

THE AFRICAN FOOD CRISIS
THE MILLENNIUM DEVELOPMENT GOALS
AFRINT II MESO AND MICRO LEVEL STUDY
UGANDA

Research Report

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1.0 INTRODUCTION

Uganda is endowed with a wide diversity of natural resources in terms of soils, climate, water and vegetation, which enables it to grow a large number of crops countrywide. Both food and cash crops are almost entirely rainfed and grown at a subsistence level with little or no input in terms of soil fertility enhancement. As a result there is continuous soil nutrient mining and degradation which impact negatively on the crop yields.

The country is administratively divided into 7 regional blocks which reflect different agro-ecological zones and ethnic groupings. The regions are further sub-divided into districts (56 in total), counties, sub-counties, parishes and finally local council villages, which have varying numbers of households.

The most widely used staple food crop in Uganda is the Banana, but the diverse social ethnic structure, has among other things played a significant role in determining the type of staple food crops adopted by different regions. Apart from bananas, the other important staple food crops grown include rice, cassava, sorghum, millet, maize and sweet potatoes.

2.0 METHODOLOGY

2.1 Selection of Study Areas for the AFRINT II Surveys

A total of 5 regions, 9 districts and 10 villages were purposively selected for this study based on four major criteria:

- The area that produces more of a particular staple than the other areas.
- An area with a high agricultural potential within a particular region and district.
- Areas that were surveyed in the AFRINT 1 phase, required to collect Panel data.
- Accessibility amidst security concerns in some parts of the country.

Consequently, the Eastern region was selected majorly for Rice and Maize; Central region for Bananas and Cassava; South Western for Bananas and Sorghum; North Western for Rice and Cassava; and West Nile for Maize, Cassava and Sorghum.

A total of 10 villages were targeted including the ones that had been surveyed in AFRINT I. On average 2 villages were selected from each of the 5 regions identified, but with some regions having more or less than 2 because of the priority given to AFRINT I villages. Two of the regions in Uganda that is from the north, were not sampled from due to the prevailing instability in those regions.

The villages were both randomly and purposively selected.

Regions, Districts and Villages Selected

REGION	DISTRICTS	VILLAGES	VILLAGE GPS-COORDINATES
Eastern	Mbale	Khamoto	<i>Lat:01 deg 01 min; Long:034 deg 07 min.</i>
Eastern	Bugiri	Busowa	<i>Lat:00 deg 36.42 min; Long:033 deg 41.458 min.</i>
Central	Mukono	Lubuguma	<i>Lat:00 deg 18 min; Long:032 deg 46 min.</i>
Central	Luwero	Temamasanga	<i>Lat:00 deg 55.55 min; Long:032 deg 39.447 min.</i>
South Western	Bushenyi	Kihororo	<i>Lat:00 deg 36.90 min; Long:030 deg 09.787 min.</i>
South Western	Kabale	Kahondo T/C	<i>Lat:01 deg 17.35 min; Long:030 deg 09.205 min.</i>
North Western	Hoima	Nyamaroby	<i>Lat:01 deg 26.73 min; Long:031 deg 10.887 min.</i>
North Western	Masindi	Mpumwe	<i>Lat:01 deg 53.89 min; Long:031 deg 57.719 min.</i>
North Western	Masindi	Masamba	<i>Lat:01 deg 53.63 min; Long:032 deg 01.171 min.</i>
West Nile	Arua	Asevu	<i>*Lat:02 deg 54.45 min; Long:030 deg 52.628 min.</i>

**Village coordinates were not obtained due to a technical fault with machine. Indicated are coordinates for ARUA town which is the nearest town to the village (7km).*

2.2 Selection of Key Informants for the Village Diagnostic Survey

Preliminary visits were made to each of the selected districts and villages prior to both the Meso-level and Micro-level household surveys. The main aim was to identify key informants for the village diagnostic survey, as well as collect sampling frames for the household survey.

In the process, appointments were made with local governing authorities at the sub-county level to highlight strategies taken towards increasing staple food production and commercialization of agriculture.

