their domestic and foreign components in order to determine the cost of trade. The purchase price of cocoa was included in the cost of trade. The price payable to the farmer by the exporter was found to be more relevant in the calculation of profit margin than farm cost used in the cost of production procedure. This price is influenced by supply and demand conditions in the absence of imperfections in contrast to the cost of production. The analysis of competitiveness of cocoa production is summarized in Table 25.

Table 25. Profitability and competitiveness of cocoa exports 1997 (Financial analysis shs/kg)

Items	Cocoa (dry beans)		
	Financial value (US\$)	Foreign (US\$)	Local (Ug.sh)
Export			
Exp. Price/kg (a)	1.384	1.384	1,522.4
Output value (b)	1.350	1.350	1,485.0
Off-farm costs			
Processing costs/kg	-	-	-
Marketing costs/kg	0.275	0.128	161.7 (US\$ 0.147)
Sub-total	0.275	0.128	161.7
Purchase price/kg	0.91	-	1000
Total costs/kg (c)	1.185	0.128	1,161.7
Expected PM/kg (d)	0.199	-	360.7
Realized PM/kg (e)	0.165	-	323.3

Exchange rate Ug.sh/US\$ = 1,100; **b** = value obtained for the quality of cocoa beans delivered for export; PM = profit margin; Expected PM is given by [$d = a - c$]; Realized PM is given by [$e = b - c$]

Source: Survey Data, 1997.

From the analysis in Table 25, the export price is US\$ 1.384 per kilogram of cocoa. The value fetched by the cocoa beans produced in Uganda is US\$ 1.350 per kilogram. This low price obtained from cocoa in Uganda is attributed to the relatively low quality compared with the international standards. This implies that there is a consistent loss of US\$ 0.034 (Ug.sh 34.7) for every kilogram of cocoa produced. It is important that the quality of cocoa beans produced in Uganda is improved so as to realize the full potential of the enterprise. The marketing costs of cocoa at local and

international levels are US\$ 0.128 (Ug.sh 140.8) and US\$ 0.147 (Ug.sh 161.7), respectively.

The current net financial benefit obtainable from cocoa is Ug.sh 323 per kg of dry cocoa beans exported as opposed to Ug.sh -59 per kg in 1993, Ug.sh 99 in 1996 and Ug.sh 110 per kg early 1997. This meant that for every kg of dry cocoa beans exported, the exports earned a profit of Ug.sh. 323. This profit margin was higher than in past years, implying that cocoa exportation is more profitable today than it was in 1996 and early 1997. The competitiveness was found to be 1.5 early 1998 (Table 26), which suggests that the net output value was higher than domestic cost of producing and exporting one kilogram of dry cocoa beans.

The competitiveness index of 1.5 also implies that cocoa is more profitable on the international markets than it was in the previous two years. These results confirm the assertions made by previous consultants that cocoa is a profitable export crop for Uganda. The competitiveness of cocoa has improved substantially over the years following liberalisation of the market that coincided with increases in international price of cocoa in the many years of a cocoa world deficit.

Table 26. Cocoa profitability measures

Year	Competitiveness index (CI)	Profit margin (shs/kg)
1993*	1.10	-59
1996**	1.36	99
1997**	1.40	110
Jan-Feb 1998***	1.50	323

Source: *BOU, 1993; ** CDP, 1997; *** Survey data.

There were however conflicting reports from the farmers and exporters about the prices paid for cocoa. The farmers reported being paid Ug.sh 500 per kilogram of cocoa beans, while the buyers/exporters claimed to have paid farmers Ug.sh 800 per kilogram of cocoa beans. It is true that in some cases farmers were paid lower rates than those reported by the exporters. This was so, particularly where the cocoa bean quality was too low to meet international standards and required an initial sorting of good quality materials. At the Ug.sh 500 rate, cocoa production is not profitable, and consequently, this discourages the farmer. It is therefore important that

farmers to receive training through extension on how to produce good quality cocoa beans to enable them realize the benefits.

3.5.2 Jobs Created by the current cocoa industry and projected potential

The cocoa sub-sector creates jobs at the farm, buyer/trader and exporter levels. It also offers jobs to officials at the government level who are assigned with the monitoring and evaluation and enforcement of Government's Policy in this sub-sector.

At the farm level, cocoa is currently being grown by 8,450 farmers, who without the help of labourers, would not be able to manage the enterprise. Each farmer on average employs about 13 labourers on part-time or full-time basis. This means that 109,850 individuals are employed throughout the year.

At the buyer/trader and exporter levels, the nature of jobs provided range from labourers involved in the loading and off-loading of cocoa bags which are approximately 10,000 jobs to clerical officers, accountants and managers who are about 1000 individuals. There about 800 officers at the government level. In total, therefore, approximately 120,000 jobs are currently created by the cocoa sub-sector. There is, however, a potential of increasing this job market as the sub-sector expands and requires more man-power.

