

Appendix 5: Market Survey Analysis Report

Improving small Holder Marketing of
Potatoes and Groundnuts in Eastern Uganda

A Consultancy Report to AT Uganda

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ABBREVIATIONS AND ACRONYMS

AT	Appropriate Technology
CCB	Community Cereal Bank
CIP	International Potato Centre.
DFID	Department for International Development
DRC	Democratic Republic of Congo
FAO	Food and Agricultural Organisation of the United Nations
FOODNET Africa	Marketing and Postharvest Research Network for Eastern and Central Africa
IITA	International Institute of Tropical Agriculture
KARDC	Kachwekano Agricultural Research and Development Centre
kg	Kilogram
m	Metre
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
mm	Millimetre of rainfall
mt	Metric ton
GoU	Government of Uganda
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organisation, Uganda
NGO	Non Governmental Organization
NPRC	National Potato Research Centre, Tigoni Kenya
PRAPACE	Eastern and Central African Irish Potato and Sweet Potato Network
SACRED Development	Sustainable Agriculture Centre for Research, Extension and Development
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
t/ha	Metric ton per hectare
TOT	Training of Trainers
UFSI	Uganda Food Security Initiative
UNADA	Uganda National Agro-input Dealers Association
UNBS	Uganda National Bureau of Standards
UNSPPA	Uganda National Seed Potato Producers Association
Ush	Uganda Shillings (February 2002, US\$1 = Ush 1700)

1 INTRODUCTION

1.1 Introduction and Background

Since the liberalisation of the Ugandan agricultural produce market in the early 1990's the small scale farmers of Uganda have had to operate in a free market environment. Concerned about the impact of this reality on farmers, the executive director of Appropriate Technology Uganda Limited, a registered Ugandan NGO, contacted DFID to assist with funding to formulate a project that would ensure both food security and improved sustainable incomes of small-scale farmers in Eastern Uganda (Mbale and Kapchorwa Districts)

As a result, a feasibility study on the development of a possible marketing system for small-scale farmers in Kapchorwa and Mbale district of Eastern Uganda was requested and carried out by SACRED Africa to assess the market value chain for Potatoes and Groundnuts in Uganda with a view of recommending the best way forward.

Farmers' collective marketing has successfully been implemented in Western Kenya, but the potential has remained unexploited in Uganda. The project seeks to enhance marketing efficiency by improving access to credit for storage and marketing, the reduction of involuntary on farm post harvest storage and reduction of the costs and trade margins involved in potatoes and groundnut trading. The study focuses on collective marketing by small holder farmers which, in a developing economy such as Uganda, can play a significant role in providing secure collateral for micro-credit lending and thereby developing the rural financial economy.

The project is intended to contribute to the poverty eradication strategy of the government of Uganda (GoU) by strengthening the capacity of poor farmers to raise income through commercial production and marketing of Irish potatoes and Groundnuts, among other crops. The target beneficiaries are the Mbale and Kapchorwa farmers who suffer extensive exploitation in the market place perpetuated by canning middlemen. This will also enable them to cushion themselves again a cash flash immediately following harvesting followed by a long period of cash scarcity during much of the year.

1.1.1 Objectives

The principle objectives of this study were as follows:

- ❖ To assess the case for collective marketing for Irish potatoes and Groundnuts in Uganda
- ❖ To provide preliminary evidence as to the institutional feasibility of small-holder farmers collective marketing in Eastern Uganda from the perspective of farmers, traders in the value chain, processors and other stakeholders.
- ❖ To make recommendations for the implementation phase, including outlining the institutional design and operating mechanisms and determining whether the cereal banking model can be adapted to improve the marketing of groundnuts and potatoes in Eastern Uganda.
- ❖ To hold a three day TOT workshop in Eastern Uganda to assist in " fine tuning" recommendations through stakeholder involvement, which will result in a high level of participation among stakeholders, including government representatives, in the project design and implementation.
- ❖ To prepare a final report with findings and recommendations for submission to AT Uganda on how the marketing of the two commodities can be improved.

1.1.2 Methodology

The assignment was carried out by a six person team, specialized in agricultural economics, marketing economics, commodity finance, commodity storage, handling and quality management. The assignment was carried out over a ten day period. The team, jointly, or individually visited several parts of Eastern Uganda between 2nd to 10th April 2005, and held discussions with different stakeholders in the following locations: Kampala, Iganga, Mbale, Kumi and Kapchorwa.

Interviews were held with the following:

- ❖ The ministry of agriculture
- ❖ Uganda Export Promotion Board
- ❖ Uganda National Bureau of Standards
- ❖ Uganda Co-operative Alliance LTD
- ❖ Uganda National Farmers Federation
- ❖ Uganda grain traders LTD
- ❖ Academic institutions and researchers
- ❖ Market and small/medium sized commodity traders
- ❖ Small-scale farmers/farmers groups/Farmers associations
- ❖ Potatoes and groundnuts processors
- ❖ Nandos and Steers (Major potato processors and consumers)
- ❖ Uganda National Agricultural Research Organization (NARO)
- ❖ National Agricultural Advisory Services (NAADS) Kapchorwa
- ❖ PRAPACE Network (Regional Potato and Sweet potato Improvement Network in eastern and central Africa)
- ❖ Input Stockists
- ❖ NGOs
- ❖ Consumers

A full list of persons met is shown in annexe 1

A three-day Training of Trainers (TOT) Workshop, entitled “Agricultural commodity marketing Improvement using the **cereal banking** model” was held in Mbale from 3rd to 5th May 2005. Some of the recommendations of this report emanate from this workshop. Proceedings will be made available shortly.

1.2 Summary Of Findings And Major Recommendations

The overall objective of this survey is to explore ways that will ensure an increase and steady the flow of income to farmers during much of the farming calendar. It is proposed that this can be done through promotion of collective marketing and micro-credit financing including partial payments during periods of bumper crop harvests. Provision of extension services to farmers so that they form and manage their own marketing groups/associations is also proposed. The overall recommendation of this study is that small holder agriculture should be commercialised to attract private sector investment in the rural areas. The consultant's main conclusions are as follows;

- The target region of eastern Uganda is a substantial groundnut and potato surplus producing area. About 60% of this is typically surplus to local needs.
- Groundnuts and potatoes have a ready and reliable market especially in the rapidly growing capital city of Uganda where they are used in manufacturing and production of fast foods.
- Eastern Uganda has fairly good infrastructure and plentiful urban centre storage facilities in good condition and with surplus capacity that can be used for bulking of large amounts of the target commodities.
- There exists in the target region micro-finance institutions, which can be a crucial link in providing banking and credit services.
- Farmers in the area already have good experience of working together in groups and cooperative societies for collective marketing of commodities such as coffee, cotton etc. This can easily be extrapolated to include groundnuts and potatoes.
- Industry standards exist in Uganda for assessing the quality and safety of groundnuts and potatoes although these are not well enforced.
- There is strong stakeholder interest. Farmer's marketing associations, whilst a relatively new concept, are being formed and understand the benefits of collective bulking, bargaining and marketing of their produce.
- Traders, manufacturers and other private investments have shown interest to support farmer collective marketing initiatives.
- Market information is available from various organizations in the country although effort is needed in making this available to poor illiterate farmers staying in the rural areas.
- Modernization (Plan for Modernization of Agriculture) and commercialization of agriculture in Uganda is a key government policy that will support these kinds of initiatives.
- Seasonal groundnut and potato price trends show that it is financially viable for producers to bulk, store and sell these commodities for a profit. However seasonal price movements vary from year to year, and there are significant speculative risks, so that it should initially be promoted with those farmers that have better access to market information, capacity building initiatives and those who can afford to take risks.

Despite the above positive factors, there are weaknesses and threats within the Ugandan economic and political environment that may hinder successful initiation and implementation of small holder farmer marketing initiatives of this kind. These include;

- The lack of timely and reliable marketing information for poor farmers living in the rural areas.
- Lack of clear political transitional mechanisms.
- Political interference in farmer associations
- A history of mismanagement of farmer associations and cooperative societies.
- High and variable bank/credit interest rates. High cost of finance.
- Unreliable supply of high quality farm inputs especially in the rural areas.
- Low level of industrialization, especially in the rural areas leading to high costs of transport to far away urban centres. High cost of transport.
- Poor laws for enforcing contracts.
- Potatoes are highly perishable which may force selling even if the prices are too low.
- The speculative risks of seasonal storage, which cannot presently be offset by using risk management tools such as forward contracts and exchange trading.

Notwithstanding these constraints, the consultants find that Eastern Uganda is an ideal location for initiative collective farmer marketing ventures for groundnuts and potatoes. There is also scope in other surplus areas (especially for potatoes) in western Uganda (Kabale), which could be considered at a later stage. Indeed we believe that Uganda which has relatively good soils and sufficient rainfall in most areas, should pioneer innovative small holder marketing initiatives in the region. However a systematic and phased approach is needed that will address policy and institutional issues and building of a broader stakeholder consensus in favour of empowering farmers to take charge of the profitable marketing of their surplus produce.

Whatever system is developed to try and improve marketing in the rural areas should have the following attributes;

- Reduction of transaction costs incurred by farmers in the market place.
- Increase output marketing options and opportunities
- Improvement in accessing market information
- Promoting farmer collective actions that will enable them to bulk large volumes of good quality farm produce in order to sell to large scale high end manufacturers.
- Building the necessary capacity and empowerment for farmers to handle marketing functions.
- Improved storage and post harvest handling of the commodities involved.

2 A BRIEF OVERVIEW OF FARMERS COLLECTIVE MARKETING SYSTEM- CEREAL BANKING MODEL

This section provides an outline of farmers collective marketing dubbed “cereal banking” in Kenya. It is based on this model that the feasibility study was initiated to find out whether it could be successfully adapted to help improve the marketing of other crops in targeted study areas in eastern Uganda by AT Uganda Ltd. This model has successfully been implemented in Western Kenya, and how it operates is briefly outlined below.

Smallholder farmers seem always trapped in the “good season, poor market” dilemma. This discourages production of surpluses. After harvest, prices are low. Lack of storage causes high post-harvest losses. Middlemen always decide the price. Farmers lack market information and means of transport to distant and better markets. Farmers are reluctant to accept new technologies, as returns from additional investments are low. These problems have been exacerbated by the liberation of smallholder marketing in many African countries. Many farmers are not prepared to participate effectively in a free market economy because they were used only to concentrating on production, leaving marketing to other players.

SACRED-Africa’s community cereal banking initiative was a bold attempt to equip smallholder farmers to become better players in the liberalized market. A cereal bank is a community based organization run by a village or a group of villages and is managed by a committee elected by the community. The name “Cereal Bank” is formed from two words *Cereal*, which refers to grains such as maize, sorghum, millet, rice, wheat etc and *Bank*, which refers to the operations that take place where the cereals are involved. In short a cereal bank operates more or less as a commercial bank, but the only difference is that the commodity involved in this case is the cereal produce. Its main tasks involve buying, storing and selling grains to villagers and outsiders. The bank stores and markets maize on behalf of its clients (individuals and farmers’ groups mainly in Western Kenya), charging a modest fee for these services.

Cereal banking allows those whose lives are most affected by food shortage, poverty and poor marketing to take control over their own food supply and marketing and gives them independence from unfair traders. For them to succeed they need transparent and democratic groups, devoid of politics and outside interference. Until recently, the marketing and storage of the major grain crops in most African countries tended to be in the hands of government agencies. Farmers simply delivered their maize to marketing boards or cooperatives and sooner or later they were paid. They encountered relatively few problems marketing their crops; as a consequence, there was little need to know much about marketing. However, the changing situation means that the farmers have to learn and develop new skills. Farmers need to be able to make their own decisions about prices, about whether to store their crops or sell immediately, about where to buy and how to pay for the inputs such as fertilizer and seed. Cereal banking intended to assist farmers with the basic guidelines and information on private sector grain marketing systems and on crop drying and storage as well as effective group leadership in the liberalized market. The key objectives of Cereal Banking are to improve the marketing of maize through Community Cereal Banks (CCB), to understand maize price trends and formulate the maize buying and selling schedules and to collect and disseminate market information to farmers. Emphasis within this section is placed upon maize-based cereal banking, but the same principles may be applied to other commodities as well.

2.1 Guidelines for Establishing a Cereal Bank

Step 1. The community is mobilized. As most smallholders are unaware of cereal banking, it is often necessary for an external agency, such as an NGO, to conduct community mobilization meetings in order to raise awareness among target groups on the pertinent issues of Cereal Banking. The external party may find it necessary to arrange initial meeting for interested parties, nominate interim cereal bank officials to recruit additional members and to initiate the process of registering members.

Step 2. A draft constitution is prepared. The need for a guiding constitution is discussed and sample constitutions from other cereal banks are circulated among members. The group then drafts a preliminary constitution that is discussed, and then tentatively adopted pending refinement by a legal advisor.

Step 3. The Cereal Bank is formalized. Once a “critical mass” of 25-40 provisional members is recruited, a general meeting is called to adopt the constitution. At that meeting, elections are held to select officers who then swear to abide by their new constitution. These officials are sworn-in by a lawyer or civil authority. The group then registers their organization. The Cereal Banks formed within Kenya were registered with the Ministry of Culture and Social Services. Next, the local cereal bank collects membership dues and deposits them within a commercial bank account with at least two signatories.

