

GANDA S RISH OTATO ECTOR

**PREPARED FOR
THE GOVERNMENT OF UGANDA'S CONFERENCE
ON COMPETITIVENESS
OF SELECTED STRATEGIC EXPORTS**

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Abbreviations and Acronyms

ACDI	Agricultural Cooperative Development International
AHI	African Highlands Initiative
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BW	Bacteria Wilt
CEDO	Community Enterprise Development Organisation
CIAT	International Institute of Tropical Agriculture (Columbia)
CIP	International Potato Centre.
CLUSA	Co-operative League of the United States of America
COMPETE	Competitive Private Enterprise and Trade Expansion Project
DES	Dar-es-Salam, Tanzania
DRC	Democratic Republic of Congo
FAO	Food and Agricultural Organisation of the United Nations
FOODNET	Marketing and Postharvest Research Network for Eastern and Central Africa
IDEA	Investment in Developing Export Agriculture (USAID – Agribusiness Centre)
IITA	International Institute of Tropical Agriculture (Nigeria)
kg	Kilogram
KGL	Kigali, Rwanda
LB	Late Blight
m	Metre
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
mm	Millimetre of rainfall
mt	Metric ton
MZ	Mwanza, Tanzania
NAADS	National Agricultural Advisory and Development Service
NARO	National Agricultural Research Organisation, Uganda
NPRC	National Potato Research Centre, Tigoni Kenya
NRI	Natural Resources Institute (UK)
SPEED	Support for Private Enterprise Expansion and Development
PRAPACE	Eastern and Central African Irish Potato and Sweet Potato Network
PSF	Private Sector Foundation
t/ha	Metric ton per hectare
UNSPPA	Uganda National Seed Potato Producers Association
Ush	Uganda Shillings (February 2002, US\$1 = Ush 1700)
W/S	Wholesale, price

Summary

The purpose of this report is to provide an overview of the Irish potato marketing system in Uganda and an analysis of the role for Irish potato within the Government of Uganda's newly devised Export Strategy. Unlike the other commodities included in this strategy, exports of Irish potato would be an entirely new venture and is therefore unable to capitalise on existing marketing channels or opportunities. In order to develop this sector into the export class several technical, infrastructure and organisational improvements need to be designed, developed and implemented, before this venture can be successful.

Trade in potato products accounts for about four percent of world production, a proportion similar to rice. The international market for potatoes has five main segments including (i) seed potato, (ii) ware potatoes (iii) frozen chips (iv) crisps and other potato snacks and (v) starch. World exports of frozen chips are valued at US\$2 billion, that of fresh potato at US\$1.8 billion FAOSTAT, and trade in seed potato is valued at US\$400 million, worldseed.org. The frozen chip market grew rapidly in the past decade and exceeded the value of fresh potato exports for the first time in 1998. Frozen chips will continue to be the leading area of growth in potato trade in the next decade.

Like many other commodities in Uganda, the Irish Potato sector is not well organized or integrated. Producers, transporters, marketers, wholesalers and retailers are fragmented and tend not to cooperate. There are very few organizations and the ones that do exist are small and young. The lack of organization is one factor that isolates the sector from regional or global markets.

In Uganda potatoes are essentially a food security crop with steadily growing urban domestic markets. Projections for future growth are somewhat obscured by lack of sound empirical data on production and demand. According to FAO statistics, the production of potatoes in Uganda (2000) was approximately 450,000 mt, produced on approximately 65,000 ha with an average yield of 7 mt / ha. However, a recent study by the national potato programme, estimated production up to 1.2 million mt per annum, with on farm yields of 14.5 mt, whereas the most recent Household survey produced a production total of 290,000 mt, with a yield of 4 mt / ha.

Ugandan potato production is constrained by a lack of inputs including clean seed, fertilizers and pesticides. There are limited commercial stores and no cold store facilities. There is a general lack of organization in the marketing chain, particularly amongst producers. Combined with seasonal production, this leads to considerable price instability. Due to lack of transparency and poor market structure, brokers are able to charge excessive fees for their services and travelling traders make the bulk of the profit in the supply chain.

Population growth and urbanisation are the main drivers for demand, and the increased consumption is supplied mainly through an expansion in the mid-altitude production, where potatoes are promoted as a cash crop. Some observers view the rapid expansion of potato production into the lower areas with reservation due to the risks of large-scale, cyclical crop failure through diseases such as bacterial blight and late blight.

Avoiding crop failure and maintaining product quality can be achieved effectively through an efficient clean seed supply system, linked to informed producer groups. At present only one association is undertaking seed production and marketing in Uganda and limited seed stocks of less than 100 mt / annum are being sold at 5 times the price of ware potatoes.

Prospects for major positive changes in the Ugandan potato export market should be considered in relation to the market opportunities. Uganda has no competitive advantage to enter the frozen chips

market, due to lack of infrastructure, distance from important markets and economies of scale that are required. Prospects for production of high quality crisps and snacks to supply the domestic market are relatively good, as long as product quality can compete with imported good. Expansion into the ware potato market should be analysed against three market options, (i) demand for 'export quality' tubers to supply fast food outlets, restaurants and the tourist trade, (ii) premium grade potatoes to supply the premium, middle class, urban market, which is being led through retail outlets such as Shoprite and (iii) standard grade tubers to supply the bulk food security market. It may be possible to explore some limited sales of high quality tubers into the regional ware markets. However, export market for seed potatoes to neighbouring countries is less likely.

Potato Markets: Local to Global

Potatoes in Uganda are essentially a food security crop with good prospects for increased domestic urban demand. The bulk of the crop is grown in the highland areas of South Western Uganda in two districts Kabale and Kisoro. In these districts Potato is both a staple food and main source of income. Virtually all households in South western Uganda cultivate potatoes producing over 60% of the national crop. Across the country, there are approximately 200,000 households producing potatoes on plots of less than one hectare. There are no irrigated commercial farms. Due to increased demand, particularly urban demand, potato production is expanding in the three traditional production zones and is spreading into central Uganda.

Production of potatoes in Uganda is entirely for the domestic market. Opportunities for regional and global trade exist but are limited. A recent regional survey found there is some cross border trade with Rwanda, but this trade is opportunistic and only fills short term seasonal windows. There are no organized export links to any other countries and therefore potatoes cannot be considered as a source of foreign exchange for Uganda.

There are a number of constraints to production and marketing of potatoes in Uganda, which apply to most staple food crops produced by resource poor farmers. Farmers do not use clean seed, and although there are no taxes on agricultural inputs, few farmers use fertilizer or pesticides. Local marketing of the crop is inefficient due to lack of co-operation amongst farmers and collusion amongst traders and retailers. The market has little segmentation, low investment and suffers from poor infrastructure in terms of irrigation, storage and market roads. Transportation costs from the main production zones are relatively high. There are no grades and standards at the market and therefore market signals based on premium prices are weak.

Market opportunities for Ugandan potatoes are exclusively focussed on domestic opportunities and the current plan for developing an export drive is based on a production strategy with little attention being paid to the marketing options. Whilst most of the interventions planned for the potato sector in the Export strategy document are to be encouraged, these activities are more likely to strengthen food security and local marketing rather than boost foreign exchange earnings. In a recent regional potato survey market conditions were as described below:-

Domestic Seed potato - Sales of seed potato in Uganda are extremely limited with production at less than 100 mt / year. The Uganda National Seed Potato Producers Association (UNSPPA) is the only organized supplier of seed potatoes. Currently the public sector has no facilities to produce clean pre-basic seed and supplies of tissue cultured materials are obtained directly from Kenya via the International Potato Centre (CIP) and the Kenyan Agricultural Research Institute, (KARI). Investment in improved facilities to produce basic seed would be of great benefit to the sector and is an essential first step in supporting increased production and improved quality.

Domestic Ware potato – The bulk of potatoes are sold into the ware market as an ungraded product. The marketing system is not well organised with most farmers being price takers and retailers paying high prices due to the collusion of traders. More competitive production, and increased transparency in the market through market information and improved organisation of producers would strengthen the position of farmers to negotiate better prices. Clearly defined market segments would also assist farmers to make investments for standardised products with known premiums. Overtime, consumers would also benefit from a range of priced products based on quality related standards.

Regional seed and ware potato – At present there are few trading links between any of the countries in the Lake zone and no country has made a concerted effort to supply a neighbouring country with either seed or ware potatoes. The Government of Uganda's export strategy does not identify which country or market segment it intends to supply and it would seem prudent to

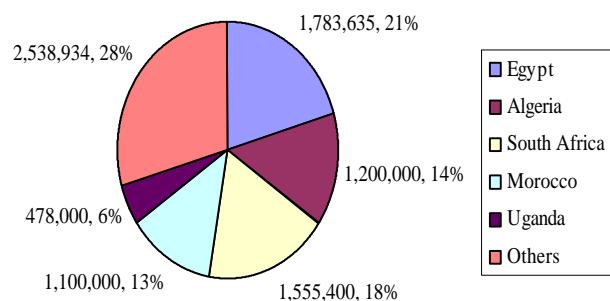
develop a detailed marketing plan prior to any campaign for increased production, if the potato sector is to avoid simply oversupplying its domestic market.

Export from Uganda. Uganda is currently not able to profitably supply the Kenyan markets as most 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.

Export from Rwanda. Rwanda is a traditional supplier of potatoes to Burundi and Kivu, in the Democratic Republic of Congo, (DRC). Although the quality of Rwandan potatoes is generally poor, Burundian potatoes are of an even lower quality. As part of the national re-habilitation programme, the Government of Rwanda is planning to re-establish its potato sector. Studies have shown there are good export prospects to supply Burundi, DRC, with some potential to supply Uganda and Tanzania. The Rwandan export plan will include supplies of both seed and ware potatoes. Rwanda has a strong comparative advantage in potato production due to its high altitude and long-term links with potato production. The country already has tissue culture and screen house facilities for production of pre-basic and basic seed and the extension service is planning to promote the use of improved seed, fertiliser and pesticide use through a national demonstration programme. This campaign will be supported through a USAID funded agri-business programme.