At village level, the local council chairpersons helped with mobilizing different focus groups give insights on the agricultural situation in their villages. On average 2 government officials were interviewed per sub-county, 4 -5 village council officials addressed sensitive topics e.g on Ethnicity, Land and HIV/AIDS, while a separate focus group of 10 to 15 key informants handled the rest of the farming related questions. In all cases the selection of key informants took into account a balanced participation in terms of gender (male & female), age brackets (Informed youths, adults and the elderly), Educational levels and Status (Village officials and typical farmers). If such measures are not put in place, focus groups typically tend to be dominated by men only, the educated or those with a higher status in the community, which biases the information obtained.

2.3 Selection of households for the Micro-level household Survey

The village local council chairpersons together with the village LC 1 Secretaries assisted in compiling and updating existing village household lists, from which researchers randomly selected 40 households per village with some extras to replace those who would be found absent. For those households that had been interviewed in AFRINT I, the same households were targeted and in case of migration or non-existence of the household, a completely new household was interviewed.

Enumerators were trained and sent out in pairs per village for company and accountability. It was preferred that either the farm manager or the spouse be the respondent and to a larger extent this was achieved. Appointments for household interviews were scheduled by the village chairpersons with the consent of the heads of selected households. The main complaint from both the enumerators and respondents was the big size of the questionnaire and the length of time it would take to address all the questions. This concern is valid for Uganda given that each farming household in Uganda was likely to be found with a minimum of 2 - 3 staple food crops on top of other food and non-food cash crops.

3.0 RESULTS OF THE VILLAGE DIAGNOSTICS SURVEY

3.1 The Economic priorities of local governing authorities at Sub-County Level

As earlier mentioned, informal interviews were held with sub-county officials to highlight government's specific contribution towards increasing staple food production and commercialization of agriculture. The sub-county offices happen to be the closest arm of government to the village. The 3 most important economic priorities for the local government authorities in the targeted villages were found to be **Agriculture, Health and Education** in that order.

Of the 10 sub-counties visited, 8 focused on increasing agricultural production and marketing as their first economic priority, in terms of budgetary allocation and activities, which included:- extending advisory services to farmers, disseminating technologies and improving market access. The other 2 sub-counties which govern Masamba and Mpumwe villages in Masindi, gave first priority to improving education. The two villages Masamba and Mpumwe, happen to be major settlement areas for refugees, they border with a major National Wild Life Park and their agro-ecological potential was rated among the lowest. This could probably explain why education, followed by health are given a higher economic priority than agriculture.

The second economic priority for nearly all the sub-counties is an effort to improve health services in the villages, with the exception of Vurra sub-county in West Nile, which focussed more on Education. Health services are to be improved by renovating existing health facilities, rolling out of more health centres, promoting the use of mosquito nets for malaria control, sensitizing the public on HIV/AIDS and ensuring the availability of safe water and proper sanitation. The philosophy held is that “for people to be productive, they must be healthy”.

Although improving primary education and literacy rates takes third priority in most (6 out of 10) of the sub-counties visited it equally plays a significant role on the well-being of the households. The educated in the villages have been found to appreciate and participate more in terms of adopting and disseminating innovative ideas. In a bid to increase the literacy rate in the villages, government has put in place mechanisms to support girl child education, adult literacy and education for the disabled. Constructing of more schools, staff houses and purchasing of the required school furniture is top on the agenda of most sub-counties.