Step 4. An office and stores are established. A local store is identified and renovated. In general, stores should be located within a trading centre and readily accessible to members and the general public. The store should be able to hold at least 200 ninety-kg bags of maize. The store should exclude the entry of vermin, allow for good ventilation and provide space for a small office. Many moderate sized commercial buildings are suitable for this purpose. A sign should be posted that advertises the name, purpose and hours of operation of the local cereal bank.

Step 5. Officers and members are trained. The officers and members of the newly formed cereal bank receive training from a facilitating group. Officers receive instruction on sales and marketing, bookkeeping, leadership and civics. All bank members also receive training on the overall operations of cereal banking, grain quality control and commercial standards, cereal processing and bagging, the detection and control of storage pests and conducting local sales. During training, several committees are formed to undertake specialized tasks within the cereal bank. This training requires about one week and is conducted within the community store or bank. At the conclusion of the training, grain processing tools are “turned-over” to the local cereal bank and its commercial operations commence.

Step 6. Grain is traded. The cereal bank operates as a commercial grain trading enterprise on behalf of its members. Each group member is required to deposit a specified amount of grain that serves as the banks initial stock and a certificate is issued by the bank to acknowledge the initial and all following deposits. Additional grain is purchased from non-members, particularly following peak harvest when commodity prices are lowest. This stock may then be stored for a few months, and then resold when prices are higher. Local institutions, such as schools and hospitals are strong potential customers for cereal banks. Furthermore, a large portion of the grain stocks may be retained by the cereal banks for retail sales during food shortages, particularly the later dry season and early cropping season when household food supplies have become exhausted. These cereal bank operations are performed by the association officers and members, serving within specialized committees or as employees. These committees may include the Collection and Buying, Cleaning and Drying, Receiving and Inspection, Marketing and Sales and the

Record Keeping Committees. The cereal bank officers are expected to serve within these committees and to supervise their activities.

Step 7. Regular meetings are held. The Local Cereal Bank holds regular general meetings to inform members of its progress and to allow them to share views. Officers are required to announce these meetings well in advance and hold them at times and in places convenient to all members. These meetings may consist of an opening, reading of previous minutes, matters arising from those minutes, Chairman's Report and reactions, Organising Secretary's Report and Reactions, Treasurer's Report and Reactions and any other business. The officers' reports are expected to provide a clear description of the financial status of the cereal bank. Any other business also allows for special presentations or training activities to be planned as well as announcements of interest to members.

Step 8. Loans facilitate broader trading. Two mechanisms serve to rapidly scale-up cereal banking operations, loan acquisition and centralized marketing. Loans allow the cereal bank to purchase much larger amounts of grain from non-members when commodity prices are low, allowing for greater profits later in the season. These loans may be obtained from a facilitating organization or from commercial sources, but care must be taken to assure that the short-term interest payments from bank loans do not undermine potential profits. Cereal banks need not operate in isolation but may rather coordinate their efforts with several other cereal banks. By combining their bulked grains, several cereal banks may meet the minimum purchases of the largest, top-end commercial buyers such as millers or food relief agencies. Such collective marketing efforts are greatly facilitated by the establishment of a "Central Cereal Bank" that arranges large, forward contracts on behalf of the Local Cereal Banks and larger-scale grain producers. These two mechanisms, loans and centralized sales, are complimentary and may be considered to be two necessary components to expanded cereal banking operations.

Step 9. An annual general meeting is held. Once a year, the Community Cereal Bank conducts an annual general meeting where business and financial activities are reviewed, profits, losses and dividend payments are announced, next year's officers are elected and special awards are presented. The bank's financial statement must have previously been reviewed by an auditor. As with the regular meetings, the time and place of the Annual General Meeting must be announced well in advance and held at a convenient location and time. After the cereal banks business and finances are reviewed, elections for the various officers are conducted and the new officers sworn in. This meeting typically ends with the past Chairperson handing over to the new Chairperson who then assures members that the new officers will uphold their responsibility to safeguard the assets of the Community Cereal Bank group. In addition, membership drives may be organized at the regular and annual meetings in order to increase participation within the local cereal bank. Thereafter, the cereal bank's annual cycle of activities continues.

3 : POTATOES IN UGANDA

3.1 Production Trends And Characteristics

3.1.1 Production Characteristics

Potatoes in Uganda were introduced by the European missionaries towards the end of the 19th century. The FAO estimated that the total area under potato production in 2001 was 64,000 ha with an average yield of 7.02 mt/ha. Potato is an important food and cash crop especially in the highlands. In Kabale and Kisoro, the potato is as important for food as it is for cash. In other districts like Kapchworwa, the potato is mainly grown not only as a food security crop but also for sale in urban markets.

In the mid-elevations, potato is a secondary food security crop. In many communities outside the traditional potato producing zones, potato is considered a side dish, hence not able to make a complete meal especially for the adults. It is consumed when there is a shortage of major staples e.g., banana, sweet potatoes and finger millet. Because of its early maturity period and relatively long shelf life compared to most vegetables, it alleviates food shortages before major staples become abundant.

3.1.2 *Potato Production Zones*

The major potato production zones are located in South-western and eastern highlands . Kabale district alone produces between 50% to 60% of the total annual potato output consumed in Uganda (Table 1). Districts in Uganda that have potential to sustain the potato industry are Kabale, Kisoro, Mbarara, Bushenyi, Kasese, Kabarole, Mubende, Nebbi, Kapchorwa, Mbale, Sironko and Kibaale. Potato can be grown in almost all the agro-ecological zones in Uganda although this is curtailed by lack of quality seed, disease problems, inadequate knowledge on cultural practices, culture and feeding habits of the community.

3.1.3 *Agro-Ecological Conditions And Farming Systems*

Potato production in Uganda is most popular in the districts with high altitude agro-ecologies (i.e., 1700-2500m above sea level). Here, the potato is both a commercial and food crop. This type of agro-ecology can be found in the districts or parts of Kabale, Kisoro, Rukungiri, Kanungu, Sironko, Mbarara, Mbale, Kapchorwa and Nebbi. With better adapted varieties, other mid-altitude zones (1,200-1,600m above sea level) have been able to grow the crop. In these areas, commercial potato production is a monoculture. Occasionally however, intercrop of potato with either beans, maize, sorghum or peas are encountered especially where the crop is grown at subsistence level. In such a setting, there is minimaleffort to control most pests and diseases of the potato.

In zones with banana and coffee farming systems, potato is usually grown under these canopies often not as an intentionally planted crop but as a result of ground creepers. Such intercropping practices are often done either by resource-limited farmers in primary potato production districts or as a food security measure in secondary potato production zones. Such practices do not permit the actual or potential yield of the crop to be expressed. Studies on potato-maize intercrop show that sole crop potato yields better than intercropped potato and reduces the size of the tubers. In the mid- and low altitude areas where the population has a diverse food crop resource base, there is less attention to better management of the crop, with insignificant out-of-farm inputs use that leads to low yields.

3.1.4 *Potato Yields And Output*

Official yield data show that the average yield of potato in Uganda is 7.02 mt/ha (FAO, 2001). This is far below the 13.6 mt/ha average for Africa. Survey data from Kabale and Kisoro in 1997 shows that average yields from subsistence farmers was between 7 and 10 mt/ha. With adoption of improved varieties, average yields within Kabale have increased from 7 mt/ha in 1997 to 15.4 mt/ha in 2000. Among farmers that use improved cultural practices, average yields were above 25 mt/ha in 2000 and 2001. The low yields, therefore, among subsistence farmers are due to use of varieties with poor genetic background, low quality seed, improper cultural practices, insignificant soil fertility amendments and minimal disease and pest control. Estimated potato production in 2001 is indicated in Table 1 below.

Table 1: Estimated Ugandan Potato Production in 2001

District	Year - 2001	
	Hectares	Tonnage

District	Year - 2001	
	Hectares	Tonnage
Kapchorwa	2,500	27,500
Mbale	1,050	12,600
Sironko	700	5,250
Mubende	4,800	28,800
Masaka	200	1,300
Mbarara	10,710	77,112
Bushenyi	800	5,600
Kisoro	25,160	452,750
Kabale	33,750	615,375
Nebbi	725	7,910
Total	80,395	1,234,197

Source: National Potato Programme

3.1.5 Promotion Of Potato Production In Uganda

By 1940, potato was being grown in the highlands of Kigezi, Toro and slopes of Mt. Elgon in Bugisu and Sebei. In 1974, Uganda government introduced a new seed (variety) from Kenya to prop up production. By 1970, about 7,000 ha of land were being used for potato cultivation country-wide. Serious potato breeding work in Uganda did not start until 1966. Nevertheless, between 1969 and 1970, seed potato was being imported from Kenya to boost production. Between 1976 and 1986, there was a slow down in potato research and development. Production dropped to an all time low. Between 1990 and 2000 there has been an improvement as a result of manpower development in the potato programme, release of new varieties and cleaning old ones, expansion of seed storage space at Kalengyere Research Station and improvement of road infrastructure. There have been hitches, which include expensive agro-inputs, lack of credit facilities for farmers and unstable funding of the potato research programme.

3.1.6 The Potato Production Profile In Kapchorwa And Mbale

Table 1 indicates that about 3.25% of national potato production comes from Kapchworwa and Mbale districts, while Kabale produces about 50% of national potato production. As such in Kabale this is reflected in its ranking among farmers as the crop that brings in the highest amount of income to the majority of farming households.

3.1.7 Production Seasons And Patterns

There are two major seasons of production in upland areas; March – June and September – November. In Kabale, production in the swampy areas is undertaken during the dry season between June and August.

3.1.8 Varieties Grown

Because the majority of farmers save seed over from the previous season or buy potatoes from the local market, there are a number of variety mixtures in what is planted. By far the most popular improved variety is Victoria, which is red skinned, an attribute preferred among consumers.

3.1.9 Potato Yields

Yields being realised by farmers range from about 10 –25 tons per hectare (4-10 tons per acre).

3.1.10 Investment In Research

Through the breeding effort undertaken in collaboration with the International Potato Centre, six varieties have been released since 1991. However, few are available to farmers because many are not in the micro-propagation scheme. Therefore, clean planting

materials for most of the varieties are needed. What is received from CIP-SSA (International Potato Centre) comes irregularly and is often insufficient. There is therefore need to develop local capacity for producing tissue culture mini-tubers. There are no laboratory facilities where the potato program operates. The screen house space available to the program is inadequate and needs to be expanded.

3.1.11 Infrastructure For Seed Potatoes

There has been improvement in the storage capacity of seed from less than 10 mt in 1990 to more than 100 mt in 2001 at the research program level. There has been a deliberate effort to involve farmers in seed potato production, storage and distribution. In Kabale and Kisoro districts, there are 25 seed potato stores belonging to individual members of Uganda National Seed Potato Producers Association and 112 community diffused light seed stores built under the auspices of Africare's Uganda Food Security Initiative (UFSI) project. This is, however, limited to two districts in Uganda. There is need to spread improved seed potato storage to other potato producing districts in the country.

Since 2002 AT Uganda has helped 20 individual multipliers to establish diffused light stores at the household level. No community level stores have been established yet.

3.2 Cost of production and profitability

3.2.1 Cost of Production

Average national costs of production/investment per hectare for major and potential food crops are summarized in Table 3 below. Costs are indicated by technology/production practices as applicable, but generalized for the country. In this analysis, "subsistence/traditional" refers to use of home-saved seeds/planting materials with poor crop husbandry practices, while "low input technology" refers to use of improved planting materials (usually purchased) and adherence to recommended crop husbandry practices (including spacing, plant population and timely field operations). "High input technology" encompasses all aspects of the low input technology plus the application of fertilizers and pest management.

Though the comparison has been generalized under the above three categories, analysis for some of the crops falls under only one or two categories.

Table 2: Cost of Production/Investment for Selected Crops

(Costs are given in Uganda Shillings per Hectare by Production Practices/Technology)

Crop	Subsistence/ Traditional	Low input technology	High input Technology
Passion	286,000	---	591,500
Banana	213,000	278,000	440,000
Maize	194,000	299,750	431,000
Finger millet	303,750	---	---
Sorghum	290,100	---	---
Wheat	273,000	---	473,500
Beans	146,750	296,500	366,750
Groundnuts	319,250	455,750	539,000
Sunflower	186,850	---	317,500
Sweet potatoes	305,250	---	533,500
Irish potatoes	386,000	---	860,500

Source: Agricultural Policy Secretariat, IDEA project, field interview

From the above table, it may be noted that adopting improved technology/crop husbandry practices results in increased investment costs. Some of the costs arising from the adoption of improved technologies are more than twice the costs using traditional farming methods. It is therefore worth pointing out that in encouraging farmers to adopt improved technologies, the aspect of increased cost of investment should be well articulated. It is indeed argued that farmers are not well advised on the benefits resulting from increased investment costs.

3.2.2 Measures of Profitability:

Though farmers are usually interested in cash income accruing from sales of crop, it is important to analyze crop profitability from two points; viz output:input ratio and net profits. The output:input ratio shows the relationship between the unit price received by the farmer and the unit cost of production. A ratio of more than 1.00 shows an enterprise is profitable. An enterprise with a higher ratio than the other is said to be more profitable.

Net profits on the other hand refer to the difference between the gross income (including valuation of crop consumed by the household) and the total cost (including valuation of family labour). If the difference is positive, an enterprise is said to be profitable.