3.6. Environmental impact of cocoa growing.

Cocoa is a long duration crop whose impacts on the general environment, although not thoroughly known, are considered to be similar to those imparted by other tree species. The impact of cocoa on the environment was assessed based on a standard check-list of the Uganda National Environment Management Authority (NEMA) with a few modifications to suit the purpose of this study. The cocoa actions on the environment and human elements are summarized in Tables 27a and 27b. The results show that cocoa (when mature) negatively affects ground cover by discouraging undergrowth of other plants, ranching, dairying and grazing by utilizing land (space) that would otherwise be used by these entities (Table 27a). Cocoa trees impart minor positive impacts on habitat, landscape, air, landfill, noise, vibration and energy generation by virtue of their physical presence which modifies these characteristics and provides fuel source for

farmers. The most significant benefits of cocoa plants on the environment are registered in their improvement of drainage, weather, erosion, reforestation, waste recycling and encouraging the development of chemical and food industries.

Table 27a. Cocoa Actions on the environment

Element	Impact
A). Modification of Regime	
* Exotic flora or fauna	5
* Modification of habitat	3
* Alteration of ground cover	2
* Alteration of ground water (hydrology)	3
* Alteration of drainage	4
* Weather modification (cloudiness, temperature, humidity & rainfall)	4
* Noise and vibration	3
B). Processes	
* Farming	1
* Ranching and grazing	2
* Dairying	2
* Energy generation	3
* Chemical Industry	4
* Food industry	4
C). Land alteration	
* Erosion	4
* Landscaping	3
* Marshfill and drainage	5
D). Resource Renewal	
* Reforestation	4
* Waste recycling	4
E Waste emplacement and treatment	
* Landfill	3 & 5
* Air (smoke)	3

Key

- | | |
|----------------------------|---------------------------|
| 1 = minor negative impact; | 2 = major negative impact |
| 3 = minor positive impact; | 4 = major positive impact |
| 5 = undetermined impact; | 6 = no appreciable impact |

The effects of cocoa growing on specific natural and human elements are presented in Table 27b. Like most trees, cocoa trees extract large amounts of nutrients from the soil, but because of their high leaf litter drop rates, they return substantial quantities of nutrients upon decomposition, thus offsetting the initial nutrient drain. This may probably explain why cocoa can

be grown for a very long period without significantly depleting soil fertility.

Table 27b. Impact of cocoa on natural and human elements
Arranged Horizontally

Element	Impact	Element	Impact
A). Physical and chemical characteristics			
1. Earth			
* Mineral resources	1 & 3	* Unique physical features	1 & 3
* Soils	1	* Land forms	1
2. Water			
* Surface	4	* Acidity	5
* Underground	4	* Alkalinity	5
* Relative humidity	4		
3. Atmosphere			
* Quality (gases, particulate)	4	Temperature	4
* Climate	4		
B). Biological conditions			
1. Flora			
* Trees, shrubs, grasses & crops	5		
2. Fauna			
* Birds, land animals, including reptiles	5		
C) Cultural factors			
1. Land-use			
* Forestry	4	* Historical sites	5
* Agriculture	4	* Residential	5
* Rare and unique species	5		
2. Recreation			
* Picnic	6	* Camping	6
3. Aesthetic & human interests			
* Scenic views	3	* Landscape design	5
* Open space quality	3		
4. Cultural status			
* Cultural pattern	5	* Health and safety	5
* Employment	4	* Population density	2 & 3
5. Man-made facilities and activities			
* Utilities networks	3	* Waste disposal	4
* Brush encroachment	1 & 3	* Others	5

Key

1 = minor negative impact;

3 = minor positive impact;

5 = undetermined impact;

2 = major negative impact

4 = major positive impact

6 = no appreciable impact

It is important to note that inspite of the ability of the crop to exist for a long time on a shamba with minimal nutrient depletion, the crop can not be grown continuously without the addition of fertilizers if high yields are to be maintained. In addition, farmers need to control pest and diseases which also have negative impacts on the yields by judicious use of pesticides. There is therefore need to encourage and train farmers how to use fertilizers and pesticides without significantly affecting the environment.

Due to the taproot and widely extensive root system, cocoa trees abosrb large amounts of water from deep soil profiles that they expire by evapo-transpiration into the atmosphere thereby modifying the relative humidity, temperature and rainfall characteristics. The wide and thick canopy exhibited by cocoa trees tends to slow drying of the soil surface, thus creating suitable micro-climate for microbial activities, which enhances the performance of the soil. There is limited information on the effects of cocoa trees on other flora and fauna.

By their nature, cocoa plants are best grown together with other crops preferably taller plants which provide shade that protects them from intensive sunshine that is detrimental to their yields. Intercropping of cocoa with other trees and/or crops has been found to significantly improve forest (woodlot) and agricultural systems. Therefore, it is a crop fitting in the Ugandan small-hold farmer's farming system, enabling the farmer to efficiently utilize his/her natural resources.

Its impact on health and safety, rare and unique species is not thoroughly understood, but its impact may be associated with the pests and diseases that are often found in the cocoa plantations. Otherwise, the cocoa shambas can be suitable sites in which to dump domestic organic wastes as mulch that will consequently improve on sanitation and the soil's fertility.