Export from Kenya and Tanzania. Kenya and Tanzania are the only countries in the region which have a regular trade in potatoes. The Nairobi market provides regular supplies to Mwanza and potatoes are supplied to Nairobi from Arusha as part of a cost saving back load system. These markets are essentially based on most efficient transport links and regular trade routes. Kenya has a strong potato programme, with tissue culture and basic seed production facilities. There are no plans at this time to significantly strengthen the potato sector, but the sector is fairly robust and there is strong demand for potatoes in Nairobi.

Major potato producers in Africa in 1997(Source FAO)



African market – Potato production in Africa is dominated by four countries, Egypt, Algeria South Africa, and Morocco, which produce 65% of the crop. These are also the leading countries in potato trade. Links to the European and Middle Eastern markets are well developed and likely to grow as demand for processed and niche market potato products increase. The production is highly intensive and irrigated, with yields in excess of 40 mt / ha. South Africa is already exporting frozen fries into its fast food chains in Uganda.

In 1999 the total export value of fresh potatoes from Africa was US\$ 85.9 million and the same four countries accounted for 97% of that value. The value of exports of frozen potatoes from Africa was US\$ 6.5 million and Egypt and S. Africa accounted for 85% of that value.

Global market Global trade in fresh potatoes is dominated by the European countries (67%) and the USA and Canada (11%). Most of this trade is among those countries. Netherlands is the world leader in frozen chips trade and together with the USA, Canada and Belgium account for 85% of world trade. These countries have highly sophisticated, vertically integrated market chains for all market segments and are likely to increase their market share through consolidation of competing companies.

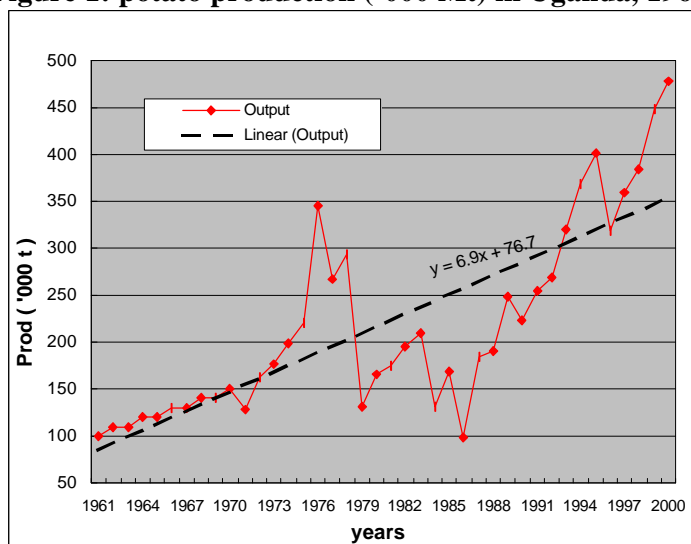
Production

According to MOA and FAO figures, Uganda produces approximately 450,000 tons of ware potatoes from 65,000 hectares with an average yield of 7 tons per hectare. We estimate that approximately 200,000 to 300,000 farmers are involved in potato production. Most are poor farmers with farms of 1-2 ha in the highland areas of the country. As illustrated in **Figure 1**, from 1961 – 1976, production increased from 100,000mt to 345,000 mt. Between 1976 and 1985 this trend was interrupted by the civil wars of 1979 and 1981-86.

*Since 1986 potato production in Uganda has increased by 14% per annum, from 98,000 mt in 1986 to 478,000 mt in 2000, one of the highest growth rates of any food crop in the country, **Appendix 1**.*

Observers attribute this increase to a combination of political stability, increasing population, the 1991 introduction of new potato varieties (named Victoria, Kabale and Kisoro) and an expansion of production into mid-altitude production zones. In western Uganda development organizations including the South Western Reconstruction Project (SWARP), the African Highlands Initiative (AHI), PRAPACE and AFRICARE have heavily promoted potato production. These agencies encouraged increased potato production by providing farmers with clean seed, production skills and enhanced market access through construction of feeder roads.

Figure 1: potato production ('000 Mt) in Uganda, 1960-2000



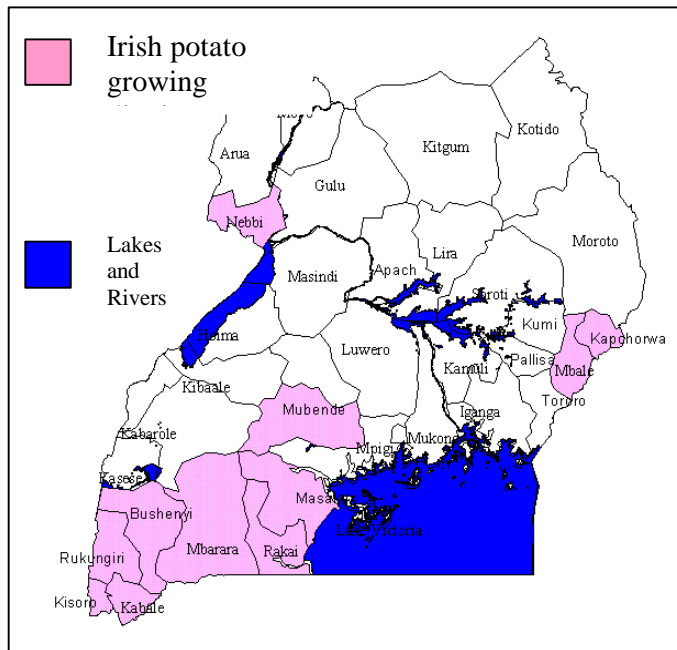
Source data: FAO

Other research recorded on-farm yields of more than 20 mt / ha (Lowe 2000). A recent study, by NARO (2001), concluded that total production was approximately 1 million mt of potato from 60,000 ha, with corresponding figures for 2001 at 1,234,197 mt from 80,395 ha, respectively, **Appendix 2**, Wagoire et al. (unpub). The most recent household survey contradicts these figures with values of 290,000 mt from 70,000 ha, suggesting a production of 4 mt / ha and discussions with farmers, on bags per ha, tends to confirm the lower yield levels.

These huge differences in estimated production are most likely due to the different data collection methods. The national estimates devised by MOA and FAO are based on census data which is projected thereafter based on growth factors. Although many observers criticise these figures, the data collation method has the advantage that a similar method is used across countries, **Appendix 3**. For the purposes of this study, we will use the FAO statistics as this aligns with the GOU's export plan which seeks to double production up to 1 million mt.

Production Zones

Potatoes have traditionally been cultivated in the highland areas of Uganda, 1500–3000m. The major production zones include (i) the Kigezi highland districts of Kabale and Kisoro in the south west, which produces the bulk of the crop in Uganda, (ii) Mbale and Kapchorwa districts on the slopes of Mount Elgon and (iii) Nebbi district, a mid-altitude region in north-western Uganda which has more recently started to promote potato production.



The traditional production zones of Kigezi and Mount Elgon are favourable for potato production due to their deep volcanic soils, high altitudes with mild temperatures (10 – 30° C), and abundant rainfall (900 – 1400 mm).

These high altitude zones also have reduced risk of disease (LB, BW) that is associated with lower temperatures at higher altitude.

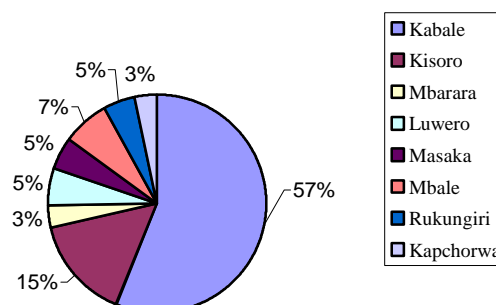
Kabale district alone produces between 50 and 60% of the total annual ware potato consumed in Uganda **Figure 2**.

Map 1 Major potato production zones in Uganda.

Kabale district lies within an altitude range from 1,400-2,500m and has an annual rainfall from 1,000 -1,500 mm, which occurs in two peaks from March –May and September – November. The mean annual maximum temperature is below 22.5°C with an annual minimum below 10.0°C, making Kabale one of the coldest districts in Uganda (Low, 2000).

The physical and climatic conditions of the mountainous districts of Kisoro, Mbale and Kapchorwa are similar to those in Kabale. Many potato farmers in Mwizi and Mbarara are migrants from Kabale that brought their potato producing habits to the region. So although the hills of Mwizi in Mbarara have a relatively lower altitude (1,200-1,600m) and rainfall (800-1100mm) ranges than Kabale, potato production is important. Other districts in Uganda that have potential to sustain potato production include Kisoro, Bushenyi, Kasese, Kabarole, Mubende, Nebbi, Kapchorwa, Mbale and Kibale.

Figure 2 Potato production in 2000 by major producing districts in Uganda.



Source data: MAAIF

Seasonality

Kabale farmers have three potato growing seasons and are able to produce almost all year round. They do this by intensive use of all available hills, slopes, swamps and valley bottoms. The Kabale potato cultivation calendar (**Table 1**) shows typical planting and harvesting times. On the hills, the first season starts from mid February during the short rains and is harvested in June. The second season is planted during the longer rains from September-November and represents the main commercial crop. During the short dry season, farmers also plant into the non-swampy valley bottoms from April – May, harvesting from August. In the Valley the planting season follows on from the hills through December and January, harvesting in March and April. Using this combination of sites and rainfall patterns, there are only a limited number of weeks when markets supplies are low.

Table 1 Potato production calendar for Kabale District

Area of cultivation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Hill slopes	Harvest	potato planting				potato harvest			potato planting			Harvest
Swamp land					potato planting			Harvest				
Valley bottom	potato Planting		Harvest									potato Planting
Mean monthly Rainfall 1990-2000 (mm)	72.3	73.1	136.5	114.9	98.4	43.0	13.7	56.4	88.8	131.4	98.4	90.0

In Kisoro and Mwizi (Mbarara) potato production closely follows that of Kabale except that these districts do not have swampland for irrigated production, **Table 2**. Therefore these districts only have two major potato seasons, with the minor season starting in February with harvest in May, and the main season starting in September and harvested in January. For Mbale and Kapchorwa Districts the first season is between March (planting) and June (harvesting), while the second season starts from August and ends in December. The combination of production seasons assures that Uganda is able to provide ware potatoes nearly all year round.