Table 3 shows output:input ratios and net profits for nine staple crops. From the table, it may be observed that the adoption of improved technologies greatly improves enterprise profitability.

Table 3: Enterprise Profitability for Selected Crops
(Net Profits are in Uganda Shillings per Hectare)

Crop	Subsistence/ Traditional		Low input technology		High input Technology	
	Ouput: input ratio	Net Profit	Ouput/ input ratio	Net Profit	Ouput: input ratio	Net Profit
Passion fruit	2.62	464,000	---	---	3.49	1,471,000
Banana	1.41	87,000	1.80	222,000	2.05	460,000
Maize	0.97	-6,500	1.25	75,250	1.31	131,500
Finger millet	2.14	346,250	---	---	---	---
Sorghum	1.60	174,900	---	---	---	---
Wheat	1.32	87,000	---	---	1.58	276,500
Beans	1.07	10,750	1.12	36,000	1.19	70,750
Groundnuts (shelled)	1.25	80,750	1.40	184,250	1.48	261,000
Sunflower	1.12	23,150	---	---	1.26	82,500
Sweet potatoes	1.31	94,750	---	---	1.80	426,500
Irish potatoes	1.17	64,000	---	---	1.45	389,500
Seed potatoes - Irish	1.5	328,960	-	-	3.1	4,005,000

Source: Agricultural Policy Secretariat, IDEA project and field interview

It is, however, worth noting that profitability will generally be affected by several other exogenous factors. These include location factors on input and output costs, yield potentials, labour cost variations, etc. Although it is clear that changes in commodity prices, costs and availability of inputs may have a direct impact on profitability; improved production technology will still show higher profitability than subsistence/traditional technology.

Of interest to note is that although some enterprises show negative returns, farmers still produce them. Farmers rarely value their own labour and are more interested in gross output than their own labour contribution. On the other hand, profitability of some commodities can be artificially high. This is due to the very high prices that farmers may

receive at a given period in time. For this reason, a more realistic profitability assessment is usually based on most probable long-term prices.

The above analysis shows that farmers who are producing at subsistence level are more prone to price changes. In general such producers are inefficient and require a high price in order to be profitable. A low price in a given season would therefore discourage such farmers from growing a given crop the following season. Consequently output would decrease and price would substantially increase. Farmers would then react by planting more of the given crop and as a result, the price would fall. This cycle (i.e. "farmers chase prices") is one of the major reasons why Uganda as a country has for a long time been considered an unreliable supplier.

At the production level therefore, issues that require attention revolve around the following:

- Increasing farm level efficiency and competitiveness
- Reducing post-harvest losses
- Improving quality
- Transforming subsistence producers into commercial farmers
- Provision of linkages through private-sector driven input and financial networks.

3.3 The Supply Chain

3.3.1 Overview of Crop Marketing in Uganda

Since the advent of liberalization, the marketing of agricultural produce in general and crops in particular is largely done individually by the farmers and mostly during the peak harvest seasons. Over supply in a given season causes the price to fall because the farmers and traders have limited storage. Besides, the traders cannot wait because the costs involved (such as lodging and meals plus waiting time) are quite high. The lack of collective marketing initiatives and storage facilities as well as viable market outlets contributes to a glut immediately after the harvest.

The main sources of market information on price and markets include friends, fellow farmers, local leaders and occasionally the radios. The chain between producers and consumers is long with minimal value addition ensured. In the case of grains, most of the smaller traders sell to urban traders/millers (who then sell to schools, hospitals and other institutions) and also to the larger urban buyers. The large produce buyers, mainly based in Kampala, in turn sell to the urban population and sometimes export to neighbouring countries such as Kenya and Rwanda.

In Uganda, the food markets can be characterized as being thin and volatile in terms of prices and trading volumes as well as the little liquidity. This absence of large well-developed marketing system explains the inadequacy of viable market outlets, high costs of transaction as well as minimal value addition. Besides, poor access to markets in terms of long distances, limited information flows and inadequate transportation means constrain efficient market exchanges.

Several studies have shown that mobilising large volumes of produce was still a problem due to the following reasons:

- Failure by farmers to know what was required by the market as a result of the missing link between the buyer, extension worker and the farmer.
- Production at subsistence level, with farmers scattered in rural villages and without common storage facilities.
- Farmers were not organized, lacked leadership and therefore could not pool produce together for price negotiation and selling in bulk.

- Buyers lacked finance to procure big volumes even if there was a readily available market.
- Poor post-harvest practices and poor storage facilities that lead to high crop losses (25-40%) and overall poor crop quality.
- Equipment and machinery for processing (like dryers, hullers, pre-cleaners that could process sizeable quantity of produce) are either lacking or quite expensive.
- Lack of affordable credit for crop finance, confusion and lack of knowledge on how to access whatever funds are available.

The marketing of agricultural produce takes place either on the farm, at the buyer's store, or in the rural market. Crop marketing in Uganda can be categorized into three main stages namely the primary, secondary and tertiary. The **primary stage** involves private rural traders, farmer groups, primary co-operative societies and grassroots NGOs as the main players. The **secondary stage** has district urban traders, wholesalers and processors, while the **tertiary stage** includes large-scale urban traders and exporters (Figure 1).

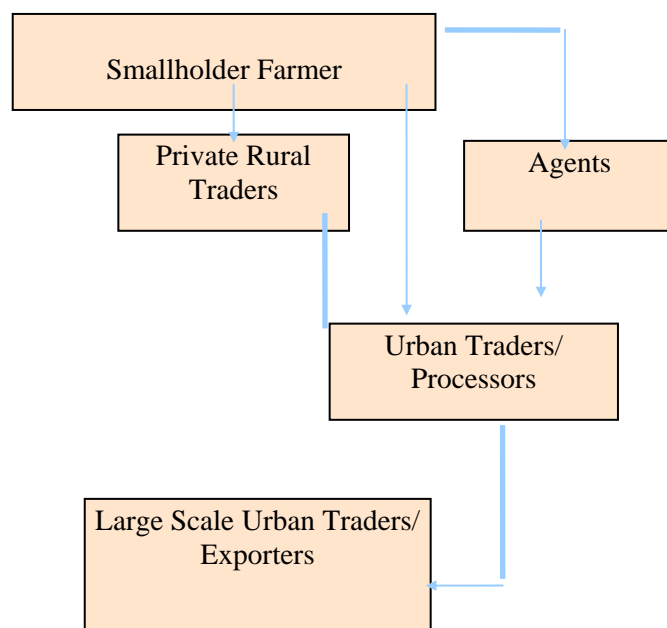


Figure 1: Crop Marketing under a Liberalised Marketing System

Marketing structure: The supply chain starts with the producers (referred to as farmers) and ends with the consumers (usually urban dwellers, institutions, deficit producers, displaced persons, neighbouring countries, and even animals). Though the chain differs from country to country and even within countries, the potato supply chain can be generalized as diagrammatically presented in Figure 2. The key participants include the farmers (both small-scale/subsistence and medium-scale/commercial), rural traders/agents, urban traders, wholesalers and retailers, institutions, urban dwellers, and consumers in neighbouring/regional countries.

The primary stage of the supply chain consists of farmers, rural traders, rural agents and retailers, and the rural population. Given their proximity to the farmers and access to post-harvest facilities (including storage), this line of middlemen is often chosen by urban traders to act as their agents. These agents traverse villages on bicycles and pick-ups procuring potato at the farm gate, side road and rural markets. The main feature at this stage is that, while the number of agents in the villages during the peak harvest periods is relatively high, they collude and fix farm gate prices and use their market power to reduce the price, particularly to smallholder farmers with little to sell. Nonetheless, the smallholder farmers

generally perceive this channel as the most reliable for disposing of their crop. Smallholder farmers attribute this to a lack of mutual trust that generally precludes bulking and collective marketing.

The secondary stage of the supply chain encompasses urban traders based in major trading centres and at district headquarters. The number of traders/dealers reduces as one move up from the sub-county to the district level. This is attributed to the large capital requirement for district-based trading. The main activity of the urban traders is to assemble the commodity in rented or own stores, ready for selling to large-scale traders, institutions and processors.

The tertiary stage of the supply chain consists of large-scale traders based mainly in cities. The number of large-scale traders is relatively small due to high working capital and storage requirements. These large-scale traders usually work directly with urban traders who often act as their agents. They normally also supply to national institutions, hotels and the urban population.

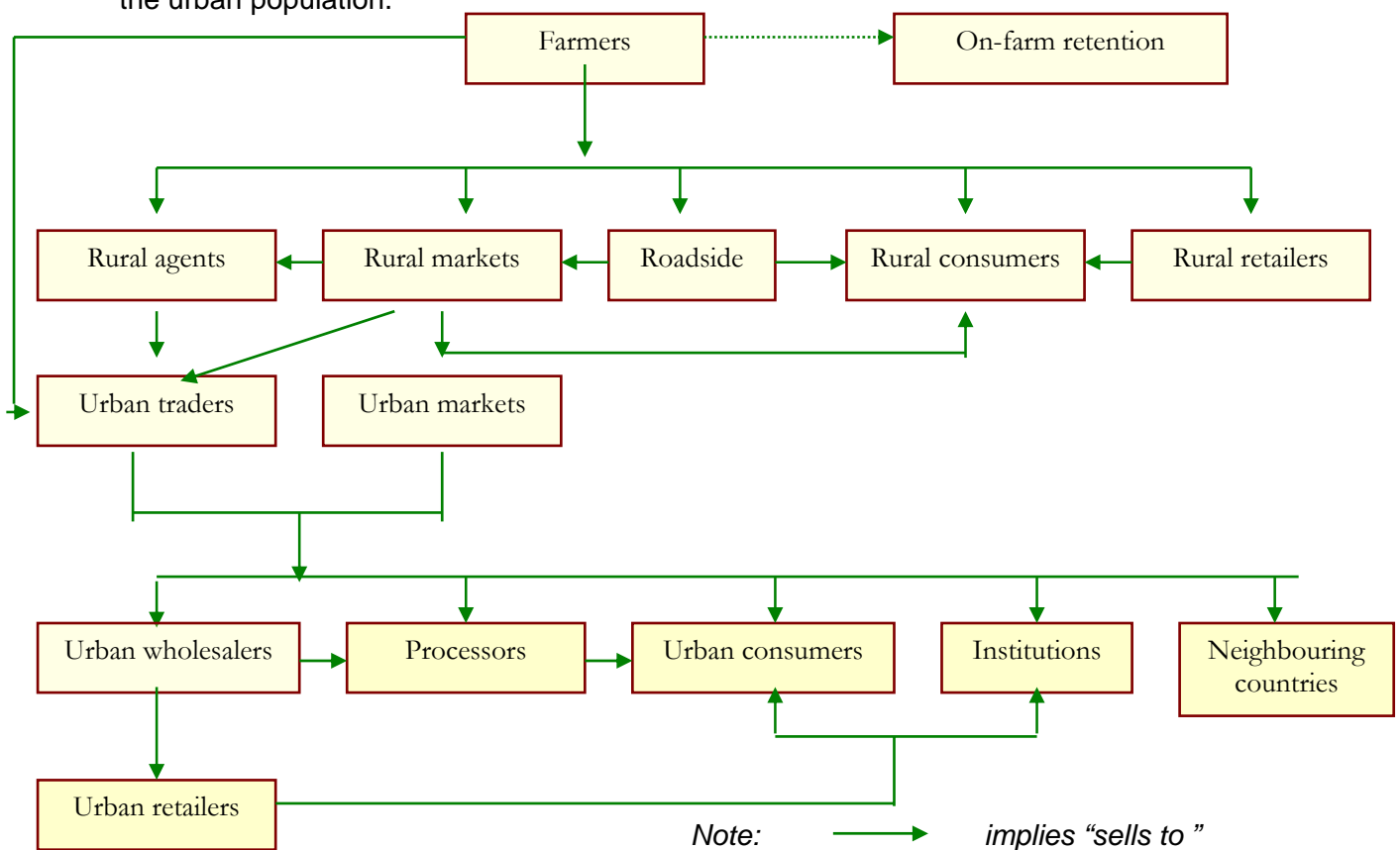


Figure 2: Potato Marketing Structure

Constrained by high product perishability and limited on-farm storage facilities, farmers do not usually harvest potatoes until they identify a buyer. Travelling traders/brokers also rarely buy from farmers before contacting their buyers in the capital city, Kampala. This caution aims to reduce post-harvest losses that are associated with fresh produce. A sizeable portion of output is consumed by the household from their own production and by purchasing from neighbours and village markets. In most cases it is the farmer who harvests the potatoes while village trader/broker provides the packing bags and does the sorting and packing. Most often, produce is sold at farm-gate on a cash basis. Farmers also sell their potatoes by the roadside, take them to the weekly village markets or sell them to a village retailer.

One major factor in the marketing of potato as a perishable, bulky crop appears to be the power of the urban broker. The final consumer market is rarely in a position to purchase a full lorry load of potatoes at one time due to the fear of spoilage. Even the largest fast food chains and supermarkets purchase less than 10 tons a week. This means that a trader taking a fully lorry load of potatoes has to sell off his load to a number of buyers. The job of the broker is to consolidate information, linking a large number of relatively larger consumers (wholesalers, retailers, institutions, restaurants etc.) to a single trader so that a fully shipment of potatoes can be disposed off quickly and the trader does not waste time and money waiting for the market. These brokers do not actually take ownership of the produce. They do not have any of their own storage capacity, nor do they use their own capital. They do, however, wield a significant market power and take a much larger margin than the traveling trader without bearing any of the risks. The largest potential for increasing the share of the marketing margin to the farmers, could potentially come from linking producers directly to urban wholesalers and processors, and eliminating the brokers cut of the margin.