3.7. Forward, Backward Linkages and Multiplier effects

Growing of cocoa leads to the production of beans that are essentially not consumed directly as food, but form a precusor to the production of many other products consumed as beverages, or sweets, in confectioneries and drugs. The production of cocoa diversifies the crops the farmer and the country at large rely on for revenue.

When the cocoa beans are exported, they earn the farmer income in the form of sales, buyer/traders who transacts with the farmer earn commissions, while the exporter obtains foreign exchange. The incomes earned by the farmer, buyer/trader and/or exporter are, in one way or another, utilized in the betterment of their individual lives.

At each of the farmer-buyer/trader-exporter transaction levels, taxes are levied on the commodity, thereby generating revenues that government can use to rehabilitate, establish and construct new infrastructure to facilitate other commercial and social sectors.

The activities involved in cocoa production (i.e planting, tending, harvesting, processing, storage, marketing and actual sale), require the aid of many hands. In this way, therefore, jobs are created. This means that some people who may be unemployed will obtain work from which they earn money to survive, hence alleviating the unemployment problem in this country.

It is still unfortunate that cocoa beans can not be processed into their intermediate or final consumer products in this country. As a result of this, the country loses the revenues she would have otherwise earned from the final processing of cocoa. These revenues are in the form of taxes from the people employed in the industry, the factories themselves, and the foreign exchange earned from the sale of the final products. Nevertheless, the country can still levy taxes from imported products of cocoa.

The development of the cocoa sub-sector will, as a consequence, encourage further growth of other sub-sectors in agriculture by generating inputs that can be used in other sub-sectors, thus improving the overall agriculture.

3.8. People's Opinions and Possible Interventions

The farmer's opinions on cocoa as a crop, on the roles of government and the ADC/IDEA project, and possible interventions in the cocoa sub-sector varied very widely.

As a crop, the farmers considered cocoa an important cash crop that enables them earn money they would have otherwise not earned elsewhere. Therefore, to them, cocoa is a crop they will continue to grow for as long as they can sell it. Majority were not aware of the use of this

crop, but because it brought them more money than they earn from other crops, it was a worthwhile crop to invest in.

On the roles of government, the farmers were aware that the government was interested in the crop for export in addition to coffee and other crops. However, they were wondering as to why the efforts government was putting in re-habilitating and facilitating this cocoa sub-sector were not reaching them in real/tangible terms. The farmers reported being limited in funds, knowledge and skills required in proper management of cocoa plantations and requested to be facilitated in these respects. They reported that government was too slow in meeting their requirements and were doubtful as to whether these good intentions would ever reach them.

According to the farmers, their basic problem of insufficient funds, inputs and information were issues that government should directly handle with the farmers without involving other individuals or agencies whom, in their view, would eventually mismanage the resources due to corruption. They reported that since cocoa was not a crop they directly fed on, they could only allocate to land after other food crops had been taken care of. In this regard, they suggested being given subsidies and inputs to encourage them grow the crop. During the study, we however informed them that they needed to save some of the monies obtained from cocoa to meet some of its requirements, since it was capable of earning them large amounts of money from which they can directly benefit.

With regard to the ADC/IDEA project, very few farmers were aware of its existence. Some only heard about it from the visiting researchers. Majority of the cocoa growing farmers were more aware of the existence of CDP. The farmers do appreciate some of the assistance they have obtained through CDP like provision of seedlings and visits by CDP extension staff. The farmers, however, reported that there was need for CDP to be more vigilant in providing them with extension services.

4.0 Conclusions and Recommendations.

This chapter presents the conclusions drawn from study findings, policy recommendations and suggests areas of further intervention and research.

4.1. Conclusions

Production of cocoa in Iganga, Jinja, Mukono, Hoima and Bundibugyo districts is presently relatively higher than in previous years of the 1980's. The higher yields are attributed to the re-establishment of previously neglected cocoa plantation and entry of new farmers into the industry. This increase in production followed assistance and promotion given to cocoa growing farmers through CDP in an attempt of enhancing/boosting cocoa production in the country.

In addition, the increase in cocoa production was stimulated by the fairly competitive prices offered on the world market following a slump in world cocoa stocks in the last five years.

In the past when cocoa plantations were abandoned, farmers relied on coffee, bananas, maize, beans cassava and other crops for revenues. But, to-day, as a result of the boost in cocoa production in the districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo, revenues generated in cocoa growing households have increased leading to a substantial improvement of living standards of farm families.

The current cocoa industry is dominated by males. Consequently, very few women are involved in cocoa investment, which has to some extent hampered the emancipation of the rural woman. This is coupled with the fact that the woman's decisions concerning money expenditure and ownership of land in a home are often not respected. It is, therefore, important that policies/legislature be put in place that empowers women to inherit, purchase and own land since it is a major factor of production and a means of capital that could be used to improve one's socio-economic status.