There is one period from late August and early November when supplies are low and prices are high. This provides an opportunity for neighbouring countries such as Rwanda to sell potatoes to Uganda., During this period potato prices at Owino market in Kampala are relatively high (Ush 28,000), hence making it possible to sell Rwandan potatoes profitably.

Table 2 Potato production calendar for Kisoro, Mbarara, Mbale and Kapchorwa Districts

District(s)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Kisoro and Mbarara	Harvesting	Planting		Harvesting					Planting			Harvesting
Mbale and Kapchorwa			Planting			Harvesting		Planting			Harvesting	
Rainfall (mm) 1994 Mbarara	100.2	30.8	85.9	68.7	164.9	6.1	6.0	31.6	29.1	128.8	156.2	104.4

The marketing windows that provide neighbouring countries with the ability to export into Uganda, suggest that some research could be done on staggered planting or simple irrigation schemes to enable some farmers to both fill these gaps and gain from highest market prices in the off –season.

Potato Varieties

Due to the concerted efforts of the National Potato Programme working in collaboration with CIP and PRAPACE, Ugandan farmers have access to a range of improved potato varieties. Farmers in Uganda are growing all of the varieties listed in **Table 3**. However, NAKPOT 1, 2 and 3 which have good commercial and disease resistance qualities, are only recently released and have a very limited distribution. To increase the availability of the NAKPOT lines, the national programme is intending to focus on these varieties in their first phase seed production.

Table 3: Characteristics of potato varieties released/grown in Uganda

Common name Year of 1 st release	Tuber size	Skin colour	Flesh colour	Tuber shape	Vegetative cycle (days)	Seed dormancy (weeks)	Resistance/ Tolerance		Storability
							LB	BW	
Uganda 11 (1973) (Rutuku)	Large	Light red	Cream	Oval round	110-130	11-13	Tolerant	Susceptible	Good
Victoria (1992)	Large	Red	Light yellow	Round	90-110	8-10	Moderate resist	Tolerant	Good
Kisoro (1992)	Medium large	White	Cream	Oval long	110-120	10-12	Resistant	Tolerant	Good
Kabale (1992)	Large	Purple white	White	Round	110-125	11-13	Moderate resist	Susceptible	Excellent
NAKPOT 1 (1999)	Large	White	White	Oval long	80-90	9-12	Resistant	Tolerant	Good
NAKPOT 2 (1999)	Medium large	Rose red	Cream	Round	85-100	9-11	Resistant	Tolerant	Good
NAKPOT 3 (1999)	Medium	White	White	Round	85-100	9-12	Resistant	Tolerant	Good
Cruza 148 (1982)	Large	Light red	Cream	Oval round	110-130	4-6	Tolerant	Tolerant	Fair
Sangema (1980)	Medium large	Pink	Yellow	Oval oblong	90-110	10-12	Tolerant	Susceptible	Good

Source: PRAPACE

Victoria is the most common commercial variety. It is high yielding, early maturing, tolerant to bacteria wilt (BW), but susceptible to late blight (LB). Farmers in Mbarara, Kabale and Kisoro quickly adopted this variety through promotion by the South Western Uganda Agricultural Rehabilitation Project (SWARP) and African Highland Initiative (AHI).

Uganda Rutuku was introduced in Uganda in 1972. It is, one of the most successful varieties in Kabale. Uganda Rutuku is highly sought after by traders, for its chip making quality. Mainly grown in Kabale at elevations above 1,800 m, this variety sells at a premium price. The survey revealed that the wholesale price of 100kg bag of Uganda Rutuku was Ush 33,000 while that of Victoria and other varieties was at Ush 28,000 in Owino market. Because Victoria has similar characteristics as Uganda Rutuku (large tuber size, red/light red skin colour and yellow/cream flesh) unscrupulous traders in Owino are said to be selling Victoria as Uganda Rutuku to unsuspecting buyers.

Given the strong demand for specific varieties and the fact that unfair trading practices exist in the market, there would seem to be merit in developing grades and standards around more clearly defined market segments, such that farmers can be rewarded for providing high quality goods to a known market.

Constraints to Production

Low yields - Most farmers in Uganda are subsistence oriented and produce potatoes using low risk systems with no inputs that provide yields of 4 - 7 mt / ha. Whilst costs are relatively low, the produce is not highly competitive on a unit basis.

Interventions

- Improve the seed supply system in terms of tissue culture facilities for pre-basic seed
- Improve facilities and increase production of basic seed.
- Promote the seed through a widespread demonstration programme which shows farmers directly the yield gains that can be made using “clean seed”, fertiliser and pesticides.
- Provide agri-business seminars to show income benefits of using inputs.
- Improved access to credit such that farmers associations can purchase inputs and repay at harvest.

Product quality - Most farmers pay little attention to product quality. Maintaining quality is critical at harvest and although dehalming is widely practised more attention needs to be given to avoid damage which accelerates deterioration. Standards need to be developed such that farmers produce for specific premiums within know grades and weights.

Interventions

- Incorporate programmes to introduce grades and standards with farmers and traders. This can only be done with strong market linkage programmes and national promotion schemes.
- Provide farmers with timely market information to backstop the price differentiation available through graded produce.
- Support extension (national and NGO) to strengthen farmer associations and increase their knowledge of market dynamics in relation to prices, grades and standards.

Temperature and Water - Potato is susceptible to drought and water restrictions seriously limit yield. The crop is very frost sensitive but that is not a factor in East Africa.

Interventions

- If farmers in Uganda are to improve yields from 7 mt / ha to 30 mt / ha, irrigation will be required. Use of valley bottom irrigation could be upgraded to maximise yields and supply market gaps.

Late Blight - The most important and damaging potato disease worldwide and in Uganda is late blight. In a single night this fungus can devastate a field planted to a susceptible variety. In highly seasonal production, a combination of avoidance and escape measures are effective. In environments such as Uganda these are ineffective and control relies on spays with fungicides and the use of resistant varieties. NARO with support from CIP and PRAPACE has introduced and is evaluating a large number of resistant varieties, many with desirable processing qualities.

Interventions

- Avoid the promotion of potato growing in areas which are prone to late blight.
- Include blight resistant varieties in multiplication programmes
- Increase access of farmers to clean seed.
- Target supplies of new varieties to areas which are less prone to disease

Bacterial Wilt - The second most damaging disease is bacterial wilt (BW). This disease resides in the soil, can be transmitted by seed potatoes and is found in other crops including banana. BW can spread in dirt carried from one field to another on shoes, farm implements or vehicles. It can also be transported in irrigation or other water runoff. BW is pervasive in Ugandan soils. Upland soils are less likely to be infected and the presence of BW is probably the largest single constraint to widespread production of potato in lowland areas of Uganda. Though CIP continues to breed for BW resistance, there are only low levels of BW tolerance among existing potato varieties. CIP and PRAPACE have worked with NARO to introduce integrated management of BW that emphasizes BW-free seed plot management on the farm.

Interventions

- Include wilt resistant varieties in multiplication programmes
- Increase access of farmers to clean seed, especially through the seed plot technique.
- Target supplies of new varieties to areas which are less prone to disease

Utilization

The total production of potatoes is utilized in various manners. Typically 10% is used as seed, about 10% is wasted and the remainder is either consumed domestically or exported. Since there are no significant exports from Uganda, the remaining 80% of production is consumed. Total consumption, in turn, is divided into the fresh and processed markets. In this section we will discuss each of these in turn.

Total consumption:

The Uganda national household survey gives information about expenditures on various foods. In the survey, expenditures on processed and fresh potatoes are not differentiated. As would be expected, expenditures are highest in the south-western production zones and urban areas, especially those in central Uganda, **Table 4**. This pattern illustrates the use of potatoes as a food security crop in the production zones and as a vegetable in the relatively higher income urban areas.

Table 4: Average monthly household consumption expenditure on potatoes by region in 1995

Region	Rural		Urban		Total	
	Per household monthly Expenditure in Ush.	% of total Exp on major food	Per household Monthly Exp in Ush	% of total Exp on major food	Per household Monthly Exp in Ush	% of total Exp on major food
Northern	20	0.1	450	0.5	48	0.1
Eastern	83	0.2	563	0.6	124	0.2
Central	513	0.6	946	0.6	633	0.6
Western	1,250	2.2	858	0.8	1,222	2.0

Source: Uganda National Household Survey (1994-95), Min. Planning and Econ. Dev't.

Demand for Fresh Potatoes

The information in **Table 5** illustrates expected future demand for ware potatoes. Given the lack of reliable production and consumption data these are illustrative estimates only. Future demand is derived using projected population statistics of 1991, data from the Uganda integrated household survey of 1992-93 and FAO production data. In these estimates population is the only growth factor. To simplify the calculation, we assume all other socio-economic and cultural factors such as price, income, and urbanisation rate to remain constant. We also assume that potato demand equals supply as there is no external potato trade between Uganda and other countries in the region. This would mean that any impact achieved through the adoption of new technology, improved marketing or accelerated urbanisation would increase demand levels.

According to this simple and conservative projection, by 2015 demand for potatoes will be approximately 850,000 – 1,000,000 mt per year. According to this projection, by 2010 urban demand will outstrip rural demand and in 2015 urban potato demand of 500,000mt will almost double rural demand of 347,000mt.

Table 5: Estimated urban and rural potato demand from 2000 to 2015.

Source: own calculations.