Uganda is currently not able to profitably supply the Kenyan markets as most potato trading is done in Nairobi and transport costs would make this prohibitive. Uganda has limited trade with Rwanda and this is unlikely to increase. Uganda has no links with markets in Tanzania, although there are possibilities to supply Mwanza via Lake Transport. Links to DRC and Sudan have not been explored

Transport To Markets

Transportation of ware potato to markets is not a serious problem as most road networks have been rehabilitated since 1990. The quantity of potato being produced has increased over the years with the downside being that prices can fall drastically in some seasons after harvest. The marketing of potatoes is not controlled and because there is no large scale processing of the crop, large quantities of the crop have to be disposed off in a short period of time leading to low prices which can be a disincentive to farmers.

3.4 Swot Analysis Of The Supply Chain

This section presents a SWOT analysis of the potato supply chain with focus on Kapchorwa and Mbale districts. The analysis is presented under strengths, weaknesses, opportunities and threats as follows:

3.4.1 Strengths

- It is a food security and income generation crop for the farming households in Kapchorwa and Mbale.
- Kapchorwa and Mbale districts produce about 3.25% of Uganda's potato output, but this share has been growing in recent years
- Potatoes are a crop whose customer base is increasing in the country, especially with growth of the fast foods industry.
- It is a crop that responds well to both good management and application of production enhancing inputs such as fertilisers.
- Seed potatoes can be stored for at least 3 months in Kapchorwa and Mbale.
- There is already a seed storage infrastructure in the district with farmers, which can be built on.

3.4.2 Weaknesses

- The crop is being grown in an ecological environment of rapidly declining soil fertility due heavy erosion on the hilly terrain of Kapchorwa and Mbale.

- Due to severe land pressure, there is little opportunity to rest fields, a factor that has exacerbated the bacterial wilt disease problem in the crop.
- The altitude at which the crop is grown, which is lower than in Kabale, predisposes it to late blight, which necessitates expensive sprays with fungicides.
- The potato is a bulky crop, which makes it transport a major cost item in marketing.
- Kapchorwa and Mbale are located in the far eastern part of the country, far from its main market Kampala. Thus, the Kapchorwa and Mbale crop is at a disadvantage in the Kampala market compared to product produced nearer the city (for example in Mbarara).
- The crop, particularly the ware potato rots easily and rapidly loses weight in a few weeks if not days if not well handled.
- Good storage of the seed potato requires specially built structures.
- There is little credit being accessed by potato farmers. This has limited their production. The lack of credit also places extreme pressure on farmers when there are seasonal cash needs, like school fees requirements. Pressure for school fees often leads farmers to sell of their potatoes early in the season when prices are lowest and the potatoes themselves have not yet been properly hardened after dehauling, and hence spoil easily,
- There is a poorly developed inputs supply system in the district. Unlike maize seed, which is widely available, agricultural chemicals associated with potato production are only available in Kapchorwa or Mbale town and are sometimes adulterated.
- Farmers have little recent history of willingly marketing together. It means efforts geared at group marketing will start slowly and deliberately.
- The past failure of cooperatives disappointed and discouraged farmers in collective marketing.

3.4.3 *Opportunities*

- A great opportunity exists to work with farmers in increasing seed and ware potato productivity, lower per unit costs of production and increase incomes to farmers.
- The decentralised local government structure, allows them to set their own agricultural development priorities. Kapchorwa District has selected Irish as a priority crop for development under the National Agricultural Advisory Services (NAADS).
- The starting point of any potato crop development is clean seed. The potato seed multiplication program of AT Uganda for farmer groups in Eastern Uganda has made significant progress in enhancing the availability of clean seed of improved varieties.
- Both central and local governments are encouraging any initiatives that go some way in modernising agriculture and increasing farmers' incomes. AT Uganda is one of them.
-

3.4.4 *Threats*

- The problem of bacterial wilt and viruses in the crop could become worse if strict monitoring of seed health is not maintained.

- Cost of transport could rise sharply in the future, significantly raising the cost of Irish potatoes to consumers.
- Yields could continue going down due to land pressure and erosion.
- There could be an overproduction of the ware potato, causing a crash in prices. Any severe crash in prices is a disincentive to both ware potato production and procurement of seed potatoes.

3.5 Factors Affecting The Performance Of The Potato Sub-Sector

The key factors that affect the overall performance of the crop sub-sector in general and the potato sub-sector in particular are highlighted under several sub-sections as follows:

3.5.1 Major Constraints And Opportunities For Improvement

The major constraints to potato production and utilization in Uganda are high cost of seed, poor pest and disease management, inadequate extension service, low-level of district records and analysis for the crop and lack of adequate research facilities in the potato program.

3.5.2 Seed Potato

There is no formal seed potato production system in Uganda. The seed certification laws do not apply to root crops. Before 1996 there is no documented information indicating farm-level seed production. The common practice was to save planting material from successive ware potato crops. The principal source of seed was the potato program (NARO). A farmers' association, Uganda National Seed Potato Producers' Association (UNSPPA) has been producing more than 80 Mt of seed potato per year for sale to other farmers since 1996 (Table 4). It is important to note that, UNSPPA formed in 1996, is making a considerable contribution to potato seed production and distribution in Uganda. The approach by UNSPPA is a highly informal seed production system but strongly supported with technical backstopping from NARO and CIP. The expansion of a UNSPPA type system to Kapchorwa by AT Uganda has significantly boosted potato production while at the same time introducing improved varieties preferred by the market. The whole objective is to supply quality seed to farmers under a private sector arrangement.

Data from a community-based seed potato production system supported by Africare, an American NGO, in Kabale district, show that they began with 67.7 Mt in the first season of 1998 and by the first season of 2000 output was at 104 mt (Table 4).

Table 4: Seed potato production (Mt) by Uganda National Seed Potato Producers' Association (UNSPPA) and Africare, Food Security Initiative Project (UFSI): (1996-2000).

Year	UNSPPA			Africare (UFSI)			Grand total
	A	B	Total	A	B	Total	
1996	-	60.5	60.5	-	-		60.5
1997	38.5	43.3	81.8	-	-		81.8
1998	49.7	76.2	125.9	25.2	42.5	67.7	193.6
1999	56.6	78.9	135.5	46.1	47.1	93.2	228.7
2000	48.1	62.8	110.9	50.0	54.3	104.3	215.2

The quantity of seed produced annually is far below the estimated total requirement for potato production in Uganda. A hectare requires 2.5 Mt (1 Mt per acre) of seed, to plant

64,000 ha in 2000, one would need 160,000 Mt of seed. In an informal seed setting, there is no requirement for 100% use of certified seed because farmers recycle or use home-saved seed. In 2000, only 0.1% of the area was planted with healthy seed. The seed potato industry is therefore largely unexploited, which calls for mechanisms that could provide affordable but quality seed potato to a wider spectrum of farmers.

Available quality seed potato is obtained from the potato program, which supplies basic seed for re-multiplication to UNSPPA, Africare (UFSI) project and, since 2002, to AT Uganda. Data for the year 2000 show that the two organisations in Kabale produced only 0.13% of the seed requirement for 64,000 ha estimated to be produced in Uganda. The implication is that the rest of the seed was from home-saved material, local markets and neighbours. The current source of improved seed potato is Kabale in South-western Uganda. Therefore such seed becomes very expensive for farmers in the east and northwest of the country due to high transportation costs. There was therefore a need to develop a similar seed system for Eastern Uganda so that farmers could travel shorter distances to get seed. Production cost data for UNSPPA in the second season of 2000 indicate that seed purchases took 54% of the cost in seed production enterprise. With the high costs of transport, seed was even more prohibitively expensive in Kapchorwa.

The seed potato production system is evolving and needs to be organised and expanded. To expand this system, the production capacity of the potato program to supply basic seed has to be improved. AT Uganda has to test all of the foundation seed coming out of Kalyengire because even the research station has significant problems with bacterial wilt infection. Expanded foundation seed production capacity could be possible by establishing a micro-propagation facility or a tissue culture laboratory in the eastern highlands in an effort to produce large quantities of quality seed with as few clonal generations as possible in order to limit the disease load before seed reaches the ware potato producers. Currently, small quantities of tissue culture mini-tubers are received from CIP-SSA but rather irregularly to match with the two seasons in Uganda. This partly leads to low seed production often in the first season. Therefore, to solve the poor seed status problem, two issues need to be addressed. The private sector or farmer-based seed system needs to be further strengthened and the capacity of the potato programme to carry out micro-propagation should be enhanced. This is likely to reduce the cost of both seed and ware potatoes.

3.5.3 Poor Disease And Pest Management Strategies

In Uganda, late blight and bacterial wilt are serious potato production constraints. Late blight is especially serious in regions that are between 1700 and 2500 m above sea level. Most farmers do not understand the disease, rarely carry out preventive measures and they harvest whatever nature gives them. In regions where the farmers are aware, fungicides and spray equipment are scarce and expensive. When they are available, the chemicals are occasionally adulterated or they are not appropriately used. There is a general lack of awareness especially where the crop is newly introduced.

Bacterial wilt is another disease that is wide spread and like late blight, there was little awareness regarding its management especially in regions where the crop is relatively new. Because Bacterial wilt is both seed and soil borne, it makes production of clean potato seed a matter of utmost priority in order to avoid soil contamination that could destroy the sector.

In mid-altitude and low land areas, viruses, aphids, cutworms, leafhoppers and mites can be serious potato production constraints. Among these, the effects of potato disease can be mitigated by provision of healthy planting material together with farmer sensitisation and improved extension service. Insect pest control is possible through farmer training on

potato production technology, which is currently missing in most potato producing districts in Uganda.

3.5.4 Inadequate Extension Research Linkage

The extension service in Uganda is inadequate and most potato production technologies remain unutilised despite their availability. There is therefore need for networking between potato research and extension service of the districts where potato is an important crop. However, this requires initial induction of the personnel at the districts that will help farmers to grow potatoes much better. A lot of extension work is needed. This is one of the reasons why the National Agricultural Advisor Services has identified potatoes as a District wide promoter crop for Kapchorwa. The NAADS private service provider is working closely with AT Uganda to learn from their experience in small seed plot promotion. Joint demonstration training plots are being planned, and NAADS is getting its seed for distribution from the AT Uganda multipliers.

3.5.5 Low-Level Of Product Development

Virtually all the potato produced in Uganda is consumed fresh. Processing is limited to preparation of French fries in fast food restaurants that have recently developed in Uganda. Potato crisps are occasionally encountered in super markets. In times of high production, price cannot be controlled by produce withholding. Currently there are no studies on potato product development and this need to be initiated to prolong the shelf life of the potato and remove excess produce in the fresh potato market. A proposal to conduct a Participatory Market Chain Assessment of the potato sector is under consideration by PRAPACE. If funded this would provide an opportunity to bring the key players in the potato sector together to investigate such value added opportunities for the market chain actors, eventually opening up wider market opportunities for farmers.

3.6 Factors Influencing Potato Output In Kapchorwa

The wide range in yields is a result of several factors, which include the following;

- **Use of unclean seed:** The need for clean seed is widely disregarded, yet the current use of unclean seed obtained from the market or left over from a previous crop is one of main channels of perpetuating and spreading viruses and the bacterial blight in the potato crop.
- **High cost of clean seed:** Between 10-12 bags are needed to plant an acre, therefore at a minimum cost of Sh.40,000 per bag of 80kg, almost Sh.500,000 is required on potato seed alone. Estimates put the cost of seed at about 53% of total production costs.
- **Bacterial wilt:** This is a big constraint to higher potato production in Kapchorwa. There is limited awareness or inability to control it as most measures include use of clean seed material, and fallowing of affected fields for at least 2 seasons. This is very difficult for many farmers who are already facing land pressure for production.
- **Late blight:** Late blight is particularly prevalent at the areas between 1700 to 2500 metres above sea level. Control measures consist of using appropriate fungicidal sprays, preferably contact and systemics. These are expensive, with widespread complaints of adulteration.
- **Virus:** The potato mosaic virus can be severe during dry spells and requires some sprays against its vector, the aphids with dimethoate insecticide. Most farmers however, are either not aware or cannot afford to purchase appropriate chemicals, and therefore leave it unchecked.
- **Poor crop management practices:** There is a general neglect of some basic production management practices, which include timely land preparation and planting to enable a growing crop to utilize all the rain that is available in the season. Others include appropriate spacing, ridging and dehauling (cutting off of

- the vegetative matter after 90 days of growth, allowing 2 weeks for the potatoes to harden).
- **Low fertility levels:** Soil fertility levels have been on a sharp decline, a result of rapid erosion in the district's hilly terrain. Neglect of terrace maintenance and depletion of forest cover has accelerated this process.
 - **High cost of soil amendment inputs:** Inorganic fertilisers, which are the most handy soil amendment inputs are quite expensive, with costs at about Sh.50,000 per 50 kg bag. Considering that farmers may need between 4-5 bags an acre, the total cost becomes quite prohibitive.
 - **Lack of credit:** There are limited avenues for farmers to obtain production credit, even if they knew what to do. This clearly limits their output and income.