3.2 Specific local government strategies to increase staple food production

Table 1: Positive measures towards increasing staple food production

REGION	VILLAGE	POSITIVE INTERVENTIONS (RANKED ACCORDING TO IMPORTANCE)			
		<i>Positive 1</i>	<i>Positive 2</i>	<i>Positive 3</i>	<i>Positive 4</i>
North Western	Masamba	NAADS put up a demo to multiply improved cassava cuttings.	Established cereal cribs to reduce post harvest losses.		
	Mpumwe	NAADS gave resistant cassava cuttings & hybrid maize seed to ensure food security.	Upland rice was being introduced because maize yields are fast declining in the area.	Farmers are argued to apply fertilizers to replenish the poor soils.	
	Nyamaroby	NAADS has trained & given improved variety of bananas, rice & cassava.	Sub-county holds Foods security & disease control workshops for farmers	By-laws have been set for each farmer to keep 1 acre of cassava or millet for food security in home.	
Eastern	Busowa	NAADS promotes use of improved seed e.g set demos of NERICA rice.	Sensitizing farmers on use of improved agric. Techniques thru farmer exchange visits.	Provide seedlings to encourage tree planting as a way of controlling soil erosion, raise food production.	
	Khamoto	Disseminated improved beans, Coffee, cassava, Gnuts, NERICA rice through NAADS farmer groups.	Put up agric shows to train & monitor the use of recommended agronomic practices.	A food security law has been passed but not enforced yet to grow famine crops, sell limited amounts of food & construct granneries.	Enterprise diversification is encouraged to avoid relying heavily on staple foods for income.
South Western	Kahondo T/C	NAADS trained farmers in use of improved agric. Practices & set up an Irish Potato	Diversification is encouraged to boost staple food production and ensure food	A lot of effort is being put into preserving the local banana varieties(area not	

		demonstration plot to multiply.	security.	infested yet), by limiting plant 7 movement of farm implements.	
	Kihororo	NAADS has provided improved coffee, bananas, cassava, irish & sweet potato vines.	Farmers are taught how to use manure to sustain banana production.	There is continuous monitoring to ensure farmers use promoted agric. practices	
Central	Lubuguma A	NAADS gave disease resistant cassava varieties & put up demos to help re-establish banana plantations. (Bananas were abandoned because of the vanilla boom).	The NERICA rice project is just being introduced in the village. Only a few farmers started growing this past season.		
	Temamasanga	AMREF helped disseminate improved banana suckers.	Sub-county officials encouraging farmers to grow more staples for food security.	Through a farmer development program, farmers get farm implements on credit and pay back slowly.	NAADS, LGDP to encourage pineapple growing for income so that staple food crops are spared.
West Nile	Asevu	NAADS gave improved seed of Gnuts rice, beans Cassava, maize.	NAADS helps in establishing maize cribs for proper storage.		

As can be seen in Table 1 above, the local government and authorities in the selected areas have taken deliberate steps to boost the production of food staples through government led initiatives.

It should be noted that the main government extension arm which is the National Agricultural Advisory Services (NAADS), promotes technologies through a limited number of farmer groups per village and that their mode of operation involves setting up demonstration plots to multiply the improved varieties being promoted.

This according to farmers is a very slow method of disseminating improved varieties, to the extent that farmers claim to not be receiving any extension services and go to great lengths to acquire the improved varieties being promoted. NAADS only deals with group members who are usually between 15 and 20 per village, from whom other farmers are supposed to learn and demand for any desired services.

3.2.2 Negative interventions in the process of increasing staple food production.

In the process of trying to establish whether there were any negative interventions by local authorities, non-intentional or otherwise, a number of interesting responses were generated, with some bordering onto negative impacts.

Eastern region

- In Khamoto, Mbale district, farmers and some of the local authorities interviewed reported that the dissemination of improved varieties is often hijacked and politicized by people contesting for parliamentary or high political offices; hence distribution is delayed to the extent that the planting materials (e.g cassava recently) refuse to germinate.
- A number of NGO's involved in boosting agricultural production often provide lunch or a lunch allowance to farmers which government extension do not reciprocate hence farmers do not gather to listen to government extension staff and likewise the latter are also reluctant to go offer their expertise in the villages.
- Farmers are complaining that market liberalization has affected the price of produce, access to inputs and overall production negatively. They claim that market liberalization has not protected them from middle men who are exploiting the opportunity to their benefit.

- In Busowa, Bugiri district, farmers claimed that the NERICA rice project had attracted a new and dangerous weed which was drying up the soil and crippling other plants. The sample shown to us revealed that the weed in question was the parasitic striga weed which they vehemently claim was introduced at the time the upland rice project was being introduced. Busowa, a major rice growing area has been growing mainly paddy rice.