Cocoa harvesting and processing is often not carried out at the farm level. Pods are pulled off the trees during harvesting which destroys flowering cushions thus eliminating the possibility of future fruiting on the same cushion. There is lack of sufficient knowledge about the fermenting and drying processes, yet these two processing greatly affect the quality of

cocoa. There is willful mixing (adulteration) of good quality beans with poorly processed beans.

There was virtually no disease and pest control in the surveyed districts of Iganga, Jinja, Mukono, Hoima and Bundibugyo, yet these pests and diseases appear to be on the increase. Lack of meaningful extension services as well as poor husbandry practices aggravated the above problems. In addition, lack of inputs, transport to collect seedlings, financial assistance to hire labour and other inputs, presence of pest infestation, vermin and diseases, limited the chance of obtaining increased cocoa production in the districts.

Cocoa was found to be profitable as an export crop. Its competitiveness has greatly improved following market liberalisation and price increases since 1993. The profit margin had improved from a negative margin of Ush. -59 per kilogram dry beans in 1993 to 99 Ug.sh per kilogram by 1996. Currently the profit margin is estimated at 323 Ug.sh. The competitiveness index had in 1993 also improved from 1.10 to 1.356 in 1996. To-date CI is estimated at 1.5.

No Government organ has been directly involved in ensuring that the quality of Ugandan cocoa beans entering the world market are of high grade. This was echoed recently in the press⁷. Cocoa Development Project (CDP) which was charged with the responsibility of monitoring the quality of cocoa beans has been sidelined by private exporters who do not oblige by the set regulations regarding quality certificates, because CDP has not yet built sufficient legislative powers to enforce these regulations. Consequently, monitoring the grades of cocoa exported are no longer carried out and Uganda's cocoa is exported as fair average quality standards. Uganda currently exports unprocessed raw dry cocoa beans which are bulky, thus increasing the average transportation costs especially for Uganda which is land locked. The export of fair average quality raw cocoa beans compromises Uganda's opportunity to earn better prices on the world market.

Unlike in the past when cocoa production was abandoned and many individuals thereafter became unemployed in this sub-sector, the cocoa industry to-day has created more jobs and is projected to create more, as long as the sub-sector becomes full operational. The existing cocoa producing capacity currently employes about 120,000 people, which is a

⁷ . Reported by Nation Paper Correspondent. 16 th February 1998.

good contribution in alleviating the current unemployment problem in the country.

Ecologically, cocoa has minor negative to minor positive environmental impacts. The crop grows together (intercropped) with other crops, thus its demand on land/space is minimal, making it a very suitable crop in Uganda's agricultural systems.

The forward, backward linkages and multiplier effects associated with cocoa production are such that there are substantial benefits/potential rewards that accrue from this sub-sector. This however will require modernisation of the sub-sector to cease its reliance on exporting cocoa beans in the raw form, but rather as an intermediate or final consumer product, to enable the country to fully exploit the potential of the cocoa industry.

4.2. Recommendations

Based on the findings of this study, the following recommendations are suggested and considered means by which the cocoa industry in Uganda and incomes at the farm level can be improved.

There is need to streamline the input delivery system. Farmers should be provided with the recommended inputs such as pruning saws, spraying equipment, wheelburrows, secateurs and pesticides at affordable prices for improved plantation management. The inputs and tools should be made available within the vicinity of farmers' reach at village level. Although Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) has divested itself from importation and distribution of inputs, it has a big role to play through CDP, given the fact that cocoa is an emerging export crop. It should identify and recommend, and possibly facilitate the private sector in the importation and marketing of inputs needed in cocoa production.

Pest and disease control should be carried out using the integrated pest management approach. Farmers should be encouraged to plant neem trees along their cocoa shambas, because these trees are known to repel pests. Solution can also be made from the neem tree leaves, bark and fruits that can be used for pest control. A cautious approach should be followed when using chemicals to spray cocoa pests, because the chemical can cause tainting and development of off flavours in beans due to high pesticide content. It is also environmentally undesirable to introduce

harmful chemical that may have a long residual effect, which is often common with many pesticides. Therefore, spot spraying should be encouraged to avoid blanket coverage which may aggravate the pesticides residual effects by spreading the effects over a wider area.

Cocoa production is significantly minimized by vermin, squirrels, monkeys, wild pigs and baboons. Therefore, in order to control the damage caused by these agents in cocoa growing areas, farmers need to be advised and encouraged to hunt/chase these animals. This could be done through local councils and the Game department. Where possible chemical repellants can be used against these vermin supplemented with judicious use of poisons that temporarily knock-out the animals. Such poison, however, should be administered by trained personnel to avoid killing the animals, creating another environmental problem.