This was the reason that AT Uganda undertook the potato multiplication project in 2002. Since that time, more than 1,400 farmers have been supplied with disease free potato seed and taught how to multiply that seed for their own ware potato production. Ongoing demonstrations and extension training emphasizes improved production practices, disease control, and analysis of the returns to improved soil fertility. The results of the 2004 impact study indicated that 91% of beneficiaries are now uprooting Bacterial Wilt, 46% were using chemical disease control for blight and aphids, and 52% were doing two earthings up. Fertilizer use, however, is still low at just 14%.

3.7 Critical Assessment of the operating Environment

A critical assessment of the business environment in which Ugandan crop sub-sector supply chains operate shows the following strengths, weaknesses, opportunities and threats:

- ❖ Two rainfall regimes in most parts that allow for two crops a year
- ❖ Emergence of commercial farmers and groups that promote rural marketing
- ❖ Increased private involvement at all levels of the potato supply chain

On the other hand, however, the supply chain is still prone to inefficiencies and faces a number of bottlenecks. The key areas of disadvantages in the supply chain which AT Uganda is trying to address include the following:

- ❖ Volatile prices amidst high transaction costs due to very many participants within the supply chain
- ❖ Bulking and consolidation of surpluses is constrained by scattered small scale farmers and inadequacy of storage facilities
- ❖ Poor storage facilities have undermined faster bulking and consolidation of surplus in the supply chain
- ❖ Unreliable supplies coupled with absence of quality control standards, weights and measures as well as lack of premium prices has undermined crop quality improvements in the supply chain.
- ❖ Limited formal contractual arrangements amongst the participants within the supply chains
- ❖ Limited improvement in competitiveness due to value addition within the supply chain.
- ❖ Lack of reliable providers of third party services. This undermines the efficiency of the supply chain
- ❖ Lack of policy focus and strategic investments in the sub-sector have greatly compromised efficiency in the Ugandan food chains.

3.7.1 Changes in policies

Prior to Government's policy of decentralisation, the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) had a department that used to organise and direct the policy of potato production country-wide. Under this arrangement, potato production activities had a "desk" at the Ministry's headquarters that used to influence the potato activities throughout the country with district potato officers with a national co-ordinator. Districts now operate as individual units, setting their own agenda. Emphasis on potato production has changed according to individual districts priorities.

The Potato Research Program, whose activities are centred at Kalengyere Research Station, is now part of the newly established Kachwekano Agricultural Research and Development Centre (KARDC) found in Kabale district. Prior to these changes that were effective as of August 2001, the program was under Namulonge Agricultural and animal Research Institute.

3.7.2 Opportunities for Improving Competitiveness - Storage

Ware potatoes (potatoes for food) are not normally stored beyond 2 weeks, as rotting rapidly sets in. This is particularly the case with those planted in swampy areas, which need to be disposed off within about 3 days. Storage at homesteads is normally on the floor of farmers' houses. The most common practice is to first put down grass on the floor before placing on the potatoes.

Seed potatoes can however, be stored for as long as 3-4 months in Kapchorwa's high altitude environment.

3.7.3 Prospects Of Tapping The Potato Crop For Collective Marketing

Ware potatoes: Under normal circumstances, ware potatoes cannot be stored for collective marketing because of their limited shelf life, on average 2 weeks. Any period beyond this reduces their fresh appearance, which discourages customers. There is also an associated problem of weight loss as they are kept in storage, in addition to loss through a portion, which rots. Any increment in price within 2 weeks cannot compensate for loss incurred therein. Ware potatoes therefore, depreciate rather than appreciate in value. This then implies a very different strategy for collective marketing. Collective transportation and direct linkages to wholesale buyers in the major markets (thus bypassing the stranglehold of the transporters and brokers) will be critical to the project success. This implies coordination of the harvesting, sorting and bagging efforts of several farmers, so that quality potatoes can be loaded directly from the farm into the hired vehicle and transported to market with a minimum of delay. Market links to high end wholesalers will need to be built well in advance of the delivery period to minimize delays and transaction costs and break the exploitative power of the brokers.

Under the NRI marketing extension, AT Uganda will also make every effort to replicate the efforts of Africare in Kabale to construct simple ware potato storage facilities in the highland parts of Kapchorwa where cool temperatures can facilitate longer term storage of ware potatoes to stretch the marketing season into the higher priced shortage period.

Seed potatoes: Kabale is the major source of seed potatoes for the whole country and significant local expertise has been built up in the last few years through outreach efforts of the National Potato Programme and the Uganda National Seed Potato Producers Association (UNSPPA). As discussed before, expertise and capacity has also been built up in construction and establishment of appropriate seed potato stores in various parts of the district. The most popular variety, Victoria can be stored for 3-4 months before breaking its dormancy and sprouting. Kapchorwa can learn from this experience for efficiency.

AT Uganda has made significant progress in establishing a similar organization in Kapchorwa District. This was particularly important, because the cost of transporting planting seed potatoes all the way from Kabale to Kapchorwa is simply too prohibitive. Now it is the trained seed multipliers who obtain clean foundation seed from Kabale and who then multiply up the seed for onward sale or distribution to farmers in Kapchorwa. All of the multipliers have constructed their diffused light stores for seed potato storage and sprouting. Now that potato has been identified as a priority "promoter" crop for Kapchorwa District by the National Agricultural Advisory Services, the seed multipliers face a significant demand to supply the clean seed required by NAADS.

Market volume:

It is estimated that less than 0.2% of the potato area planted in the country (128 ha out of the national total area of about 64,000 ha) uses clean improved seed. This represents both a challenge and market opportunity for AT Uganda Ltd to exploit. AT Uganda Ltd aims to double this area by adding on a further 0.2% next season, representing seed material that is enough to plant 128 hectares or 320 acres. As 1 ton of seed is required to plant 1 acre, 320 tons (3,200 bags) of seed potato will have to be produced. Under good management, an average yield of 15 bags of seed potato for each bag of foundation potato seed can be realised, which implies that about 213 bags of foundation seed had to be procured from Kalyengyere or Kachwekano agricultural research development centres. This was done. The current 22 farmers who are members of the Kapchorwa Seed Potato Producers Association supported by AT Uganda each planted an acre of seed potato this season. Next season, enough clean seed potato to plant 88 acres will be distributed to new farmer groups being taught the small seed plot system of multiplication. The balance of the seed will be sold to farmers by the Association and the revenue used to finance continued procurement of foundation seed. Expansion will be dependant upon the Association's success and reputation built in providing clean improved potato seed to farmers, successful marketing efforts and the continued availability of basic or foundation seed from Kalyengyere or Kachwekano.

Development of an inputs supply network:

The collective marketing groups so formed should be linked to the existing project initiatives for improved input distribution. Marketing groups can either choose to become input stockists for their members, and join the Uganda National Agro-Input Dealers Association to gain access to the necessary skills and credit linkages, or alternatively they can simply place bulk orders with the nearest registered stockist for such key inputs such as fertilisers, fungicides and insecticides so as to supply their members with genuine products at competitive prices. Fortunately in Kapchorwa the existing network of private stockists in key potato producing areas is already quite strong and several of the UNADA members have already joined some of the marketing groups.

Support to marginalised groups:

Most women were in agreement that all able bodied members of households participated in the production activities and there was in general joint planning between husbands and wives in utilisation of receipts from sale of agricultural produce. Authority by husbands over proceeds seemed to extend even to crops that a wife could have invested her own time and resources. The fact that the project already has a strong reputation for making a deliberate effort to involve women particularly female heads of households in trainings and all other project initiatives is a distinct advantage. (Nearly 70% of the groundnut beneficiaries are women, as are about 52% of the potato beneficiaries.)

Other Enterprises

Overall, the opportunity exists for increased productivity and competitiveness of potatoes in addition to other crops and enterprises. What is required is the right blend of technical and supportive services (input supply, research on varieties, market knowledge information services, etc) in the project area.

3.7.4 Opportunities For Collective Marketing

Financing farmers

Farmers like to reap the rewards of seasonal price swings by trying to hold on to their crop until the lean season, when the price and potential for profit is highest. However, improper preservation or drying techniques, coupled with inadequate storage facilities forces farmers to let middlemen and traders make the gains. By storing crops in a reliable store, until the price increases while using the crops as collateral, farmers can access funds before they sell their crops. Application of partial payments is best done for producer groups rather than individuals.

Operation

Critical factors to its success include a good storage system and careful monitoring. Use of securely stored goods as loan collateral is important in collective marketing. This allows farmers to deposit their crops in a secure warehouse where, the farmer receives a receipt certifying the deposit of crops, of a particular quantity, quality and grade. The farmer can then use the receipt as a form of portable collateral to request for partial payments from the group. The store can be sealed, so that a farmer cannot access it until a predetermined date. If the crop is withdrawn, the farmer must pay the institution for the loan (principal plus interest) and the store/warehouse operator for storage charges. Alternatively, the farmer may use the warehouse as a channel for selling the crop, in which case the crop is released to the buyer, the loan and storage charges are deducted from the selling price, and any remaining profits are released to the farmer.

3.8 Advantages and Disadvantages

- **Profitability.** Collective marketing allows small-scale farmers to delay the sale of a crop, enabling them take advantage of large seasonal price swings for the crop while obtaining cash when the harvest begins.
- **Price transparency.** A side effect of the collective marketing system is that farmers' groups work together with the stores/warehouse operator to establish prices based on the crop's market value. This will empower farmers by providing them with up-to-date information on prices throughout the season. Farmers move away from being 'price takers' to being 'price setters'.

There are some drawbacks associated with farmers' collective marketing, which include the following;

- **Speculation.** It is basically a speculative activity on the sellers' part because the farmer tries to maximize profits by holding the produce until the price reaches its peak. Once the price peaks, the rush of additional inventories on the market causes the price to fall almost immediately. If many farmers are caught with large volumes at substantially lower prices, the net effect can be to substantially decrease overall profits.
- **Transport of the crop** to a store if located far can be an additional expense to the farmer. In rural areas, where trucks and fuel are expensive and difficult to obtain, transporting the crop to the next village or closest trading centre poses a major challenge.

To ensure a successful collective marketing program, the following will need to be incorporated in AT Uganda Ltd.'s strategy:

- Understand annual/seasonal price cycles and monitor market prices closely. .
- Identify buyers early so that the financial institution and farmers are aware of the buyers needs concerning quality and quantity when the season begins.
- Ensure that farmers are trained and equipped to handle the crop appropriately.
- Minimize risk by taking in stocks only over a specified period of time and within strict price guidelines.
- Control the quality of ware potatoes delivered
- Develop detailed sales agreements that include specifics on pricing, packaging, quality, point of delivery and contract duration.
- Institutionalise clear and transparent guidelines and operations
- Monitor government policies and action of government, financial institutions and other NGOs as they will have influence on its success.
- For perishable crops it is important to minimize excessive steps in the process - where possible coordinating harvest and bulking direct to truck, and transporting directly from farmer's fields to final market.

3.9 Conclusion And Recommendations

3.9.1 Summary Of Findings

The findings in this report have revealed a number of things regarding the food crop sub-sector in Uganda. The main findings, based on field assessment surveys carried out in selected districts and results of recent surveys carried out by several other institutions, revealed that:

- Irish potato production in Uganda and Kapchorwa in particular is essentially a smallholder enterprise, with limited use of agricultural inputs and improved technologies. Average area under the crop is typically less than 0.4 ha for the majority of the smallholders. Improved seeds were purchased by less than 1% of the smallholder farmers and even less applied fertilizers and agro-chemicals.
- Analysis of the various factors, which influence farmers' decisions to produce, showed that Uganda has the potential to increase production and productivity. With improved seed, advice from extension services and proper storage and processing facilities, the prospect of increasing productivity and production is real. The favourable climatic conditions , a rising domestic market and increased food security awareness should act as impetus to farmers for increased production.
- Profitability analysis showed that the use of improved technologies was quite profitable and competitive. The scope for improving farmers' production incentives generally depends to a large extent on increasing productivity and efficiency in processing and marketing. Analysis of technology/improved husbandry practices showed that with improved seed and husbandry practices, profitability of the enterprises can be significantly improved.
- At the production level, issues that require attention revolve around the need to increase farm level efficiency, reduce post-harvest losses, improve quality, and provide linkages through the private-sector and financial networks.

- Participants in the potato chains operate individually, with no formal linkages nurtured to enhance performance. The integration of production and marketing in the tobacco, sugarcane, tea and even vanilla sub-sectors in Uganda are good examples through which efficiency and competitiveness can be enhanced.
- Transactions are still dominated by spot markets, lack of trust and opportunism, with very few contracts or long-term business relationships. This situation breeds speculation and opportunism, leading to distortions and loss of interest on the part of the producers.

The strengths, weaknesses, opportunities and threats of the potato supply chains in relation to other competing chains shows that Kapchorwa's **strengths** lie in its ability to produce two crops, its cool climate that allows for storage of 3-4 months of the seed potato, and proximity to Mbale which is a major market. The major **weaknesses** in the chain includes scattered producers who lack collective action and therefore economies of scale, poor infrastructure, rapidly declining soil conditions and disease problems like bacterial wilt and bacterial blight. **Opportunities** for the supply chains exist in the form of growing district and national demand, , emergence of commercial farmers/groups, initiation of Farmers' collective marketing by AT Uganda Ltd., growing input distribution network and improved seed supply through organized local multipliers of clean seed. By and large, the greatest **threats** to the potato supply chains include the high costs of transportation, high transaction costs resulting from lack of transparency and market information, poor quality/lack of quality enforcement, opportunistic behaviour by brokers who hold power much in excess of their contribution to the market, and lack of strategic investments in processing and cold storage.