Year	Estimated Urban population ('000)	Estimated rural population ('000)	Estimated urban population growth (2000 =100%)	Estimated rural population growth (2000 =100%)	Estimated urban potato consumption (t)	Estimated rural potato consumption (t)	Total estimated potato demand
2000	3,565	18,646	1	1	206,674	271,326	478,000
2005	4,785	20,255	1.34	1.09	277,401	294,739	572,140
2010	6,328	22,037	1.78	1.18	366,853	320,670	687,523
2015	8,648	23,869	2.43	1.28	501,351	347,328	848,679

Demand for Processed Potatoes

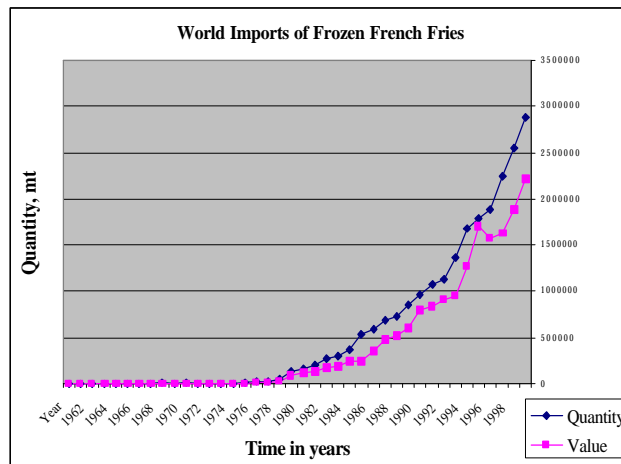
As with other developing countries in sub-Saharan Africa, Uganda has a very limited range of processed products including processed chips and crisps from potatoes. The bulk of the potato crop is sold as ware potatoes and eaten as a boiled vegetable. The advent of the urban take-way (fast food kiosks) in the early 1990s and the entry of South African fast food companies such as Nandos and Steers in Kampala have increased potato processing into chips.

Our estimates are that by the year 2015 nearly 50% of the potatoes consumed in urban areas in Uganda will be processed into chips. Mostly street vendors and restaurants prepare these, however, once becoming accustomed to the food away from home, family members are likely to influence shifts in home preparation away from traditional recipes towards these more fashionable foods. At present the quality of processing into crisps is low, but this is also a market that is being explored by the private sector and is likely to grow when quality meets international standards.

As emphasized in the analysis in **Table 5**, population growth is the major source of growth for fresh potatoes. However, the market for processed potatoes represents a new and dynamic category. In industrial countries the majority of potatoes are processed. Fast food restaurants, tourists, and urban consumers are the principal sources of growth for this new market segment.

The preference of youth for this universal food is one of the major reasons that the international market for frozen French fries has grown ten fold during the last 20 years. The spread of fast food restaurants and the growth of the tourism industry are important sources for introducing crisps to local populations. Frozen French fries are attractive to this group because of their convenience and consistent quality. Savings on labour and cooking oil are also important factors that can make imported French fries compete with locally produced fresh potatoes. In many countries home consumption of frozen French fries is nearly equal to consumption in restaurants.

Figure 3. Changes in World Imports of Frozen Fries



The value of international trade in frozen French fries was \$150 million in 1980 and grew to over \$2 billion (thousand million) in 1999, **Figure 3**. After two decades of explosive growth and technical improvement, the industry is in a phase of consolidation and concentration. World capacity is dominated by five leading firms from the US, Canada and the Netherlands that have plants dispersed around the world. McCain's, a Canadian firm, is the largest and has production plants on every continent. McCain's entered Africa in 2000 when it purchased the leading South African frozen French fry manufacturer.

McCain's has four production facilities in South Africa and employs 1,500 people there. They manage their entire supply chain with their own seed farms, ware producers, transporters, and warehouses in a fully "vertically integrated" system.

Morocco and Egypt are the only other African countries with global production capacity. A Dutch-Egyptian joint venture firm produces for the internal Egyptian market and exports to

countries in the Middle East. Industrial ventures are large scale, plants that require the production from 10,000 ha are normal and whereby production to sales systems are fully integrated.

The major import markets for frozen French fries are the US, Japan, European countries and China. The US market is served by Canada, the Japanese and Chinese markets are dominated by the US and the Netherlands covers 90% of the European market. The Middle East markets are relatively small and are served in order by the US, Netherlands and Egypt. Egypt has preferential trade concessions and a close location, that make it well positioned to strengthen its share in that market.

An infrastructure to transport and store frozen foods is an important consideration for investors. Frozen French fries typically move around the world in forty-foot containers so a fleet of refrigerated trucks is necessary. Once inside the country, wholesalers and retailers need refrigerated stores to maintain their stock. None of these facilities are available in Uganda.

Demand for seed potatoes

Most seed potatoes used in Uganda are saved from the previous crop. This self-supply probably accounts for 70% of seed used in a given cropping season. The majority of the rest is acquired from relations, neighbours or the local market. Organized seed production occupies a fraction of this market, with the only supplier providing less than 100 mt per season. Nevertheless, as outlined in the export strategy, organized seed production is critical to improving the productivity of the sector.

Recognizing this bottleneck, the Government of Uganda, with national and international collaborators have continued to support development of the seed sector. At present there is a single organized seed producing association the UNSPPA serves mostly NGO buyers. While the high prices the association charges and the narrowness of their marketing can be criticized, the very presence of an association is a significant advance. The continued presence of the association demonstrates the economic feasibility of the industry and since it supplies only a tiny percent of total seed use, the room for expansion is large, see **Appendix 4a and 4b** for details of the association members production and costs. The first focus of expansion should be in the domestic market. Improved marketing of the benefits of using quality seed is probably the major impediment to farmers deciding to invest in the higher cost of this input.

Developing this sector therefore requires, not only the infrastructure that is outlined in the export strategy, but a well co-ordinated marketing strategy with a promotional phase that is backed up with credit, such that farmers can access the new varieties. The complicating factor with the sales of new seed, is that as with maize, the most cost effective results are only obtained when the clean seed are used in conjunction with other inputs such as fertilizer and pesticides. To capitalise on these technologies farmers need to manage the quality of the crop at harvest and during the postharvest phase to maximize their returns.

In order to promote the use of the new seeds, the national potato programme should devise a targeted demonstration programme, which shows farmers the benefits of having and not having inputs. A similar scheme is being implemented in Rwanda.

After the seed industry gains experience in serving the domestic market and has increased its capacity the practicality of serving an export market becomes more viable. The macro policy setting for trade in seed is improving in the region with the ECAPAPA-led initiative on harmonization of phyto-sanitary regulations. Within five years, there could be substantially improved movement of seed within the region.

Potato Production Costs

Seed and ware potato production require the same basic inputs and labour. However, for a farmer to produce clean, certified, seed he or she must use seed from a recognised source. Seed for ware potato production can be grown from any source. Potential yield is highly dependent on seed quality and ideally farmers would plant new clean seed potatoes each year. Our field survey found that most farmer blamed low yields on poor quality seed. Farmers said they use local seed retained from their harvests or buy from neighbours. The costs incurred and margins received by an average farmer in Mbale / Kapchorwa for cultivation of one acre of potatoes using minimum inputs are shown in **Table 6**.

Table 6: Ware potato production costs (Ush) in Kapchorwa District, Uganda for year 2001.

Item	Unit price	Total cost
Inputs		
Land Rental (1 Acre)		25,000
	25,000	
Seeds 15 bags (1 bag~100kg)		150,000
	10,000	
Chemicals (Ambush & Diathane)		30,000
Fertilizer (NPK) 1 bag (optional)		35,000
	35,000	
Labour		
Ploughing (twice)		30,000
	15,000	
Ridging and planting		15,000
	15,000	
2nd Ridging		15,000
	15,000	
Weeding (twice)		30,000
	15,000	
Fertilizer application (optional)		10,000
	10,000	
Spraying		5,000
	5,000	
Harvesting		20,000
	20,000	
Total costs		365,000
Revenue Return		
Yield 1 acre = 11mt(110 bags (100kg each))		
Farm-gate price per bag =U Shs. 4,000		
Gross Revenue		400,000
Net Margin		35,000

Most potato farmers do not use fertilizers or pesticides. The combination of no fertilizers, no pesticides, no certified seed and land hiring is the most common agricultural practice of peasant farmers in Uganda. Most farmers do not keep records and therefore the costs of production presented in Table 6, illustrate the probable costs of cultivating 1 acre of potatoes. From a total investment of Ush 365,000, the likely yield, given favourable weather conditions, is 100-120 bags. From this transaction farmers earn approximately Ush 35,000, (\$20 US @ 1700 Uganda

shillings) which is only 8.75% of the total sales, with a portion of the production being retained for household consumption. For sensitivity analysis see **Appendix 5**.

Note that most labour comes from family sources and is not wage labour and does not represent a cash outlay by the farmer. Our estimates however put a value on that labour and the difference between what is paid to wage labour and not paid to family labour represents additional income to the family. This illustrates one of the benefits of potato production: its capacity for rural labour generation. Probably more than any other field crop, potato generates rural labour opportunities. In this case, the equivalent of Ush. 125,000 worth of labour / acre / season.

The 2000 estimate of potato area in Uganda is 100,000 acres. Multiply this by the per acre value of labour from the table and potato production creates Ush 12.5 thousand million in labour value. There are few rural development programs that can transfer that amount of income to the rural sector.

Ware Potato Marketing in Uganda

Description of trading and the marketing chain

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 Kampala. This caution aims to reduce post-harvest losses that are associated with fresh produce. There is almost no off-farm storage so rapid movement from farm gate to final consumer characterizes potato marketing.

Farmers - Farmers are the first link in the potato market chain. Farmers are both producers and consumers. A sizeable portion of output is consumed by the household from their own production and by purchasing from neighbours and village markets. At the time of sale, initial contact is made either by the farmer or the local trader/broker. After striking a deal on price, the farmer and village trader/broker agree on harvest date, sorting and packaging. 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. Individuals or farmer groups rarely transport and wholesale their own produce at urban markets. Most often, produce is sold at farm-gate on a cash basis. Other than selling to village assemblers and brokers, farmers also sell their potatoes by the roadside, take them to the weekly village markets or sell them to a village retailer.