Central Region

- In Lubuguma, Mukono district, farmers were encouraged to diversify and take on specific cash crops as sources of income, with the hope that this would save food staples from being sold for income. However the attractive premium price of some of these cash crops impacted negatively on the production of food staples.
- A case in point was farmers chopping down banana plantations in favour of vanilla production, which was paying them a premium price of 1200 US \$ per 100 kgs of vanilla compared to an average of 10 US \$ per 100 kgs of bananas. Unfortunately in the recent past the world market price for vanilla took a plunge leaving farmers with only a few staples to fall back to. Farmers in Lubuguma are now reluctant to embrace NERICA rice growing, fearing that similar setbacks may befall them.
- In Temamasanga, Luwero district, farmers complained that the sub-county was not giving priority to stocking up seed of improved varieties hence affecting increased staple food production. At the same time pineapple production, which is a major source of income in the area, has led to increased deforestation because of the extensive size of land required for a profitable venture. This has not only affected the micro-climate in the area but also the size of land allocated to staple food crops.

South Western Region

- In Kihororo, Bushenyi district, farmers eluded to the fact that knowledge is not appreciated if not accompanied by free handouts such as seed or lunch allowances, a precedent already set by the several NGO's that have worked in the area. Our focus group discussion was also delayed because farmers needed a confirmation that some lunch would be provided, before they could assemble.
- In Kahondo, Kabale district, the main setback reported was the fact that credit provision is multi-sectoral, with pay back terms which do not favour staple food production.
- While NAADS is encouraging farmers to have diverse enterprises e.g goat and poultry rearing, some farmers have given up or neglected the growing of certain crops, thus affecting overall staple food production.

North Western Region

- In Mpumwe, Masindi district, the promotion of sunflower production as a cash crop is negatively affecting staple food production because of its highly profitable and ready market. With the men more engaged in sunflower production and traditionally owning the productive resources in the home, women are burdened with how to produce enough food for the homes.
- No comments were got from Masamba in Masindi district and Nyamaroby in Hoima district.

West Nile Region

- Reports from Asevu, in Arua district, revealed that farmers are still reluctant to procure agricultural inputs or follow through recommended advisory services without receiving free handouts. This anticipation continues to hamper technology adoption even with the sensitization given.

- The geographical position of Arua as a cross boarder town with Congo, poses a challenge in terms of controlling plant diseases because of the frequent exchange of planting materials across the boarder with little or no proper quarantine measures in place. This has contributed to the introducing of new diseases now and again and derailing of efforts towards improving increased food production.

3.3 Specific local government strategies to increase commercialization of smallholder agriculture

Table 2: Positive measures towards increasing commercialization of agriculture

REGION	VILLAGE	POSITIVE INTERVENTIONS (RANKED ACCORDING TO IMPORTANCE)			
		<i>Positive 1</i>	<i>Positive 2</i>	<i>Positive 3</i>	<i>Positive 4</i>
North Western	Masamba	NAADS provided coffee seedlings to boost production and incomes.	NAADS introduced improved goat breeds to increase sources of income.	Farmers taught to market together so as to eliminate middle men & get better prices.	
	Mpumwe	Local govt dev programme(LGDP) has a work plan to upgrade all existing markets.	Establish stores at parish level so that farmers can keep produce for better prices.	Improve local chicken breeds by crossing them with exotic for better incomes.	
	Nyamaroby	NAADS introduced upland rice which has high yields, convenient to grow & fetches a good price.	Farmers encouraged & assisted to obtain land titles which they can mortgage for loans and invest more in farming.	Farmers are encouraged to market collectively e.g rice in order to reduce on transport costs.	
Eastern	Busowa	NAADS & LGDP are training farmers in commercial enterprise management and the importance of	Learning experiences are shared through exchange visits to encourage diversification	Farmers are encouraged to put up stalls and stores in order to market their produce at better	