Translating the findings in this study into action would imply; reaching the producer with appropriate technology and inputs, ensuring farm level efficiency and adoption of technology, minimising post-harvest losses, linking the producer to a market and credit source, and ensuring re-investment with a view to moving the producer towards an efficient "commercial" farming operation. We believe that with some slight modification the cereal bank model developed by SACRED Africa in Western Kenya could be used to improve the marketing of this commodity in Eastern Uganda. The key will be collective bulking, sorting and grading to improve quality and support with transport to link up with high-end consumers especially the rapidly growing Kampala city.

3.9.2 Recommendations

Based on the study findings, observations, beneficiaries' perceptions, the following sets of recommendations are proposed:

- AT Uganda should place more emphasis on establishing demonstration centres and the use of adopters and commercial farmers.
- Input supply network should be encouraged and supported as much as possible, so that more farmers are reached with basic inputs such as clean potato seed and fertilizers.
- AT Uganda should consider mediating some kind of financial support to seed potato growers through the banking network in Mbale and Kapchorwa districts, or better yet, secure project revolving loan funds that can be accessed by the marketing groups.
- Continue to build modalities for cooperating with NARO to access clear foundation seed for further multiplication by KASPPA.
- Information flow (production and marketing) must be improved. In particular, farmers should be provided with regular information about the weather and potential markets for their products.

- There is a need for a continuous technical support to farmers. For instance, farmers need to be guided on how to cut down on cost and be kept abreast of any new technological developments (i.e new seed potato varieties, fertilizer recommendations etc). Ongoing links with NAADS will be critical for the sustainability of this.
- Promotion of farmer-group marketing initiatives to play a greater role in ware potato marketing in the face of an increasingly competitive environment.
- Establishment of basic infrastructure in collection and rural-based commodity marketing exchange centres should be developed and supported with a reliable communication network.
- On the basis of the current agricultural practices and their possible impact on the environment, it is proposed that AT Uganda Ltd. should, in its training program, continue to emphasize improved environmental practices.
- AT Uganda should follow through with current plants to build on initiatives undertaken by Africare in Kabale in establishing and expanding on seed and ware potato storage.
- Facilitating group marketing using marketing associations who are able to bulk, sort, grade and transport the commodity to high-end markets.

4 GROUNDNUT

4.1 Crop Production System

In the area visited for the purpose of this study, groundnut is a very important crop and ranks high among the crops grown. Kumi district ranks second in the whole country in terms of the percentage of households growing groundnut with the value of 60.1% (UBOS, 2002). This figure is even likely to have changed upwards following the introduction and promotion of the new high-yielding groundnut varieties by AT in the same district. According to Tino *et al.*, (2004) the crop ranked first in the cash crop priorities among the beneficiaries of the groundnut multiplication project in Kumi district in 2004. Groundnut is grown both as a food and cash crop. Its importance as a cash crop has even increased with the introduction of new varieties since farmers have been getting good prices selling groundnut for seed to farmers who couldn't access it. Groundnut is grown mostly in pure stands adjacent to other crops.

Most farmers have two crops in a year, the first and second season crop. The production calendar for the whole region is more or less similar with only slight differences between locations. Generally, the first crop is grown between March and April to be harvested in July to August while the second crop is planted between August and September to be harvested between November and December. The national production for the first season is about double that in second season, although regional production may differ, with some regions producing more in the first season and others producing more in the second season. The eastern region produces more than double of what is produced in the second season in the first season. The average total area of land cultivated per household is about 4 acres (Tino *et al.*, 2004) in this region. Of this the area planted to the new groundnut varieties ranges from .25 to 2 acres. The source of seed is mainly own seed saved from the previous crop, apart from for the new groundnut varieties whose seed is still rare. A few farmers who consume or sell all their produce from the previous season are also forced to purchase seed during planting. Land is prepared by hand hoes or by oxen while planting, weeding and harvesting is only by hand.

There seems to be abundant labour for these activities, which is paid for at about USh.1000 per day. Labour is also paid for in kind, especially harvesting which is paid with the produce being harvested. The most intensive groundnut production activity is

harvesting which may require up to 20 man-days to complete one acre. Once harvesting is done, drying is done in the field or in the homesteads. Groundnut is then stored unshelled and sold as need arises or as market is found.

In the region visited, the quantity consumed varies from place to place. However, two consumption patterns were observed. Firstly, where a farmer sets aside what is to be used for consumption, seed and what should go to the market. Secondly, where a farmer simply consumes and sells simultaneously as long as he has kept aside the portion for seed. It was observed that many farmers intend to separate as in the former, but end up consuming as in the latter case. In Malera sub-county of Kumi district for example, many farmers divide the produce into about equal quantities for consumption and for sale, while in Nyero sub-county, only a small amount is set aside for consumption with most of the produce being provided to the market.

The constraints encountered by farmers in the production of groundnuts include:

- 1) Lack of seed for improved varieties or expensive seed
- 2) Rapid release of new varieties by the national research station
- 3) Rosette disease for the local varieties
- 4) Heavy rainfall at harvest leads to rotting
- 5) Some varieties are prone to sprouting
- 6) Heavy rains during drying is a problem
- 7) Limited or lack of stores.
- 8) Purchase of gunny bags for storage is expensive
- 9) Damage by pest such as monkeys, dogs and birds

The farmers growing the improved varieties get much better returns compared to those growing the original red varieties. In spite of the somewhat better prices on the open market for the red varieties, the production is low - especially due to rosette disease. As a result, the final margins are better for the tan types. Below is a summary of the gross margin analysis for Serenut II (tan).

Table 5: Income Projection For Groundnut

Item	Unit price	Total cost
Inputs		
Land Rental (1 Acre)	25,000	25,000
Seeds 8 basins in shell) serenut 2	8,000	64,000
Bags 16	600	9600
Labour		
Ploughing 1st	15,000	15000
Ploughing 2nd	10,000	10,000
Planting	25,000	25,000
Weeding 1st	30,000	30,000
Weeding 2nd	25,000	25,000
Fertilizer application (optional)		
Spraying		
Harvesting	30,000	30,000
Plucking		26,500
Transport home		16,000
Drying		15000

Item	Unit price	Total cost
Cleaning		5000
Bagging		3200
Total costs		284,300
Revenue Return		
Yield 1 acre = 16 bags (40kg each))		
Farm-gate price per bag =U Shs. 30,000		
Gross Revenue		480,000
Net Margin		195,700

Source: AT Uganda

4.2 Groundnut Utilization

The utilization of groundnut in Uganda is very wide with slight variations according to region and individual preference. The most important products as far as consumption is concerned are the ground powder and paste. The two are produced either by pounding the nuts in a mortar as in homesteads or by a manual or motorised grinder as done by processors. There is also the consumption of roasted nuts as snacks, which although common does not consume as large a quantity as that used in cooking. The processors manufacture peanut butter and other groundnut products. In the eastern region, groundnut skin is removed before pounding or grinding while in the western and most urban centres the skins are not removed. This has a direct bearing on which varieties of groundnut will be preferred in the different places. Only the region that removes the skin before processing prefers the tan coloured varieties since to them the skin colour is irrelevant. The other regions will insist on having the red-seeded varieties.



Figure 3: Some uses of groundnut in Uganda: (a) Groundnut pastes and powder (b) Roasted nuts with Bajia (c) Peanut butter (d) Some recipes made from nuts and other products (e) Roasted nuts with crisps

4.3 The Market Organization

Farmers in the Eastern region find marketing of their produce to be the most difficult challenge they meet in the production of groundnut. How is this market currently organised? According the market description from most of the farmers interviewed, the market chain presented in the scheme below may represent the organization of the market.

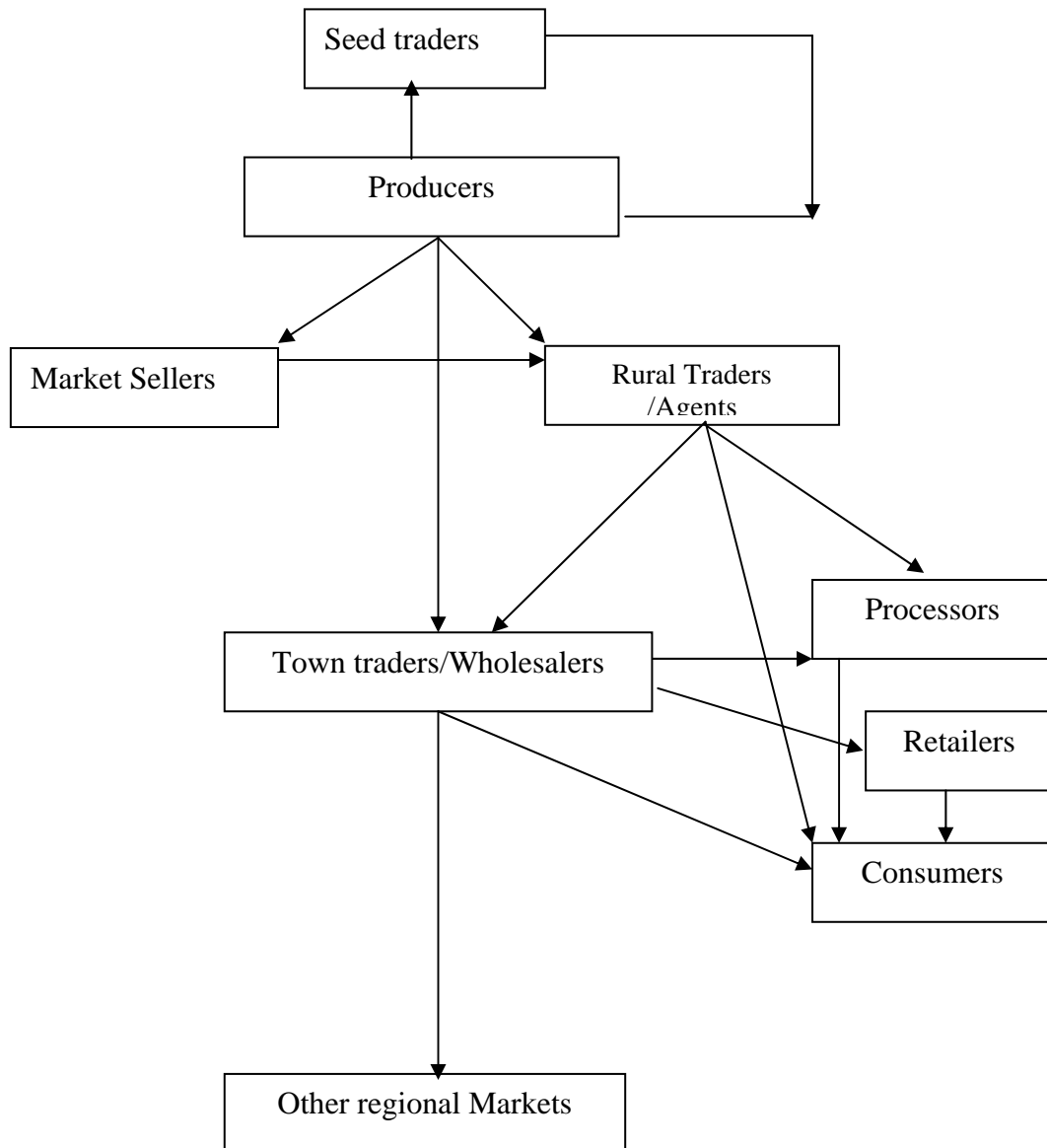
4.4 Description Of The Market Chain

4.4.1 Producers

These are the farmers that produce the crop. They normally have variable amounts of produce, large quantities at harvest and small to nil towards the harvest period. Information obtained shows that farmers sell their produce to local market traders, to rural traders, town traders and consumers. In most cases, farmers never know the final destination for their produce.

The major factor that influences the farmer's decision to sell his/her produce is immediate need. Most farmers confess that they sell their produce because they have cash needs that must be attended to immediately.

Figure 4: Groundnut Market Chain



4.4.2 Agents

The sale to rural traders and town traders is sometimes through agents, who play the following roles:

- buy the produce from the farmers on their farms
- inform the buyers of the availability and location of the produce
- inform farmers of the availability of buying points at specific locations and times
- buy the produce for agencies, NGOs and private firms.

The agents hence serve to link farmers to the buyers who are not known in the villages or who do not know the villages. The agents are not necessarily brokers due to the fact that they act on the instructions of the buyers and even where they buy on their (buyers) behalf, they offer prices set by the buyers and utilize the buyers' capital. Some of the agents are actually farmers or belong to the farming community.

4.4.3 Market Sellers

The market sellers normally operate at the rural markets. They buy the produce from farmers and sell it to consumers at the market. Occasionally, they source for the produce from other markets or from the farmers' farm. Most of them seem to have operated for a relatively long period so they are well known by the farmers who bring their produce to them especially on market days. The market sellers operate throughout the year and their prices change with the supply. Some market sellers shell whatever they buy and sell as shelled groundnuts. Normally they deal with small volumes like 1-2 bags per market day. They do not have stores and sell their produce in the open-air markets. They have a very limited source of market information especially for situations in distant markets. Their adjustment of prices depends on the local demand, number of competitors and the amounts being delivered to them by the farmers.