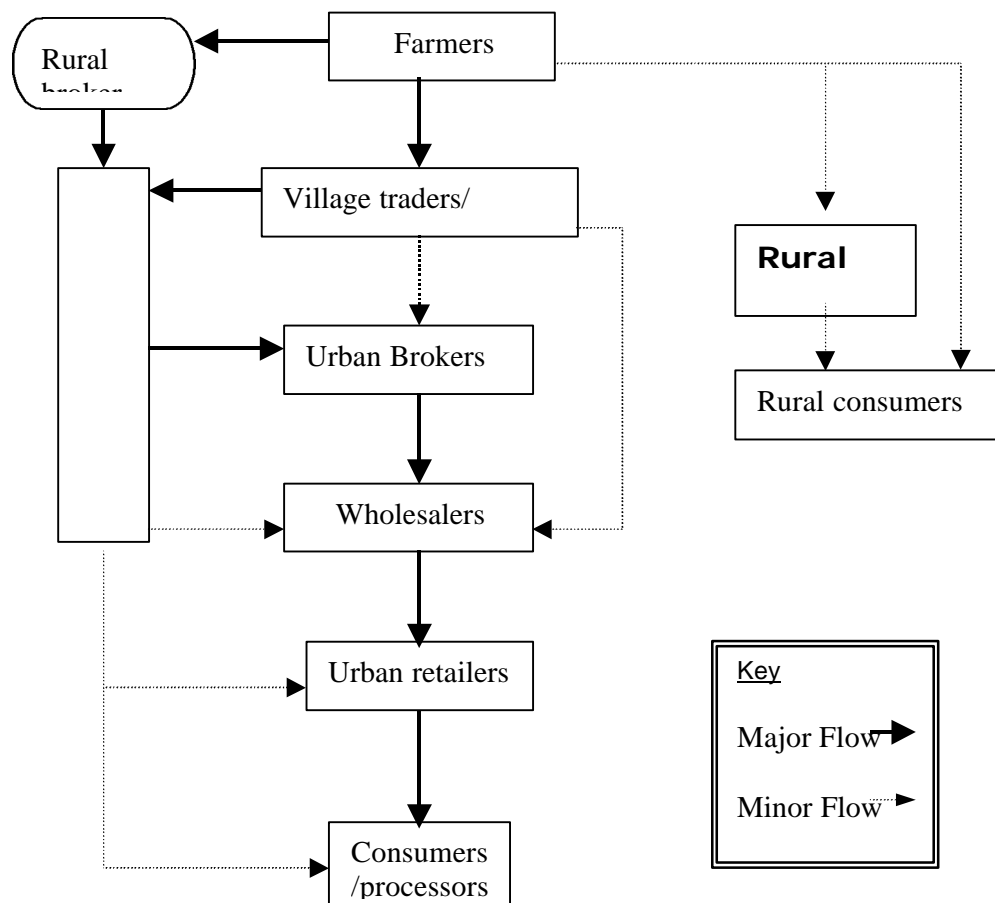
Village traders/assemblers Village traders know farmers in their village and surrounding areas and make it their business to know which farmers are ready to harvest. Village traders are in contact with transporters, wholesale buyers and financial service providers. After identifying farmers willing to sell and a price is agreed, village traders contact wholesale buyers using mobile telephones. The wholesaler who urgently requires supplies can also initiate trade. When a wholesaler requires potatoes, he will call his contact (village trader), agree on a price and other marketing arrangements and the village trader will assemble the product. To accelerate the process, village traders are given cash advances from wholesalers, in which case they at times regard themselves as brokers. Village traders/assemblers also sell to travelling traders from Kampala and to contacts in other towns. Figure 3 illustrates the typical potato trading chain.

Brokers: - The broker is one of the prominent participants in the potato marketing chain. In rural areas, brokers are the contact for travelling traders and wholesale buyers to farmers, as well as the key link between farmers and traders. Brokering is a lucrative activity and some successful village traders and wholesalers become brokers. Brokers are paid immediately on a bag basis for their services. The amount ranges from Ush 500-1,000 per bag depending on the quantity and the urgency with which the consignment is required. Apart from rural brokers who link farmers

with the travelling traders, there are also brokers in most urban centres who link travelling traders to wholesalers and urban retailers. In Kampala markets, we found that, after agreeing a price with a travelling trader, brokers were free to sell at whatever price they could negotiate with the buyers. Thus the commission that the brokers receive varied from Ush 500-2,000 per bag depending on market conditions. Brokers are an organised and influential group in the market (especially Owino market) and few travelling and village traders can directly sell to wholesalers and urban retailers, as shown in Figure 3 by dashed lines (minor flow).

In many respects the broker commands a position that plays a vital role, but also due to the nature of this position, it also restricts entry by other entrants into the market. More competition in this area would probably make for a more open market.

Figure 3: The ware potato trading chain.



Travelling traders - These are traders who either own trucks or hire them for buying potatoes from farmers or village traders and then transport and sell to wholesalers and urban retailers in other district markets. These traders supply most of the potatoes to wholesalers and retailers through brokers. Travelling traders with fresh potatoes (high quality) typically hike their prices relative to those prevailing in the market. However, when their stocks do not sell as quickly as they anticipate and quality starts to degenerate, these traders reduce the price accordingly. Travelling traders will sell at clearance prices to avoid further overhead costs such as

accommodation costs, overnight parking fees, product loss and transport surcharge from truck owners. Travelling traders sometimes also sell at a loss especially when there is excess potato supply on the market coupled with other substitute foodstuffs like cooking bananas, sweet potato and cassava.

Wholesalers - Major potato wholesalers are largely found in the Owino and Nakawa markets in Kampala and Mbale. In other towns, traders double as wholesale and retail traders because of the lower volumes. More often, wholesalers get their supplies from travelling traders. Rarely do wholesalers buy directly from farmers. Traders know the good chipping and crisps varieties most highly sought by restaurants. A popular variety, Uganda 11 (*Rutuku*) is most preferred for chips and crisps, is sold at a premium price of 7-13% over that of other varieties.

Retailers - Potato retailers range from supermarkets to village roadside sellers. In urban areas market retailers buy 1-5 bags from the wholesalers and then sell them in heaps of various sizes and grades for amounts ranging from Ush100-2,000 Uganda Shillings per heap. This wide range of heaped products aims to cater for the needs of all income groups, i.e., those buying two – three small potatoes to larger heaps of several kilograms of higher quality tubers. A heap sold at Ush 1,000 Ush weighs an average of 3 kg. Retailers sort and grade potatoes according to variety and degree of freshness. Unfortunately, grades vary by batches and cannot be relied upon by farmers. Recently, some supermarkets such as *Shoprite* have started selling potatoes in 5kg packages of high grade product, which is a real shift towards a standard. In rural areas, potatoes are sold on the roadsides by the heap or tin. A heap with an average weight of 10kg sells for approximately Ush 2,000. The area of retail grades and standards needs considerable attention, if effective market signals are to be developed for farmers.

Processors - Hotels, restaurants and take-aways (fast-food outlets) are the main business enterprises that process potatoes into chips. In urban areas, over 50% of potatoes may be consumed as chips, (per communication Owino Traders). According to the traders, most of the their bulk buyers are processors from the fast food and restaurant sector. Minimum inputs needed to process chips include fresh potatoes, cooking oil, cooking fuel and a pan. These inputs are locally available. Despite the abundance of good quality potatoes available in Uganda, the South African based fast-food restaurants such as *Nandos* and *Steers* import processed potatoes (frozen fries) from South Africa. This would appear to be a valuable niche market if Ugandan growers could produce the particular varieties required to supply these outlets. There are some small-scale food processors that make crisps from potatoes. Crisps are not yet widely eaten. Students and young people in urban areas are the principal consumers, which means that the market is limited now, but is set to grow as this age group matures and incomes increase.

Given that 50% of urban consumption is processed, it is projected by the year 2015 that up to 250,000 mt will be consumed as a processed product. For industrial processors this market size may prove to be highly lucrative if local products can compete with overseas frozen products from Egypt or South Africa. In Peru, the epicentre of the potato, one of the major local processors preferred to import frozen chips rather than process local potatoes because they were a better product and the processor made savings through lower labour costs and cooking oil costs. Therefore quality is again a key to market share.

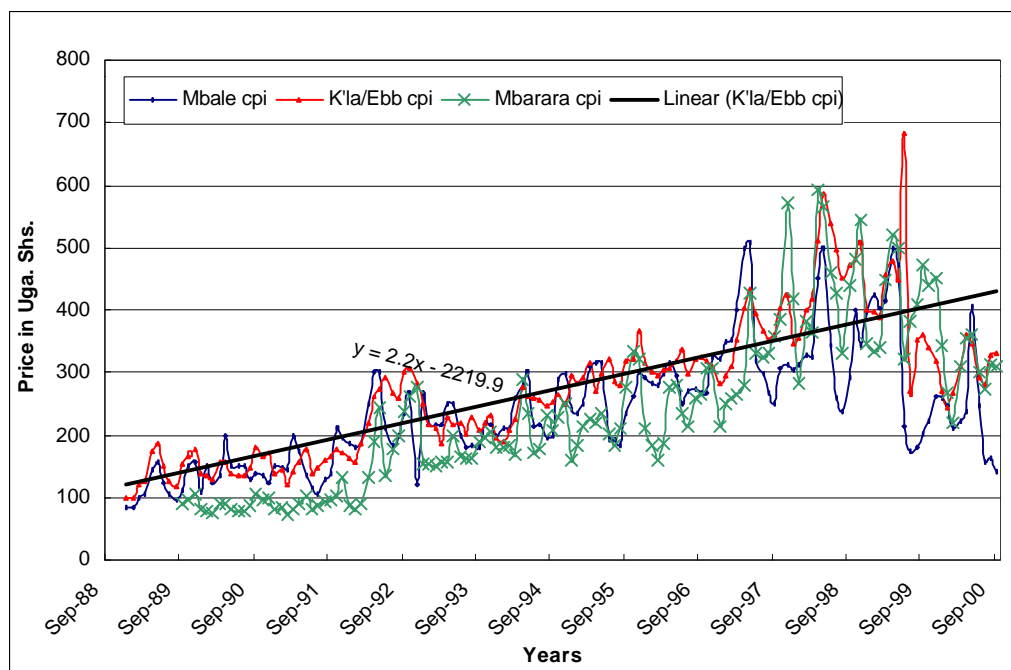
Consumption and prices

Across the country, Ugandans spend 5 times more of their monthly consumption budget on cooking bananas compared with potatoes. Cooking bananas, the staple of the lake zone, rank as the number one food staple in central and some parts of eastern and western districts. Highest monthly household expenditures go to cooking bananas, sweet potatoes, cassava and potatoes, respectively.