		adopting improved Varieties.	and increase incomes.	prices.	
	Khamoto	Farmers are encouraged to have diverse enterprises so as to get good incomes and re-invest back into agriculture.	High value crops like the NERICA rice are being introduced to boost incomes of the farmers.		
South Western	Kahondo T/C	NAADS trained farmers in diverse enterprises like pineapple & passion fruit growing, goat & poultry rearing for more incomes.			
	Kihororo	The sub-county constructed a market to reduce distances travelled by farmers to sell their produce. Traders come & offer better prices.	Youths are targeted for pig & poultry rearing while households are advised to have a cow for milk & manure.	To prevent idleness youths are trained in entrepreneur skills & advised to grow tomatoes for quick cash.	
Central	Lubuguma A	NAADS is providing disease resistant bananas & other varieties to increase production & marketing.			
	Temamasanga	NAADS provides training and pineapple suckers to encourage farmers take on this viable business in the area.	NAADS also supports APIARY by providing bee-hives & training in honey harvesting.	Mango seedlings are given out to farmer groups to encourage mango growing for local & the export market.	LGDP assisted in re-stocking and improving local breeds by introducing superior breeds.
West Nile	Asevu	A market was built to enable farmers market their Gnuts, honey & onions collectively for better prices.	A maize sheller & grinder were provided to add value to maize, cassava, millet & to ease purchase.	LGDP is repairing roads & bridges, also putting up market shades in a fenced area.	

The main interventions towards increasing commercialization of agriculture have included:-

- a) Providing access to higher yielding, disease resistant varieties of crops and animal breeds in order to boost production on the small farmer plots thus ensuring that farmers have enough surpluses for sale.
- b) Promoting diversified agricultural production which has several advantages such as reducing risks due to crop loss, profitable utilization of small plots and having several sources of income which provide enough funds for re-investment.
- c) Improving existing infrastructure such as road & bridge repairs, constructing of markets close to the farmers hence reducing distances moved in search of markets and providing farmers with a platform to negotiate for better prices.
- d) Encouraging farmers to adopt various entrepreneur skills such as marketing collectively and making use of storage facilities to hold produce until a better price is offered. A premium price will always act as an incentive for increased commercialization of agriculture.

3.3.2 Negative interventions in the process of increasing staple food production.

Eastern Region

- Busowa village in Bugiri district is strategically located along the main-highway to the Eastern region of the country. Apart from being a major rice growing area, it is an attraction for a lot of trade and commercial activities. As a result the area has a high influx of migrants, leading to increased land scarcity and reduced overall production per household.
- No comments obtained from Khamoto.

Central Region

- In Lubuguma, Mukono district, the village received a tractor but its operation was politicized hence the intended benefits were not realised.
- Improved maize seed had been delivered to the sub-county for farmers to access but the seed was smuggled out for other uses before farmers could get it.
- The quality of improved varieties is not always certain and at times it is bad with poor or no germination hence affecting commercialization.
- In Temamasanga, Luwero district, pineapple growing has led to extensive deforestation because the enterprise requires big chunks of land and attracts sizeable returns. This has affected the micro-climate in the area which will in the long run negatively impact on commercialization.

South Western Region

- No negative interventions gathered from Kihororo and Kahondo in the South West.

North Western Region

- In Masamba village, Masindi district, and Nyamaroby in Hoima district, Tobacco farmers complained that they lacked protection from any exploitation by contractors amidst varying prices due to the ready cash offered, and yet cash crops like Tobacco and Sunflower tend to be labour intensive, robbing time off food production and occupying 2 to 4 acres on average for a period of not less than 9 months.
- No comments obtained from Mpumwe in Masindi district.

West Nile Region

- In Asevu village, Arua district, farmers complained that Tobacco growing takes up a lot of labour and prime land because of the premium, at the expense of other food and cash crops. They also complained that it leaves the soils exhausted all of which may affect crop production in the long run.

3.4 General Village Characteristics and Agricultural Dynamism.

3.4.1 Village Characteristics

A critical assessment of the regions surveyed in this study revealed that the South Western Region of Uganda had on average the highest (7.5), agro-ecological potential on a scale of 1-10, in terms of rainfall pattern, soil qualities, topography and the possibility to irrigate. This was closely followed by West Nile with an average of 7, Eastern 6.5, Central 6 and North Western Region 5.7.