Figure 6: A rural trader sells groundnuts at a rural market

4.4.4 Rural Traders

The rural traders normally buy their produce from the farmers, they either collect it from the farm, or it is brought to them by the farmers. They normally have stores which open as buying centres for groundnut. Some rural traders operate only as long as there are large quantities of the produce with the farmers. When the amounts reduce, the rural traders may decide to engage in a different activity. One rural trader interviewed said that he only operates for four months in a year, i.e. July to December when there are large quantities. When the rural traders purchase the produce from the villages either themselves or through their agents, they normally do not charge the farmers transportation costs but count them as their own. Rural traders deliver their produce to urban traders or wholesalers. They normally shell their produce before delivering to urban traders using machine shellers. They may also shell other farmers produce at a fee. Their source of market information is limited normally just to the few urban traders they deal with.

Figure 7: Some of the groundnut shellers used by traders to shell groundnut before selling it to town traders and wholesales; (a) Manual (b) motorised.



This category of traders is located in major towns. They can be found in all large towns such as Mbale, Jinja and Kampala. Their source of produce is normally the rural traders who sell to them what they have bought in the local markets. Two market arrangements exist with the rural traders; the rural traders may deliver their produce for which they will be paid, or the urban traders may send agents to purchase and deliver the produce to them. Either way, the cost of transport is normally met by whoever is responsible for the transportation of the produce to the destination market. Urban traders deal almost exclusively in shelled groundnuts. Some urban traders are also retailers and processors. Otherwise they normally sell large quantities to other traders in other towns, to retailers and to processors. Urban traders and wholesalers deal in large volumes of groundnuts. They have an elaborate network in towns throughout the country and share market information enabling them to adjust prices according to both local and distant demand. They do sometimes also have unofficial associations that assume the marketing regulatory role, including setting prices and ensuring that they are adhered to.

4.4.5 Processors

Currently, no large-scale processors for groundnut exist. Processing is mainly done by town traders and wholesalers as a means of adding value to their produce before selling. The traders process the nuts into pastes and powder using both manual and motorized grinders. The processed products are normally sold at the point of processing which are normally at market places. It is important to note that the processed products are normally expensive and only ideal for busy town dwellers but not for the villagers who can produce their own. Hence the market for processed products is minimal in the rural areas and processing and value addition are not a priority. Less than 10% of the producers actually added value by shelling, making powder, or paste (Tino *et al.*, 2004).

4.4.6 Retailers

Normally purchase their produce from wholesalers. They sell properly sorted groundnuts to consumers. They will normally weigh the produce and package it into packs of ½ kg -5kg. Their prices are normally the highest in the whole chain among unprocessed products. Retailers have limited or no market information apart from the prevailing prices at their own respective markets.

4.4.7 Consumers

Normally buy from retailers already sorted and cleaned produce. They only deal with prices offered by the retailers. They have a wide choice of retailers to pick from. They may purchase either processed or unprocessed produce depending on their needs.

4.4.8 Seed Dealers

Seed dealers are a special category of players in the groundnut market chain because they do not deal with products for food. They may be seed companies or individuals who purchase good quality produce from selected farmers and sell it as seed. Their produce is supposed to come from selected farmers whose farms were monitored during the growth period, but some simply buy from farmers as long as they are satisfied that it is a pure variety. Seed dealers normally offer very high prices compared to the normal produce price. They will normally buy it in-shell and do hand-shelling to avoid mechanical damage and preserve higher germination rates.

4.5 Groundnut Prices

The groundnut price trends in Uganda are very complex and unclear, but some facts can be established from them.

- 1) The average groundnut price in Uganda is far higher than at the international markets. The average price at the international market in Rotterdam is about \$0.5 per kilo of shelled groundnuts (Revoredo and Fletcher, 2002). In Uganda, the average price from major markets for the year 2004 was \$0.84 (Foodnet, 2005) (US\$1 = USh.1770). This is the price for the product as found in the markets.
- 2) No specific town, area or season consistently posts a higher or lower price. This is largely due to the constant movement of the produce from surplus areas to deficit areas. As a result of the network developed by the traders, it is easy to know where a deficit is and supply it hence stabilizing the market.
- 3) Generally, the retail price of groundnuts is increasing with time. The annual averages show a steady increase since 2002.
- 4) Generally, the range between the highest and the lowest price is decreasing with time. This implies that the price differences between markets are becoming more and more stable. The reason for this is may be related to the improved market information and the increased ease of accessing distant surplus markets during times of shortage. According to a dealer at Jinja market, produce is acquired from where it is in plenty depending on the period of the year; January to may from Arua region, June to August from Busoga region, September from Masaka region and October to December from Teso region.

According to traders, their prices are determined by the buying price of the produce and the transaction costs all the way from the purchase to when it arrives in their stores. Most farmers have an estimate of what it costs to transport a bag of groundnuts from one point to the other. A summary of the produce prices at various levels of the market and the margins at each stage are summarised in the table below.

Table 6: Groundnut Profit Margins

Stakeholder	Selling price USh. (tan)	Margin	Selling price USh. (red)	Margin
Producers	800		1000	
Market sellers	900	100	1100	100
Rural traders	1050	150	1250	150
Wholesalers/Town traders	1100	50	1300	50
Retail price (Mbale)	1200	100	1400	100
Wholesale (Kampala)	1500	300	1500	100
Retail (Kampala)	1600	100	1600	100

Source: AT Uganda, field survey

4.6 Groundnut Quality

The existing production and marketing structure does not have serious considerations for quality. This could be due to a number of reasons:

- limited knowledge over quality attributes
- the consumers do not consider some quality attributes when choosing produce
- absence of documented national quality standards
- lack of a quality enforcement body

Among the farmers, there was very limited knowledge over what quality standards are important. Very few farmers for example knew that groundnuts develop “poisonous substances” called aflatoxin when they are not properly handled during harvesting and storage. . Because farmers sell most of their produce in shell, they do not pay much attention to quality since there is little to be noticed in this form. The traders are concerned with the grain size and broken grains, which they sort and separate to have good quality, uniform and fully skinned nuts. The processors dealing with registered products and organizations interested in exports are the only ones who consider aflatoxin levels, which is the most important quality consideration for international trade. In such circumstances, the standards at the destination market have to be followed (FAO, 2001). Otherwise the ordinary processors do not mind since the small, shrivelled and broken grains are normally ground into pastes and powders. The quality control committees of the newly formed marketing associations have established some assessment criteria for the nuts that the association bulks for the purpose of marketing. Under these criteria, size, moisture content, and trueness to type of varieties are considered. Table 1 below gives maximum aflatoxin levels acceptable at some of the important world markets.

Table7: Maximum Possible Levels Of Aflatoxin In Imported Groundnut

Source: Freeman et al., 1999

Country	Aflatoxin type	Maximum permissible level (ng g ⁻¹), 1995	
		Foodstuffs	Livestock feed
Belgium	B ₁	5	20
France	B ₁	1	20
Germany	B ₁	2	20
Ireland	B ₁	5	20
Italy	B ₁	5	20
The Netherlands	B ₁	0	20
Sweden	B ₁ , B ₂ , G ₁ , G ₂	5	10
UK	B ₁ , B ₂ , G ₁ , G ₂	4	20
USA	B ₁ , B ₂ , G ₁ , G ₂	20	20



Figure 8: (a) A woman cleans groundnuts at a market in Kampala. (b) Clean sorted groundnuts for the retail market. Inset: Unsorted nuts. Note the difference in quality.

The Uganda National Bureau of Standards (UNBS) has not developed any groundnut quality standards specific for Uganda. According to David Eboku, the standards officer at UNBS, all that can be done when quality issues have to be considered, is to borrow from the international CODEX Alimentarius standards which are internationally recognized, uniform and reasonable. No organization plays any form of regulatory role for groundnut quality.

At the policy level, there is a fairly serious concern over the potential dangers of aflatoxin. Preliminary studies have been conducted especially by research organizations such as Makerere University and NARO to establish the status of this problem. Because of the chronic nature of the effects of aflatoxin consumed in small amounts, it is important that a relationship is established between aflatoxin and health problems to properly illustrate its effect on the groundnut-eating population. This is the next point in aflatoxin research according to the head of food science department at Makerere University. All leading organizations that wish to venture into international groundnut business, such as Uganda Grain Traders, site aflatoxin as the most important consideration in securing export markets.

4.7 Market Information

It was important to establish the source of market information at different levels of trade since this is very important as far as price adjustment and market access are concerned. Farmers usually do not have any reliable source of market information. Indeed according to Nyero sub-county farmers, one of their leading problems is identifying the right buyer and price. Information regarded as important was price and transport information. Farmers seemed to be the most disadvantaged as far as market information is concerned. Agents get their market information from those who engage them. Rural traders get much of their information from the urban traders. The best national marketing situation can only be obtained from urban traders who have an elaborate network and monitor prices countrywide with the aim of either purchasing or selling to the most appropriate regions.

A possible source of information is the local radio station, where market prices gathered by the district commercial officer are broadcasted under a special programme supported by Foodnet. The problem is that their prices are only gathered from key market centers. But all the same they give a general indication of the market situation in the region.

4.8 Marketing Constraints

Listed below are some of the constraints to marketing as reported by a cross-section of the people interviewed and observed during the survey. The list may not be conclusive but generally represents the most important constraints to marketing at all levels.

4.8.1 At Farmer Level

- 1) Low prices offered for the farmers produce: Most farmers felt that they do not get a fair price for their produce leading to their being discouraged. They however were not very sure of how to determine a fair price. Farmers receive about US\$ 800 per kilo of shelled or US\$ 24000 per bag of unshelled groundnuts at the worst and US\$ 1300 per kilo (39000 per bag of unshelled). The farmers lacked information on world market prices and even the prices in other Ugandan towns.
- 2) Lack of information on the best market prices and buyers: Most farmers feel cheated by the buyers of their produce because they lack market information. They always feel that the prices out there are far better than what they are offered. This results in two problems for the farmers, firstly, they are not satisfied with what they get and secondly, they are unable to bargain for better prices. One farmer commented as follows:

“The buyers come here and cheat us that the prices are very bad out there. They buy our groundnuts at US\$1000 per kilo and cheat us that they are going to sell at US\$1200. We don't think so; we believe they sell at much higher prices. If they sell at US\$1200, how could they afford transport and other costs?”

- 3) Immediate need problem: Some farmers felt that they are normally in dire need for cash to fulfill their immediate cash needs so they are unable to wait for market prices to improve nor to reject unfair prices offered. This hinders their ability to get the best price for their produce.
- 4) Lack of a standard measuring equipment for unshelled groundnuts: Most of the unshelled maize is sold either in bags, basins, or korokoro. This kind of equipment is open to abuse by unscrupulous traders. For example, a typical bag of unshelled groundnut should contain six basins and weighs about 40kg or 30kg shelled, but it all depends on the size of the bag and how it is packed.
- 5) Transport problems: Farmers lack good means of transport to use for delivering their produce to the market. They mostly carry it on their heads and on bicycles. This also limits the markets they can access to only those in their neighbourhood. In addition, there is the problem of poor roads, some of which are almost impassable during the rainy season. Such roads affect the prices that the farmers get since buyers argue that transport costs to such areas is high and will eat into their profits.
- 6) Dishonesty of some farmers and buyers: This problem is related to the (4) above in that dishonest traders insist on using their own measuring containers which are large during buying (and smaller when selling). When purchasing in bags, they insist on extended bags which may carry up to seven basins instead of six for a normal bag.
- 7) Rapid release of varieties: Just as it is a problem at production level, so is it at marketing level. Farmers feel that new varieties are released before they have adequately grown the previous ones to profitability. The market prices hence keep changing since the new ones will fetch high prices for seed.
- 8) Lack of confidence in collective marketing: Farmers seem to remember the problems that affected farmers' cooperatives in the previous years making them very hesitant to form any other association. The farmer confidence in farmers associations will have to be very slowly and carefully built.

4.8.2 At Trader Level

The constraints listed below apply to market sellers, rural traders, town traders/wholesalers and all their agents.

- 1) **High local market prices for groundnut:** As already discussed, the prevailing prices on the local market are higher than the international prices. This actually discourages international trade in groundnut. Despite these high prices, farmers still wish to have better prices. Traders who wish to engage in international trade find it difficult to offer farmers the international prices especially when the transaction costs have been deducted.
- 2) **Transportation costs for distant purchases:** Many traders actually use private transporters to ferry their produce. This reduces their profit margins to a minimum. This is confirmed by a survey conducted by AT Uganda where it was established that all the traders together share only 37.5% of the profit margins as compared to the farmer who retains 62.5%.
- 3) **Price fluctuations:** The rapid changes in prices are sometimes a problem especially to traders who purchase large quantities. When prices fall, they have no alternative but to go with the new prices meaning they have to incur losses.
- 4) **Poor quality produce:** Wholesalers normally wish to have very properly sorted grains to send to distant markets, especially the Kenyan market. They however receive machine shelled produce from the farmers, which is normally broken, un-skinned, and contains rotten nuts and lots of foreign matter such as stones and shell particles. This forces them to sort the produce, a process that is time and money consuming. The processors do not have such a big problem with broken and un-skinned produce but they also have to remove foreign matter and rotten nuts.
- 5) **Aflatoxin contamination:** Although this seems not to be of concern at local trader level, most potential exporters are very concerned about the aflatoxin content of the groundnuts on the markets. The problem however needs to concern all market players since preliminary studies have shown much higher levels in the traders' and processors' produce than in the farmers'. The process of determining the presence of aflatoxin is long and expensive since only few places have the capacity to do it.

a. Marketing Opportunities

Despite the many problems that exist from both ends, there are also a number of opportunities that all the market players could take advantage of. Listed below are some of these opportunities, which farmers could seriously organize to exploit.