The data in **Figure 4** shows the nominal retail price of potatoes in selected markets in Uganda from September 1988 to September 2000. As with other perishable horticulture crops, this graph shows a typical instability of potato market prices associated with seasonal supply that meets a steady demand. The linear trend shows that over time potato prices have more than doubled in the last 10 years in direct relation to the macroeconomic conditions (inflation, exchange rate instability, supply shocks, etc.) prevailing in the country.

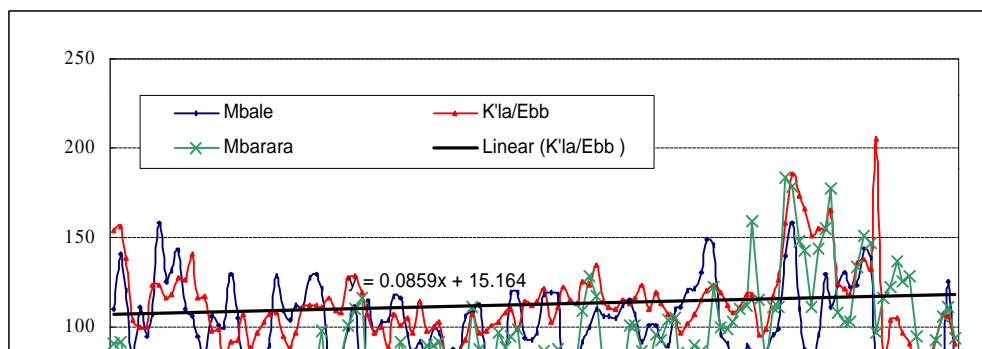
The deflated retail prices of potatoes in Kampala, Mbale, Masaka and Mbarara, indicates that, real prices have been stable, **Figure 5**. The most likely reason why potato real prices have remained almost constant over the long run is because whilst demand for potatoes has increased, supply has matched growth. In Uganda, ware potato production is no longer a monopoly of the highland regions of the Kigezi districts. Victoria, a versatile potato variety with a short maturity period can be grown in virtually all parts of Uganda which have adequate rainfall.

Figure 4: Trend of monthly nominal retail price of potatoes in select district urban markets



Source data: Uganda Bureau of Statistics; Min. of Finance and Econ Dev't.

Figure 5: Trend of monthly real retail price of potatoes in select district urban markets: (base year: Sept 1989 = 100)



Source data: Uganda Bureau of Statistics; Min. of Finance and Econ Dev't

Ware Storage

Price instability is a constant problem for producers and a source of much complaint by Government authorities. Ware potato storage is often suggested as a solution to this problem. Ware storage is typically used in places with strongly seasonal production and very high or very low off-season temperatures. North America, Europe, India and Egypt are regions where storage is widely used. Where potatoes are produced in tropical highland conditions such as those found in East Africa, the Andes or southern China, the use of ware storage is limited. Different crop production calendars from different production zones assure that fresh produce can be found in most markets during most of the year. A fresh potato is superior to a stored one and consumers strongly prefer the former.

During the 1970's Venezuela, Colombia, Ecuador and Peru all experimented with government run ware potato storage services with the objective to reduce the size of the price cycle. In all cases the investments were failures and today governments in the region do not attempt to manage ware potato prices. The storage schemes failed because farmers did not want to put their potatoes into stores. For a ware storage system to be successful, the farmer must be able to reliably sell his stored potato at a price above the price at harvest time plus the cost of storage. This was not possible in the Andes and would not be so in East Africa.

In East Africa, there is limited potential for ambient temperature storage, especially in areas near to the urban markets. Refrigerated stores require reliable sources of electricity and are expensive to build and operate. This further reduces the feasibility of large-scale ware storage.

Marketing Costs and Margins

The data in Table 7 shows the costs and margins derived from the survey of various participants along the potato marketing chain, as found in August 2001. The tables present the costs and returns on potato trading between western Uganda (Kabale, Kisoro, Mbarara, Rakai) and Kampala.

At farm gate, the "average farmer" in Kabale sells potatoes at 8,000 Ush per 100 kg bag. The farm-gate spread price was between 5,000-15,000 Ush, depending on the variety. This wide range reflects either the lack of accurate and timely market information available to farmers or their inability to negotiate effectively with traders, and many farmers were aware that they did not negotiate as association, which weakened their position. As indicated in the potato marketing chain in **Figure 3**, travelling traders are the main buyers of potatoes, through a third party, the rural broker. To ensure quality and minimum post-harvest losses, travelling traders provide packing bags, pay labour to sort and pack, and incur various other costs, as indicated in **Table 7**.

Travelling traders are exposed to many risks as they move food from rural areas to urban centres. In Uganda, potatoes are grown in highland areas which have the worst road networks. While in transit, traders may find that a section of the road has been washed away or their truck may breakdown. In such case, travelling traders may face 50-100% loss of the consignment. In business, the higher the risk, the higher the return and this is particularly true in potato trading where the travelling trader enjoys net margin of over 35%.

While wholesalers seem to earn a lower net margin of Ush 2,393 (9.5%) per bag of potatoes, retailers get an average net margin of Ush 3,700 (12.3%), they usually have a higher turnover than retailers. A wholesaler may sell between 200-400 potato bags per month giving him a net income ranging from Ush 400,000-800,000 per month, whereas the retailer may sell 20-40 bags giving him a monthly net income range between Ush 70,000-150,000 only. Brokers who have an opportunity to handle five, 10-tonne lorries in a month, can attain a monthly income of between Ush 250,000-500,000.

Table 7 : Potato marketing cost and margins

	U Shs./100kg bag	% of selling price
Farmer		
Farm-gate price	8,000	
Travelling trader		
Purchase price	8,000	
Selling price	22,000	
Gross margin	14,000	63.6
Costs		
Commission (Rural broker)	1,000	4.5
Packing bags	500	
Sisal rope for sowing top	83	
Grass for packing	33	
Sorting, packing & sowing labour cost	300	
Loading	200	
Sub-county tax levy	200	
Transport	5,000	
Total cost before Kampala market	7,316	
In Kampala markets		
Market fee	500	
Offloading fee	200	
Commission (Urban broker)	1,000	4.5
Costs in Kampala market	1,700	
Total costs	9,016	
Net margin	4,984	35.6
Wholesaler		
Purchase price	22,000	
Selling price	25,000	
Gross margin	3,000	12.0
Costs		
Market stall rent	14	
Miscellaneous Overhead costs	100	
Post harvest loss	500	
Total costs	614	
Net margin	2386	9.5
Retailer (Owino market)		
Purchase price	25,000	
Selling price	30,000	

Gross margin	5,000	16.7
Costs		
Market stall rent	200	
Miscellaneous labour	300	
Miscellaneous Overhead costs	100	
Post harvest loss	700	
Total costs	1,300	
Net margin	3,700	12.3

Ware potato Imports/Exports.

Interviews held with traders and government revenue officials along the Uganda-Rwanda and Uganda-Kenya borders revealed limited trade in potatoes between Uganda and her neighbours.

At Katuna border (Uganda-Rwanda), a prominent potato trader explained the system of marketing Rwandan potatoes to Kampala. When there is scarcity in Kabale (September-November) amidst high demand from Kampala, traders from Kabale and Kisoro exploit the situation by importing potatoes from Rwanda, repacking them in Kabale and reselling them as potatoes from Kabale. The traders say they buy potatoes from assembly centres in Ruhengeri owned by a cooperative organisation. The traders repack the potatoes by mixing a large percentage of Rwanda potatoes with a smaller amount from Kabale. This is done to persuade travelling traders from Kampala that the whole consignment is from Kabale. Sometimes Kabale brokers who are advanced credit by their trading partners in Kampala mix Kabale potatoes with those from Rwanda. This phenomenon of potato repacking is influenced by the quality of Kabale potatoes. It is generally recognised that Rwandan potatoes are of a lower quality than Ugandan potatoes. Rwandan potatoes have a high water content as most farmers do not practise dehalming, as this reduces weight. However, high water content potatoes have a low shelf-life, and Rwandan potatoes are only saleable for 3-5 days and are therefore treated as a fresh vegetable on the market.

According to reports from Owino markets, Rwanda did attempt to send a shipment of potato to the markets in Kampala, but due to their poor quality, the sales prices was very low and this was not repeated.

Other than at Katuna border, traders revealed that potato trade between Uganda and Rwanda exists informally along other smaller border crossings in Kabale and Kisoro such as Cyanika. In addition, some traders occasionally import potatoes from Eastern Congo (Masisi). A review of the literature suggests there is no cross-border trade in potatoes between Uganda and Kenya. The TechnoServe / University of Nairobi Technical report of 1997 on cross-border trade between Uganda and Kenya makes no mention of potato trade. Traders from Kapchorwa who regularly sell maize grain into Kenya said they have never attempted to sell potatoes from Kapchorwa to Kenya. Also no traders from Mbale, Tororo, Busia and Malaba districts that border Kenya claimed to have imported or exported potatoes between Uganda and Kenya. The potato production map of Kenya shows a major potato-producing belt on the slopes of mount Elgon on the Kenya side. This suggests that all the Kenyan districts bordering Uganda have adequate potato supplies within Kenya.