Extension services should be strengthened through practical training of farmers and staff in groups on the various aspects of cocoa production. For example pruning, harvesting, proper fermentation, and drying procedures, quality control, disease and pest control, so as to produce high grade cocoa beans. Farmers also need field tours and visits to other cocoa growing areas in order to enrich their knowledge and skills of cocoa production. The newly recruited field extension workers plus those already in the field also require updating their extension knowledge and skills on the crop. In order to ensure good quality beans, there is need for concentrated efforts to enforce quality control. Both farmers and traders should be trained on what is high grade crop, how to produce it and distinguish it as well as proper storage. This may help to alleviate the problem of adulteration. Large farmers should be encouraged and helped to install their own processing units (artificial dryers). The government fermentries should be rehabilitated to help farmers who are unable to adequately process cocoa in their homes. This rehabilitation should be addressed by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) through CDP. Government should come up with a promotional programme to create awareness and encourage new farmers. The promotional programmes could utilize the facilities of the press, radio talks and films to capture new farmers and boost morale of the existing farmers.

Research is very important in any industry, because without it, the industry can not remain viable indefinitely, and there can not be sustained development. It is therefore important that research in the cocoa sector is re-initiated to ensure sustained cocoa development. There has been limited

research on cocoa done in Uganda. The recommendation for research is based on the observation that hybrid developed over the years through research have greatly increased yields obtainable under natural conditions. The selection of individual mother trees for desirable attributes of high yield, good bean size, vigour, disease resistance and their subsequent propagation in nurseries to improve cocoa production in Uganda can only be achieved through research. This can be implemented by institutions like COREC at Kizuza Research Station and CDP, currently responsible for the cocoa crop in Uganda. These institutions, however, need support to rehabilitate existing and/or build new capacity for research.

In order to facilitate delivery of seedlings to the farmers plots, while at the same time reducing the costs of raising the seedlings, a small fee (say Ug.sh 20) could be charged for each seedling. This fee could in part cover transport costs from the nursery to the farmer's plots to avoid constraining the farmers capital base. Alternatively, CDP could in collaboration with other authorities set up cocoa nurseries in the vicinity of cocoa growing farmers to avoid delays and problems associated with movement of seedlings over long distances and minimize costs of raising them. Then, the seedlings could be given free as an incentive to farmers in cocoa growing areas.

Uganda cocoa should be sold in grades and not in fair average quality, because prices on the international market are variable based on grade. A realistic price differential between grades might encourage high standards of processing. In addition, Uganda needs to add value to its cocoa by exporting at least roasted beans or a confectionery industry could be established to process the beans into butter and powder. It is clear from the comparative advantage impressions that Uganda has great cocoa production potential, which if a chocolate industry is developed in the country, its products could easily be consumed by even the neighbouring countries.

It is important that cocoa producing countries like Uganda build up capacity to export cocoa in either immediate, intermediate or final product forms rather than in raw forms to enable earn more revenue that accrues from processing of cocoa.

Although its important to allow the private sector to take a leading role in economic development, the development of the cocoa industry should not be left entirely to the monopoly of the private sector. Government should take full responsibility in the drive to boost cocoa production. It should

Liaise with all participants in the cocoa industry to ensure that quality of cocoa beans exported is of premium grade, so as to favourably compete with other cocoa producers. The current role played by CDP of monitoring cocoa production, processing and inspection of cocoa for export should be strengthened. CDP should also avail to the private sector market related information, to enable them exploit better market prices. All government institutions concerned with cocoa trade such as Ministry of Trade and Industry, Customs Department, Export Promotion Board and CDP should co-operate to establish quality standards of consignments for export.

Although high yields of cocoa have been registered in some districts in Uganda, it is important that the amount of land allocated to the crop is increased.

The role of ADC/IDEA project in promoting cocoa growing in Uganda has been substantial. It is important to note that the cocoa industry in Uganda is still at its threshold, and therefore this would not be the moment at which ADC quits assistance to farmers. There is need to support the farmers until such a point when they can be self perpetuating.

4.3. Possible areas of further ADC/IDEA project interventions

The major problem cocoa growing farmers face to-day is lack of sufficient inputs and funds to adequately manage their enterprises. Government has instituted various rural farmer loaning schemes such as the Rural Credit Scheme, Entandikwa, Poverty Alleviation Project (PAP)/Poverty Eradication Project (PEP) and several others, whose impact has not adequately helped the cocoa growing farmer. It is important that, although the ADC/IDEA project does not, as an objective, provide subsidy, loans and inputs to farmers, the project could utilize its technical and administrative capacity to influence government policy regarding subsidies and loan schemes to help the cocoa farmer.

In addition, the project could, as a promotional tool, avail market related information to cocoa growing farmers, so as to negate the problems associated with farmer's ignorance of market related parameters.

The ADC/IDEA project could provide training to technical staff on the methodologies of establishing and maintaining a seedlings nursery, tissue culture technics, quality monitoring and maintenance, and conduct farmer training on the methods of production and processing of cocoa.

In addition, provide extension services to farmers while, at the same time, training extension staff who will take over once the project is terminated for continuity purposes.

Research into ways of improving productivity of cocoa at the small-holder farm level should be designed and conducted. The findings accruing from such research should then be passed on to the farmers through extension agents.

Studies into determination of disease and pest thresholds on the cocoa crop that cause economic loss should be conducted and subsequent control measures developed.