- 1) **Farmer organization into marketing associations:** The general feeling of most of the farmers was that they could do better if they marketed their produce collectively. They therefore needed someone that they could trust to help bring them together. This role has been taken by AT Uganda, which has a strong reputation in the region and can be trusted to organize the associations and build the capacity of the farmers to manage them.
- 2) The shortage of good quality produce that does not require further sorting in the market is an opportunity that could be pursued by the farmers right away. That would mean that they do more to the produce before selling it. They could conveniently acquire a sheller for the group and hence retain all the money that is gained by the rural traders who currently do the shelling. In addition to earning them better prices at the market, such produce could also market them to the urban traders as a source of good quality produce.
- 3) The introduction of high-yielding groundnut varieties in the AT Uganda areas of intervention provides an opportunity for the farmers to produce at a lower cost than

they were doing. The farmers should never lose sight of this. This makes them more competitive both at the local and international markets while earning reasonable income from their produce.

- 4) There are opportunities for export with large markets that have not yet been exploited. There are key links to these export markets such as Uganda Grain Traders and the Uganda Cooperative Alliance among others. All that is required is for farmers to produce large quantities of good quality groundnut, and offer it to the market at a lower price. The formation of the quality committees is an opportunity that could be utilized to manage aflatoxin levels at production and processing stages which are key as far as aflatoxin control is concerned. A very significant reduction in aflatoxin levels is achieved simply by sorting the produce (CAC/RCP, 2004; Hell *et al.*, 2002). The committees could hence enforce a code of practice for aflatoxin prevention and reduction during production and processing as well as training farmers on the same.
- 5) National groundnut market trends also offer an opportunity for the farmers. From the analysis of market prices it is evident that any good offer on the market will be purchased regardless of its location as long as the farmers are in contact with the major buyers and sellers in the different parts of the country. Any time prices go down in a certain region there is the possibility of exporting it to another regions. There is already a network of traders in place; farmers need to get themselves into this network so that they can exploit the markets in other parts of the country. Farmers could also make good use of radio broadcasts to advertise their produce as long as they have sufficient quantities, of good quality and at a good price.
- 6) The government Plan for Modernization of Agriculture (PMA) provides an opportunity for the farmers to improve groundnut marketing. The plan emphasizes key components necessary for successful collective marketing of groundnuts such as provision of market information, development of farmer organizations and educational programmes for farmers. Integration of government, farmer, and AT Uganda efforts in the area of marketing could achieve good results.

b. Recommendations

Based on the study findings, observations, and beneficiaries' perceptions, the following sets of recommendations are proposed:

- AT Uganda should place more emphasis on establishing demonstration centres and the use of adopters and commercial farmers.
- The on-going seed multiplication for the improved varieties should be extended to reach as many farmers as possible so as to stabilise seed prices and improve availability for groundnut farmers.
- AT Uganda should consider mediating some kind of financial support to groundnut farmers through the banking and financial network in the region.
- Information flow (production and marketing) should be improved. In particular, farmers should be provided with information about the weather, prices, and potential markets for their products.
- There is a need for a continuous technical support to farmers. For instance, farmers need to be guided on how to cut down on cost and be kept abreast of any new technological developments (i.e. new seed varieties, fertilizer recommendations etc)
- Promotion of farmer-group marketing initiatives to play a greater role in groundnut post harvest handling and processing (especially shelling) and marketing in the face of an increasingly competitive environment.

- Establishment of basic infrastructure in collection and rural-based commodity marketing exchange centres should be developed and supported with a reliable communication network.
- On the basis of the current agricultural practices and their possible impact on the environment, it is proposed that AT Uganda Ltd. should, in its training program, emphasize improved environmental practices.
- AT Uganda should assist to link the marketing groups to distant market opportunities including export markets and facilitate initial group trading activities.
- Our analysis show that using the cereal bank model to improve the marketing of groundnuts is viable, only that care must be taken to eliminate the possibility of aflatoxin poisoning. It is recommended that groundnut marketing associations be established and facilitated to bulk, grade and store the commodity during times of harvest and later be sold to high end consumers, seed companies and manufacturers.

2. THE SHAPE OF THINGS TO COME- OUTLINE OF THE COMMODITY MARKETING SUPPORT SERVICES FOR EASTERN UGANDA.

The foregoing discussion allows us to outline the sort of commodity marketing system, which is likely to work best in Eastern Uganda. We first discuss the range of services, which will be provided, then the players and their roles in the system and lastly how to imbue the system with trust.

a. Range Of Services

Based on our baseline study survey, the following recommendations are in our opinion plausible for the successful implementation of collective marketing in the studied areas. This is done with the existing structures in mind. In doing this we have also borrowed heavily from SACRED Africa's experience in Western Kenya. We also endeavoured to highlight key similarities and differences between Western Kenya and Eastern Uganda. The similarities are very clearly highlighted in the constraints that the farmers encounter with respect to marketing, the fears of the farmers regarding collective marketing and the opportunities that exist that can be taken advantage of. For effective collective marketing to take place, it must be based on solid groups with a common interest. Each of the collective marketing groups should therefore have a core product which should form the basis for the formation of the group. Unlike in Kenya, the group membership will compose of diverse interests since the range of crops grown is very wide. This could cause a problem unless the group formation process addressed this diversity. Fortunately, most of this work has already been done. AT Uganda has already been working with a large number of farmer groups for the past five years. The earlier work with potato and groundnut multiplication and extension helps ensure that at least one product is available in sufficient surplus to be marketed and which can form the core for group activities with the others building up on this. The viability of the collective marketing activities shall be determined by the core product to be marketed. In Kapchorwa for example, the formation of collective marketing groups will have maize and potato as their core activities. This will help to bring together farmers with a common primary interest although they may have other interests, which could also be addressed.

While AT Uganda has been working with a total of 200 farmer groups, these groups will have to be consolidated for marketing purposes. The requirement to pay membership fees and buy shares will undoubtedly result in a reduction in the total membership of the re-organized marketing groups.

After groups are formed, they should be provided with training which, in addition to building the capacity of the farmers in the management of their affairs, should serve to also build the trust of the farmers in the group. Lack of trust due to the failure of the cooperative movement featured prominently as a fear from the farmers. A corresponding amount of concern should be given to addressing this problem. The training therefore will focus on bringing out the issue of ownership of the process by the farmers. In addition to defining the roles of individual farmers, the trainings should also emphasize the responsibilities of the individual members in the management, and hence success of the whole process. The farmers need to be empowered and to understand that they will be the ones to decide on what should be done. The regular monthly training on problem solving which is built into the NRI project will go a long way towards capacity building in collective marketing but it is unfortunate that the 9 month period (April-December) is just too short to take the groups through the full process. At the end of the day it has been made clear from the start that the profitability of the farmer marketing association is the responsibility of the farmers and not AT Uganda or any other facilitating organization. A longer facilitation period, however, would greatly increase the chances that the groups will have a strong enough foundation by the time the facilitating organization withdraws to ensure sustainability.

What services shall be offered by the groups?. The basic services in collective marketing include bulking and/or buying, processing, storing and selling. Although what should be done and the exact procedures will depend on the choice of product, some important issues arise that will need to be carefully addressed by all those concerned. Of paramount importance is the ability of the system to develop produce quality standards that must be adhered to by all.

Bulking: This is a process in which the farmers put their produce together with the intention of raising sufficient quantities to attract bulk buyers of the commodity. This may involve physically bringing the produce together or merely defining what each individual has ready for market. Bringing together will require that the group owns a store of the right size to accommodate all that needs to be bulked. Under such circumstances, the groups should lay down very clear rules and regulations on possession and ownership modalities for the time period between bulking and sell. Such rules may be very specific and variable and can be addressed by the constitution. The groups shall therefore need to make by-laws that will govern all aspects of the business. Here the activities of the cooperative alliance should come in handy as an example that groups can copy from. One way of bulking produce is for farmers to buy shares using their commodities. Then a trading period is defined at the end of which profits are paid out according to one's shares. Produce can be sold either in the local, neighbouring or distant markets depending on the market dynamics. Where bulking in a central store is anticipated selection of stores has to take into consideration the expected amount of produce and market demands. Standards and levels of hygiene should be observed in stores identified and public health procedures followed.

Purchasing: This is a very important activity in collective marketing. If the produce is purchased from farmers, it helps to resolve the issue of ownership before it is sold and also to stabilize prices. This however requires that the group accesses funds for this purpose. There are two possible approaches towards this. One is that the groups could be encouraged to raise funds internally using such activities as table banking, merry-go-round, fundraising and saving schemes. With such activities, in addition to the profits they may make from trading, the group may in time have sufficient funds to finance purchases and processing leading to a more effective collective marketing. Such an approach is slow however, and there is a danger that groups will get discouraged before they really achieve sustainable levels of operation.

The other possibility is for the sponsoring organization to source for funds for this purpose. This is a major rationale for the application to Rockefeller, since the revolving funds

included in the proposal will go a long way in ensuring that the objectives of the group are met. However, it is encouraged that funds be availed to the groups on a loan basis with enforcement of repayment used to strengthen incentives for proper financial management and accountability. We stress that AT Uganda should take the initiative to source for funds to be used by the groups to purchase the produce or as partial payments to members. Market sourcing for perishable commodities like potato should start well in advance to avoid prolonged storage and wastage.

Processing: It will be important that sorting, grading and cleaning be done to ensure that buyers get a consistently high quality product from the farmers at all times. This may be seen as part of handling or adding value. Farmers have to carry out this activity either individually for their own produce, or collectively using some kind of duty roster system. They have to constantly keep the final quality needs of the buyers in mind. Unfortunately for groundnuts and potatoes, unlike for maize in the case of SACRED Africa in Kenya, there are as yet no well defined quality standards set by the buyers. All the same quality is considered at purchase and determines what a producer receives for his/her produce. For groundnuts, we recommend that the groups be able to at least shell and sort the produce. Most wholesalers currently buy very badly mixed nuts and then have to employ casual workers to clean it before it is sold. The cleaning charges are taken into consideration when determining the price offered to the farmer. By shelling the produce, the groups shall increase the revenue they generate from their groundnuts. It is possible and very necessary for the groups to purchase or be assisted to purchase shellers for this purpose. In meeting the quality specifications of the buyers, measurement of some technical parameters such as moisture level, broken nuts, foreign matter, undersized nuts, aflatoxin content (tested using Elisa tests etc) shall have to be carried out. It may not be possible to establish formal laboratories to deal with all these issues, but the sponsoring organization should ensure that for each need, there is a well defined process for solving it. This may involve establishing links with relevant laboratories for regular analysis or setting up of a central laboratory to address these issues. The same procedure should be employed for activities such as fumigation and other complex tasks as the need arises. The provision of quality control equipment and testing facilities is another essential support requirement that is not covered in the NRI budget and will require supplemental funds as a matter of highest priority.

Selling: Again AT Uganda should play a facilitative role in the selling process. Creation of the necessary market linkages is very important for the success of small rural marketing enterprises of this kind. Although the objective of collective marketing is to enable farmers to deal with their own issues, support needs to be provided in certain key and delicate areas especially in the initial stages. AT Uganda is well placed to facilitate interactions between buyers and the farmers more efficiently. A list of possible buyers, their contacts etc should be drawn, maintained and updated by AT Uganda. Farmers should also be encouraged to source for buyers as a way of learning the business and for future sustainability of the enterprises. The groups should be encouraged to deal with buyers with convenient means of delivery or collection and who are also honest in their dealings. They should rely more on convincing the buyers to come for their produce and hence organize the transport from the bulking point to the final market destination. This may not always be possible however. Ideally the supporting organization should be able to offer facilitation in terms of transport advances, but AT Uganda does not have sufficient budget at this time to do so. If crop finance loans were available under the Rockefeller proposal, of course, the transportation expenses could be advanced out of the working capital loan.

b. Building Trust In The System

Early in the development of this system, decisions must be made as to the most appropriate form of documentation needed to run and manage a marketing venture of this kind. This will be important for creating trust. Social mechanisms for building and

maintaining trust should also be considered. On the side of leadership it is important that elections of leaders be held annually, and that there be working committees to oversee the activities of leaders. AT Uganda is already working with the groups in a participatory manner to develop a comprehensive constitution, that provides for impromptu audits, and holds leaders personally liable for any losses or wrong decisions. This will help to improve the trust that farmers have in the system. Mechanisms for punishing perpetual offenders and rewarding good actions must also be put in place and enforced by the members.

c. The Players

AT Uganda should also facilitate efficient flow of market information using their well developed and advanced communication network. AT Uganda needs to link directly to such organizations as Foodnet, NAADS, district commercial officers, Uganda Agricultural Commodity Exchange and even Kenya agricultural commodity exchange on behalf of the groups and then ensure that this information is passed to the groups on a regular basis. SACRED Africa would be happy to provide backstopping services, training, carrying out targeted surveys etc. For sustainability involvement of local county officials (without politicizing the system), Ministry of Agriculture, NARO etc will be very important.

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