Constraints to Marketing

There are a number of problems in the marketing of potatoes which means that producers obtain low prices and consumers face high prices. Problems in the market chain include:

- General lack of understanding of market opportunities
- Lack of associations or fora, at which producers, traders and processors can meet, to explore new trading opportunities and marketing channels.
- Lack of standards / premiums that would encourage more commercial farming.
- Highly seasonal supply, which forces down prices, combined with crop perishability
- Lack of associations which could foster collective purchases of inputs and negotiate higher sales prices. Greater co-operation amongst farmers could also be used to leverage credit and act as a conduit for spreading knowledge.
- Lack of market information or an inability of farmers to be able to benefit from knowing market prices, due to lack of association.
- Collusion amongst traders which drives down farm gate prices and yet also retain high urban market prices. At the retail level, many traders collude to maintain prices to protect themselves from rapid price fluctuations.
- Lack of processing technologies and industries to segment the market more effectively.

Opportunities.

- State financed Research, development and extension, agencies should be strengthened within a well defined market orientation. The R&D should have access to / build capacity to collect information and analyse market trends and provide farmers with advise based on market conditions. This may mean that R&D organisation have to hire in a range of different types of skills to improve on their ability to respond to and advise others on market conditions. ***The current export strategy has no marketing component and a strong case needs to be developed, that investment in potatoes will supply an identified market.***
- Investment in training or facilities to enable farmers to improve the quality of crop products, in terms of information and training in grading, sorting and weights and the reasons for meeting recognised standards.
- Investment in or provision of credit to promote the use of inputs.
- Promotion of collectivisation at the rural level to gain economies of scale through integration of labour and development for the capacity to benefit from lower input prices through joint procurement of agricultural inputs and collective sales of bulked agricultural products, this will also assist with increase sales price to farmers and will assist in gaining reduced transport costs.
- Provision of market information related to local, national and regional market opportunities, through local radio stations.
- Training of farmer groups in methods to undertake or understand information based on or derived from market studies.
- Develop stringent guidelines for market operation and encourage the development of more transparent, less collusive behaviour in the market place, through the provision of monitoring services on marketing practices against non-competitive activities.
- Need to work with donors and privates sector to investigate the possibilities of investing in value added processing. This will require support from donors in terms of technical assistance and credit guarantees.
- Promotion of sorting varieties at the market

The Way Forward

Uganda has a long term comparative advantage for the production of both seed and ware potatoes based on its climatic conditions in highland areas. However, the production at present is entirely geared towards domestic markets, primarily for food security and secondly to supply the growing urban demand. Although thanks to its favourable production zones and low cost of labour, Uganda has a comparative advantage, its competitive advantage in the regional and global market place is both untested and at this time limited. Consequently prior to any marketing attempts into external markets, it is more practical to consider the current plan as means to strengthen the domestic market and put production on a more competitive / market oriented footing. Developing a more competitive domestic market is a highly desirable goal given the importance of potatoes as a food security crop and the fact that regional trade is likely to increase within the new frameworks of the East African Community, COMESA and the WTO.

The potato sector in Uganda is expanding, responding to growth in demand from urban areas. Potato can yield over 30mt/hectare in Ugandan conditions, but present yields only manage from 4-7 mt / ha, thus the crop has considerable room for technical improvement. The crop responds well to irrigation and fertilization. The major pests and diseases are controllable with good seed and crop management. IPM technology for the major pests and diseases exists to minimize the use of agrichemicals.

It is a crop ideally suited for smallholder farmers on sloping lands. The sloping lands make mechanization of production difficult and so the crop requires many labour days. As a source of rural employment it probably cannot be surpassed on a per hectare basis.

In production areas the potato is a food security crop. In non-production areas it is a vegetable that is increasing in popularity and importance. Population growth will drive increases in demand for fresh potatoes. Income growth and the expansion of supermarkets and fast food restaurants will contribute to the creation of an industrial processing sector that will lead growth of this new market segment.

Whilst the Government plans are sound in their desire to improve production, the proposal may be more sustainable if it were to consider developing the sector in a more market oriented manner. The following steps may be helpful in incorporating a marketing component into the present strategy.

Step 1. Improving the seed supply sector (2002 – 2004)

The strategy being proposed by the Government will initially focus on the development of an improved seed sector which is essential. All the countries in the region have facilities for supply of pre-basic and basic seed, except Uganda, and therefore this aspect is of highest priority.

- Develop tissue culture facilities for importation and holding of key varieties and for rapid multiplication of plantlets.
- Improve or construct screen houses for mini-tuber multiplication leading to production of pre-basic and basic seed stocks.
- Improve production and bulking rates for basic seeds through outgrower systems, that are linked to a monitored certification scheme.
- Construct storage facilities for holding seed stock
- Development of credit facilities or loan guarantees with donors to enable NGOs and farmer associations to purchase seed, fertiliser and pesticides.
- Promotion of this exercise through extension via demonstration plots and support to the process through an orchestrated media campaign.

Potential Actors in Step 1. This activity should be led by NARO, as they have trained staff, working in collaboration with PRAPACE, CIP and local NGOs, NAADS and MAAIF extension agents. The Uganda National Seed Potato Producers Association should play a key role in developing the basic seed in collaboration with NARO.

Pre-basic seed development of tissue culture plantlets	NARO, CIP, PRAPACE
Production of basic seed -	NARO, UNSPPA, PRAPACE
Bulking of basic seed through outgrowers -	UNSPPA, AFRICARE, PRAPACE, CARE, AHI, farmers associations
Storage facilities	Market trader associations
Rural loan guarantee schemes	Uganda micro-finance consortia, Centenary bank, ACDI risk fund, World Bank
Promotion, demonstration plots	NARO, local NGOs, farmer associations

Step 2: Defining the Market (2002-2005)

- Improving statistics on production levels of potato in Uganda.
- A number of studies need to be done to define the market segments clearly. For, example, if there are any export-quality markets available a business plan is required to evaluate the accessibility of these markets. There may also be a possibility of developing a niche sector for Frozen French fries market to supply the local market. If successful fast food chains such as Nandos and high end retailers such as Shoprite, may be amenable to the process. This would be import substitution rather than an export market, but achieve the same result. Studies need to evaluate demand in the following segments:-
 - Pre-basic and Basic seed
 - Low quality ware
 - Premium quality ware
 - Export quality ware
 - Frozen fries
 - Crisps and other snacks
- Develop grades and standards with farmer associations, traders and retailers. This work will need to be done through a market led approach to define, what share of the market is prepared to pay, a premium and how this can be integrated into the marketing system. Traders already sell a large percentage of their product to processors and this market area should be targeted for higher quality, graded sales.
- As part of this process of strengthening linkages along the market chain, development agencies should provide marketing specialists to guide this process and assist the players to test new ideas and meet to discuss new proposal in a constructive manner.
- Donors, cooperatives and government should establish partnerships to promote and implement the development of the marketing strategy.

Potential Actors in Step 2. This activity should be led by agencies, who are qualified in market research, in Uganda, these agencies include IDEA, COMPETE, FOODNET, CIP, CIAT, local market research agencies. However, the work needs to be done in close collaboration with the private sector and therefore linkages needs to be made for the specific aspects of the market segments.

Production Statistics	FAO, MAAIF, NRI, PRAPACE, CIP
Market studies	FOODNET, PRAPACE, CIP, IDEA, CIAT, consultants.
Market information	NAADS, FOODNET, COMPETE, local FM radios, MTN, NARO, MAAIF.
Defining market segments and grades and standards	Shoprite, major market traders, Chambers of Commerce, Transporters association, farmers associations, PSF.
Supply chain support	PSF, FOODNET, CIAT, NGOs, private sector partners in chain including farmers associations, input suppliers, traders and retailers.
Promotional strategy	Media consultants, FM radios, NAADS.

Step 3. Making Production More Competitive (2002-2010)

- Farm level demonstrations should be developed in partnership with extension, NGOs and NAADS to show the benefits of clean seed, fertiliser and pesticides.
- Agri-business information needs to support the demonstrations such that farmers can be shown the economic benefits and also link premium products to best market opportunities. A radio based promotional campaign would be useful in reinforcing the benefits of input based farming.
- Develop local capacity to provide market information and routine market studies to measure changes in the market conditions.
- Support the development of farmer associations, such that credit and use of market information can be linked to associations.

Potential Actors in Step 3.

Demonstrations to promote inputs	NARO, NAADS, UNSPPA, IDEA, NGOs, farmer associations.
Agribusiness information	CIAT, IDEA, COMPETE, SPEED, FOODNET, CEDO.
Market information	FOODNET, AHI, NGOs, involved with telecentres, FM radios, FIT Uganda business news.
Strengthen farmers associations	CLUSA, CEDO, NAADS, Local Government, PMA, farmers associations

Step 4: Developing the Markets (2005-2015)

- Increase support to most competitive areas of production, based on results from uptake of new technologies.
- Support linkage of identified markets to most successful / innovative groups, i.e., those who have adopted the higher input farming systems and are able to integrate improve management and grading into their systems.
- Donors to provide interested processors with incentives, to develop local processing capacity, in terms of grants, loan guarantees, and technical assistance for business development.

Potential Actors in Step 4.

Support to most competitive areas

NAADS, Private sector Foundation (PSF), Centenary Bank, ACIDI risk fund, IDEA, FOODNET, SPEED, Uganda Microfinance consortia.

Market linkage

IDEA, CIAT, FOODNET, High end retailers such as Shoprite.

Support to Processors

PSF, Centenary Bank, ACIDI risk fund, IDEA, FOODNET, SPEED, Uganda Microfinance consortia.