Reviews in the cocoa processing methods and technologies employed at the small-holder farm level need to be carried out to establish their short limitations and develop appropriate procedures to ensure production of high grade cocoa beans.

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Annex 2

LIST OF RESPONDENTS JINJA

NAME	HECTARES	LOCATION
1. James Walube	0.62	Mafubira
2. B. Mugaya	0.62	Mafubira
3. Paul Isabirye	0.83	Butagaya
4. Aksoferi Kisige	0.62	Butagaya
5. Michael Zagenda	4.13	Butagaya
6. Bosco Busoni	0.41	Butagaya
7. Eriniah Kyeranyi	2.07	Butagaya
8. John Kawuka	0.83	Butagaya
9. Daniel Hamba	0.62	Buwenge
10. Eliphas Lubowa	0.41	Buwenge
11. Christopher Balwaine	0.41	Buwenge
12. Zuriat Alou (Ms)	0.21	Buwenge
13. Kavuma Marinzi	0.21	Buwenge
14. Goliath Baganzi	0.41	Buwenge
15. Akazia Baliza	0.1	Buwenge
16. Nathaniel K. Kitakuwomela	0.41	Budondo
17. John Wawunyamu	0.21	Buwenge
18. John Luse	0.41	Buwenge
19. Kisakye Bernard	0.41	Buwenge
20. Mulezi John	0.62	Butagaya

BUNDIBUGYO

1. Musoke Kamara	2.07	Kasitu
2. Hamisi Tumusobole	5.6	Kasitu
3. Bwambale Ison	0.83	Kasitu
4. Augustine Mbakanya	1.24	Kasitu
5. Muhindo Wilson	1.65	Kasitu
6. Isiah Kasirombe	1.24	Kasitu
7. Obadiah Kyanzolero	1.24	Kasitu
8. Kipesi Ezron	1.65	Kasitu
9. William Kamuroro	1.65	Kasitu
10. Abdu Muhindo	1.65	Kasitu
11. Thomas Tibinduka	2.48	Kasitu
12. Yafesi Muliwabi	13.2	Kasitu
13. Husai Busingye	1.24	Kasitu
14. Steven Rwatoro	1.24	Bundibugyo Township
15. Joseph Balinda	1.24	Kasitu
16. Nicholas Bamage	0.41	Kasitu
17. Augustine Ngomanjunga	1.03	Kasitu
18. Mbusa Jack	0.21	Bundibugyo Township
19. Sulait Mugisa	0.83	Kasitu
20. Stanley Bebihirya	0.41	Bundibugyo Township
21. Mohamed Tibakunihirwa	0.83	Kasitu
22. Yokasi Kalisa	1.24	Bundibugyo Township
23. Timothy Banguma	1.24	Bundibugyo Township
24. Eric Bagonza	0.83	Bundibugyo Township

25. Charles Sabiti	0.83	Bundibugyo Township
26. Musana Kisémbó John	1.24	Kasitu
27. Yakobo Junior	3.72	Kasitu
28. Nathan Kisoro	3.31	Kasitu
29. Joel Bakigaya	2.9	Kasitu
30. Amin Kisémbó	1.24	Kasitu
31. John Balyebuza	2.48	Kasitu
32. Kisaya Musisi	1.65	Kasitu
33. Baguma Neliyon	1.65	Kasitu
34. Musa Kisoro	1.24	Kasitu
35. Kanja Gideon	Agriculture office	Bundibugyo Township
36. Friday Sibelireki	Trader	Bundibugyo Township
37. Kibwonga Zachary	Trader	Bundibugyo Township
38. Ugacof(Katurama)	Exporter	Bundibugyo Township
39. Coffee-tea(Yusufu)	Exporter	Bundibugyo Township
40. Lawrence Muhindo	Exporter	Bundibugyo Township

MUKONO DISTRICT

1. Kasozi Ronny	1.24	Buikwe
2. Ssemakula Shem	0.62	Mukono Town
3. Kibirango Robert	0.83	Mbalal/ Mukono
4. Kisomba Aggrey	0.41	Kasawo
5. Musoke Alferd	1.03	Kasawo
6. Watate Steven	0.83	Kasawo
7. Mwebesa Isaac	0.41	Kituza
8. Damulira Sunday	0.62	Ntenjeru
9. Sekirevu James	0.62	Namilyango
10. Musisi	0.62	Ntenjeru
11. Kabunga Moses	0.83	Namilyango
12. Samson Ggayi	0.83	Nakifuma
13. Henry Lwambi	1.24	Kasawo
14. Musa Serebe	0.62	Namilyango
15. Byansi Katto	0.83	Namilyango
16. Mutumba Peter	1.24	Ntenjeru
17. Senyonjo Daniel	0.62	Mukono
18. Mutyaba Ivan	0.62	Nakisunga
19. Moses Male	0.62	Nakifuma
20. Kasozi Deus	1.03	Namaiba
21. Mpima Cosy	1.03	Katosi
22. Kabanda Leonard	0.62	Mukono
23. Sempira William	0.62	Gulama
24. Kakoza Joseph	0.62	Mukono
25. Mukasa Esperito	0.62	Buikwe
26. Mayanja Dickson	0.62	Najjembe
27. Kibirango J.	0.83	Mbale
28. Lulume Sam	1.03	Mukono
29. Nandibigyo Herbert	0.83	Mukono
30. Senfuka Danie	1.03	Kasawo
31. Mukasa Michael	1.03	Bugerere
32. Kibuka Benard	0.62	Buikwe
33. Katende William	1.24	Mukono
34. Goloba Simple	0.62	Kasawo
35. Mukiibi Jonan	0.62	Buikwe
36. Sembule / Mabwa	102/Exporters	Nkokonjeru