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Appendices

Appendix 1: Production of potatoes mt by district

Appendix 1: PRODUCTION OF IRISH POTATOES ('000 TONNES) BY DISTRICT									
District	1992	1993	1994	1995	1996	1997	1998	1999	2000
Apac	652	779	896	979	774	877	935	1,094	1,164
Arua	3,061	3,655	4,203	4,591	3,632	4,112	4,386	5,129	5,460
Bundibugy	2,703	3,227	3,711	4,054	3,207	3,630	3,872	4,527	4,820
Bushenyi	1,289	1,539	1,770	1,934	1,530	1,732	1,847	2,160	2,300
Gulu	-	-	-	-	-	-	-	-	-
Hoima	2,683	3,204	3,685	4,025	3,184	3,605	3,845	4,496	4,787
Iganga	5,712	6,820	7,843	8,568	6,777	7,672	8,183	9,569	10,187
Jinja	5,610	6,698	7,703	8,415	6,656	7,536	8,038	9,399	10,006
Kabale	100,681	120,216	138,248	151,020	119,464	135,242	144,258	168,677	179,571
Kabarole	5,238	6,254	7,192	7,856	6,215	7,036	7,505	8,775	9,342
Kalangala	122	146	168	184	145	164	175	205	218
Kampala	-	-	-	-	-	-	-	-	-
Kamuli	6,816	8,138	9,359	10,224	8,087	9,155	9,765	11,418	12,156
Kapchorw	6,200	7,403	8,513	9,299	7,356	8,328	8,883	10,387	11,058
Kasese	5,694	6,799	7,819	8,541	6,757	7,649	8,159	9,540	10,156
Kibaale	2,273	2,714	3,121	3,409	2,697	3,053	3,257	3,808	4,054
Kiboga	1,637	1,955	2,248	2,456	1,943	2,199	2,346	2,743	2,920
Kisoro	27,543	32,887	37,820	41,314	32,681	36,998	39,465	46,145	49,125
Kitgum	96	115	132	144	114	129	138	161	171
Kotido	-	-	-	-	-	-	-	-	-
Kumi	5,785	6,907	7,943	8,677	6,864	7,770	8,288	9,691	10,317
Lira	7,398	8,833	10,158	11,096	8,778	9,937	10,599	12,394	13,194
Luwero	9,675	11,552	13,285	14,512	11,480	12,996	13,862	16,209	17,256
Masaka	8,841	10,556	12,139	13,260	10,490	11,875	12,667	14,811	15,767
Masindi	2,675	3,194	3,673	4,012	3,174	3,593	3,833	4,481	4,771
Mbale	12,125	14,478	16,650	18,188	14,388	16,288	17,374	20,315	21,627
Mbarara	6,050	7,224	8,308	9,076	7,179	8,127	8,669	10,136	10,791
Moroto	-	-	-	-	-	-	-	-	-
Moyo	211	252	290	317	251	284	303	354	377
Mpigi	2,539	3,032	3,487	3,809	3,013	3,411	3,638	4,254	4,529
Mubende	2,455	2,931	3,371	3,682	2,913	3,298	3,518	4,113	4,379
Mukono	1,478	1,765	2,030	2,218	1,754	1,986	2,118	2,477	2,637
Nebbi	3,037	3,626	4,170	4,555	3,603	4,079	4,351	5,087	5,416
Ntungamo	-	-	-	-	-	-	-	-	-
Pallisa	2,191	2,613	3,005	3,283	2,597	2,940	3,136	3,667	3,904
Rakai	3,460	4,131	4,751	5,190	4,105	4,648	4,958	5,797	6,172
Rukungiri	8,457	10,098	11,613	12,686	10,035	11,360	12,117	14,168	15,084
Soroti	6,453	7,705	8,861	9,680	7,657	8,668	9,246	10,811	11,509
Tororo	7,161	8,554	9,837	10,746	8,500	9,623	10,265	12,002	12,777
TOTAL	268,001	320,000	368,002	402,000	318,000	360,000	384,000	449,000	478,000

Production ('000 Mt) of potatoes in Uganda 1980-1992												
Year	1980	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Prodn ('000 Mt)	166	175	209	132	168	98	185	190	248	224	254	268

Source Wagoire et al, (unpubt)

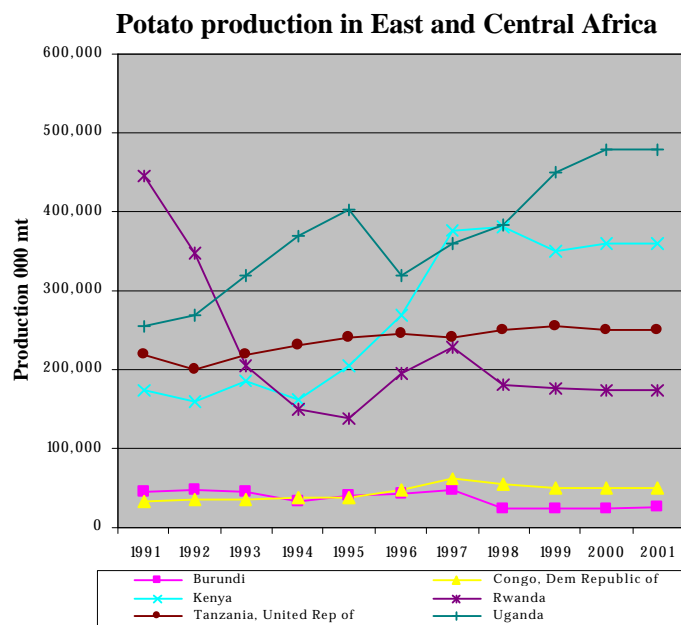
Appendix 2. Potato production statistics in ten selected districts of Uganda 2000 and 2001

Year	2000		2001*	
	Ha	T	Ha	T
Kapchorwa	0	0	2500	27500
Mbale	840	10080	1050	12600
Sironko	755	8305	700	5250
Mubende	0	0	4800	28800
Masaka	192	1344	200	1300
Mbarara	0	0	10710	77112
Bushenyi	0	0	800	5600
Kisoro	24930	448740	25160	452750
Kabale	32500	603355	33750	615375
Nebbi	660	7720	725	7910
Total	59877	1079544	80395	1234197

*Annual production (Mt) are estimated from last years mean yield as most districts are yet to harvest the second season crop

Source Wagoire et al, 9unput)

Appendix 3 Potato Production in East and Central Africa



Source FAOSTAT

Appendix 4a: Analysis of production cost for UNSPPA members in 2000B season

Name	Bags planted	Bags Harvested	Damaged Bags	Net harvest	Multiplication rate	Capital input (Shs)	Production cost per bag (Shs)	Net return (%)
Beinamaryo	10	70	1.5	69	7.0	157.5	1,1514	121.8
Bitarabehe F.	10	66	3	63	6.6	148.6	11,791	36.7
Karibushe	10	82	4.5	78	8.2	182.7	11,293	128.3
Kemani E.	3	18	.5	18	6.0	45.5	11,988	191.9
Kihumuro A	10	66	3	63	6.6	148.6	10,091	110.2
Kikafunda	5	19	1.5	18	2.7	46.2	18,289	28.1
Kisiizi	8	48	3	45	6.0	110	12,969	88.0
Mwongyera	12	100	6	94	8.3	220.3	10,520	171.9
Rubereti	6	29	3	26	3.2	67.2	16,414	-46.6
Sentaro	10	68	0	0	6.8	84.8	13,456	-38.8
Tindimubona	14	115	3	112	8.2	252.2	15,196	158.7
Twesigye V	3	24	1	23	8.0	59	13,313	87.8
Sub-Total	101	705	30.0	755	7.8	1522.6	11,302	96.2

*Each bags weighs 80 kg

For every bag that was planted, 7.8 bags were harvested (Appendix 4a). There was a marked increase to this ratio, which could be probably attributed to better crop management. The mean production per bag was Sh. 11,302 with a minimum and maximum break-even points at Sh. 10,091 respectively. For farmers whose crops were not degraded to ware Potatoes, the average marginal net rate ranged between 28.1% and 191.9% (Appendix 4a). Average marginal net return for all the members was 96.2%. Farmers with low multiplication rates and high production costs per bag made less marginal net returns (Appendix 4a).

Considering resource allocation by UNSPPA members, the greatest proportion of resources was spent on seed Appendix 4b. Farm labour took 18.2%, fertilizers, 8.5%, transport, 7.3% pesticides 6.4% and empty bags took 2.7%. Among the pesticides, the expenditure on insecticides was low. The bulk of this item was used to procure fungicides (90%).

**Appendix 4b : Resource allocation (US\$) in seed potato production by members of Uganda
National Seed potato Producers Association (UNSPPA) in 2000 B**

Name	Cost of seed (Shs)	Farm labour (Shs)	Fertiliser (Shs)	Pesticides (Shs)	Empty bags (Shs)	Transport (Shs)	Total cost (Shs)
Beinamaryo J.	500000	500000	40000	50000	20000	40000	1150000
Bitarabehe F.	500000	500000	90000	33000	21600	5600	1150200
Karibushe G.	500000	500000	42000	50000	36000	140000	1268000
Kemani E.	150000	150000	5000	7800	2000	2000	316800
Kihumuro A.	500000	500000	0	22000	15000	20000	1057000
Kikafunda B.	250000	250000	0	35000	3500	5000	543500
Kisiizi K.	400000	400000	42000	58000	12500	0	912500
Mwongyera A.	600000	600000	86000	45000	53000	87000	1471000
Rubereti E.	300000	300000	0	40000	10000	7000	657000
Sentaro P.	500000	500000	106500	91500	10000	5000	1213000
Tindimubona	700000	700000	340000	88000	50000	310500	2188500
Twesigye V.	150000	150000	0	50000	8500	24000	382500
Total	5050000	5050000	751500	570300	242100	646100	12310000
Percent	56.9	18.2	8.5	6.4	2.7	7.3	100.0

1 \$US – 1725 Uganda shillings, February 2002.

Appendix 5: Sensitivity analysis of the effects of changes in costs and revenues on farmers' margins

Variable option	Total costs (Ush)	Yield (bags) 1 bag ~100kg	Price per bag (Ush)	Revenue (Ush)	Profit/loss (Ush)	Remarks
No fertilizer use	325,000	80	4,000	320,000	-5,000	Common with peasant farmers
No fertilizer & pesticide use	285,000	70	4,000	320,000	35,000	Common with subsistence farmers
No fertilizer use & land hire	300,000	80	4,000	320,000	20,000	Most common situation
No fertilizer use & land hire	300,000	80	5,000	400,000	100,000	Most common situation with off season production

Source Okoboi and Ferris, 2002 (unpub)