37. Dr. Wetala	COREC Agronomist	Kituza
38. Alice Nyanzi	Agriculture Ext. Co-ordinator	Mukono
39. Naome Nabeta	COREC Office	Kituza
40. Solomon Musoke	Cocoa Dev. Office	Mukono

IGANGA

1. John Nkono	1.65	Imanyiro
2. Walufeli C	1.65	Imanyiro
3. Tilibuza	0.21	Imanyiro
4. Vincent Rusindi	0.62	Imanyiro
5. Wakabi Rusindi	0.41	Imanyiro
6. Abdul Kirya	0.1	Imanyiro
7. Samuel Tibita	0.41	Imanyiro
8. Sakulo Kirembe	0.41	Imanyiro
9. Besweri Walyoba	0.83	Imanyiro
10. Nejjo K	0.83	Imanyiro
11. Waiswa Y	0.83	Imanyiro
12. Kisubi B	1.24	Imanyiro
13. Mulekwa C	0.83	Imanyiro
14. Wagugwe E	0.83	Imanyiro
15. Wamala E	0.83	Imanyiro
16. Kampi L	0.83	Imanyiro
17. Kakoma	0.83	Imanyiro
18. Nabeta N	0.83	Imanyiro
19. Baligeza S	1.24	Imanyiro
20. Mugeni F	0.41	Kityerere
21. Musana D	0.83	Kityerere
22. Nakungu K	0.83	Kityerere
23. Lukungu A	0.83	Kityerere
24. Byakika A	0.83	Imanyiro
25. Nsubuga N	0.41	Kityerere
26. Mukama S	0.83	Kityerere
27. Wapande S	0.21	Kityerere
28. Naisita	0.41	Buwaya
29. Kasoba	0.62	Buwaya
30. Gendeiza	0.62	Buwaya
31. Balamu Gabantu	1.65	Buwaya
32. Tibatyagenda Amos	0.83	Bukanga
33. Mary Isabirye	0.41	Bukoma
34. Isabirye Yeese	0.41	Bukanga
35. Kawikizi	0.83	Bukoma
36. Mawagala Isoba	0.83	Bukoma
37. Namundere Baronde	0.41	Bulongo
38. Bendamira Tenywa	(CDP)	Imanyiro
39. Baligeza S	Staff/Employee	Imanyiro
40. Narwenyi Moses	(CDP)	Bulongo
41. Tibita S	Field Assistant - DFI	Imanyiro

HOIMA

1. Clovice Mugabo	0.62	Kigoroby
2. Wako Amooti	0.62	Bulindi
3. Asiime T	0.62	Kigoroby
4. Ategeka P	0.62	Kigoroby
5. Byoma O	0.62	Bulindi
6. Begumisa Tom	0.62	Karongo
7. Kagaba Mujuni Monday	0.83	Kahoro

8. Balongo Iginatius	0.21	Hoima
9. Ijuka Amoni	0.62	Buhimba
10. Sewanyana	0.83	Buhimba
11. Mpaayo Martin	0.62	Buhimba
12. Bintumaki	0.83	Buhimba
13. Kyasima	0.83	Kahoro
14. Mugenyi	0.62	Karongo
15. Ojure Thomas	0.62	Bulindi
16. Bamaturaki Ford	0.83	Bulindi
17. Moses Abudu	0.83	Bulindi
18. Dropaka	District Agricultural Office/Cocoa	Hoima
19. Kugonza Alfred	0.62	Bulindi
20. Balikagira	District Agriculture Office	Hoima

ANNEX 3

ALTERNATIVE A

Draft Questionnaire A for the Farmers/Producers

Date of interview:

1. Name and location of the respondent

.....

.....

2. Sex: M/F (please tick)

.....

3. Area under cocoa

.....

4. What is the condition and age of the cocoa trees?

.....

.....

5. Please describe the agronomic aspects of cocoa growth?

.....

.....

6. What methods do you use in the production of cocoa?

.....

.....

7. How many labourers do you use on your cocoa plantation?

.....

8. What costs do you incur in the production of cocoa, and what are your profit margins?

.....
.....

9. How is cocoa marketed from your farm to the export point?

.....
.....

10. On average, what are your net earnings per harvesting season?

.....

11. Of the above income, how much of it do you derive from cocoa growing?

.....

12. What are the socio-economic conditions of the cocoa producers?

.....
.....

13. What would you comment on the nutritional status of the cocoa producers?

.....
.....

14. What are the most prevalent environmental impacts resulting from producing cocoa?

.....
.....

15 What are the main constraints faced by the cocoa farmers, and what kind of interventions should the project put in place?

.....

.....

Thank you for the information you have given us.

The above questionnaire will be administered to 100 cocoa farmers, of these 40-50% will be female.

ANNEX 3

ALTERNATIVE B

INTERVIEW SCHEDULE FOR COCOA PRODUCTION AND
MARKETING

Date of interview:

.....

Location of Respondent:

.....

District County Sub-county

I. Socio Demographic Information

1. Respondent's name:

Age Sex

2. Number of people currently staying on the farm

3. Members of the family engaged in farming activities by sex.

Category	Age in years	No. full time		No. part time	
		Male	Female	Male	Female
Adult	18 and above				
Children	12 to 17				
Children	10 or less				

II CROP ACREAGE

4. For how long have you been growing cocoa?

Length of years

<5	6-10	11+
----	------	-----

5. What is the area of land planted to cocoa?

Crop	Area in hectares
1. Cocoa	
2. Beans	
3. Coffee	
4. Maize	
5. Peas	
6. Bananas	
7. Others	
8.	
9.	
10.	

III TOOLS AND EQUIPMENT USED ON THE FARM

6. Which agricultural implements do you have for use on your farm?

Implement	Quality	Year of Acquisition	Cost price	Benefiting crops
Hoes				
Axe				
Pangas				
Forked hoe				
Slashers				
H. Sprayer				
Gunny bags				
Wheel				
Barrows				
Others				

IV LABOUR AVAILABILITY/UTILISATION

7. What labour did you use on cocoa and other competing crops?

a) Family labour

Crop	Family activity	Area (ha)	No. of persons per day	Hours worked	Days worked
Cocoa	Weeding Pruning Fertiliser application Mulching Spraying Post harvest operations				
Maize	Weeding Pruning Fertilizer application Spraying Post Harvest operations				
Bananas					

b) Hired labour

Crop	Family activity	Area (ha)	No. of persons per day	Hours worked	Days worked
Cocoa Beans Maize Bananas					

VI WAGE RATES

Crop	500-1000		1001-2000		2001-5000		5001 Above	
	M	F	M	F	M	F	M	F
Cocoa								
Maize								
Beans								
Others								

VII INCOME LEVELS (IN SHS) SPECIFY AVERAGE INCOME

Crop	Area harvest	Quantity harvested in kgs	Quantity sold (in kgs)	Unit price	Total amount earned (Shs)
Cocoa					
Maize					
Beans					
Bananas					
Other					

VIII HOW ARE THE DECISIONS MADE WITH RESPECT TO:

- Planting
- Harvesting
- Marketing
- Income utilisation

IX WHAT IS THE SOCIO-ECONOMIC SITUATION OF THE PROJECT BENEFICIARIES?

XI WHAT IS THE NUTRITION STATUS OF THE MAIZE/BEANS PRODUCED

XV DO YO PROCESS YOUR COCA OUTPUT?

- a) Yes/No
 - 1. Home
 - 2. Fermentry
- b) How do you ferment the wet beans?
- c) For how long do you do this?

XVI DO YOU SOMETIME FAIL TO SELL THE CROP?

Yes or No? If yes, why?

- a) No buyer
- b) Poor quality (rejected)
- c) Too low prices
- d) Other (specify)

XVII WHAT ARE THE ENVIRONMENT IMPACTS RESULTING FROM GROWING COCOA?

XVIII WHAT ARE YOUR PERCEPTIONS ON THE CONTRIBUTION OF ADC/IDEA TO YOUR WORK?

XIX WHERE SHOULD FUTURE PROJECT INTERVENTIONS FOCUS?

XX ANY OTHER INFORMATION COMMENTS?

Thank you.

ANNEX 4

A draft questionnaire to be administered at Macro-National level. This will be answered by CDP personnel, selected employees, traders and exporters.

Interview Date:

1. Name and Location of the respondent

.....
.....

2. Title of respondent (i.e trader, employee, exporter, CDP staff) please tick the right title.

.....
.....

3. Please identify the location, number and capacity of cocoa processing facilities in this area:

Name of facility	Processing capacity
.....
.....
.....

Total:

4. What are the national cocoa production levels, and please provide information on:

- geographical spread
- number of producers
- percent of women involved
- projected/past production trends

5. What are the volumes and export earnings?

- Past

- Future

6. In your view, how many jobs has the cocoa industry production, processing and export levels generated in the recent past?

.....

.....

.....

7. What are your comments on the economics of cocoa production and exports; discuss and compare the comparative advantage of cocoa production?

.....

.....

8. What have you noted as the backward, forward linkages and multiplier effects associated with cocoa growth?

.....

.....

9. What are the environmental impacts associated with cocoa?

.....

.....

10 Will you please analyse and describe the producer-export chain?

.....

.....