On the other hand the Eastern Region, North Western and Central regions had the highest mean population sizes per village with 304, 170 and 149 households respectively, while South Western and West Nile Regions had the lowest with 80 and 75 households on average per village respectively.

It is interesting to note that the least populated regions and villages had a higher agro-ecological potential than the most populated regions of the country. As much as there are several factors responsible for the trends observed, it is clear that high populations negatively impact on the quantity and quality of the productive resources available.

The main occupation of about 80% of the residents in the villages surveyed was found to be mixed farming involving mainly growing of crops alongside rearing livestock for different purposes. The rest had more who entirely depend on agricultural labour, while a few others have non-farm sources of income such as salaried jobs or businesses.

On a regional level, the villages in the East had the shortest mean distance to an all-weather road (2.5km), followed by West Nile (7km), South Western (10km), North Western (14km) and Central Region (30km) in that order. Details for each village can be seen in table 3 below.

Table 3: Agro-ecological potential, population size, occupation and infrastructure of the 10 villages surveyed.

REGION	VILLAGE	AGRO- ECOLOGICAL POTENTIAL	POPULATION SIZE	MAIN OCCUPATION	DISTANCE TO NEAREST TARMAC ROAD
NORTH	Masamba	5	80	Mixed farming	4
WESTERN	Mpumwe	6	300	Mixed farming	12
	Nyamaroby	6	108	Mixed farming	26
EASTERN	Busowa	6	600	Mixed farming	0.02
	Khamoto	7	104	Mixed farming	5
SOUTH	Kahondo	7	110	Mixed farming	10
WESTERN	Kihororo	8	50	Mixed farming	10
CENTRAL	Lubuguma A	7	155	Mixed farming	20
	Temamasanga	5	143	Mixed farming	40
WEST NILE	Asevu	7	75	Mixed farming	7

Migrants and Ethnic groupings

As earlier mentioned, Busowa village in the Eastern region was having a high influx of migrants because of its strategic location along a major highway, hence a centre for commercial activities and its importance as a rice growing area in the region.

Table 3 above shows that Busowa had a population of 600 households, which is over 5 times the population found in almost all the other villages, with a total of 300 migrants reported to have arrived in the village in the past year seeking for land. The migrants adopted the livelihood strategies of the area which are mixed farming and commercial trade.

Mpumwe village in the North western region also has up to 300 households, which was evidently due to people migrating from other over populated regions in the country and

the refugee settlements within close proximity. The majority of residents are not natives of the region.

Another village that attracted many migrants is Lubuguma A found in the central region. A total of 180 migrants were reported to have come into the village seeking for land in the past year alone and out of these, 35 households were settled in the village according to the local council chairperson. Most of these people were displaced due to construction of the northern by-pass road and they are mainly government employees or business people.

With the exception of Kihororo village in the South Western Region, the migrants in all the other 9 villages surveyed, attain land only by purchasing. Farmers in Kihororo revealed that due to severe land shortages, family land is no longer fragmented but preserved through collective use hence no single person is allowed to sell land. Migrants can only rent or borrow.

The regions which were associated with high population densities and subsequently large numbers of migrants, were also found to have the highest number (4-6) of ethnic groupings per village, while the least populated regions had 1-3 ethnic groupings comprising of natives of the area. For example, Busowa in the East had 60% Basoga, 15% Basamya, Banyoli, 12% Iteso, Lugbara and about 3% Karmajong. Mpumwe in the North West had 45% Bagisu, 25% Banyoro, 20% Bakyope, 7% Baruli, 2% Iteso and 1% Lendu from Congo. On the other hand Kahondo T/C in South West and Asevu in West Nile had 100% Bakiga and 100% Lugbara respectively.

3.4.2 Land and Land Tenure Systems

Although the possession of a formal land title or registration offers security in terms of land ownership, the general assessment in most of the villages surveyed was that only a few of the households hold formal land titles.

In 3 of the 10 villages visited, the general consensus from the key informants was that there was no single household in their villages that had a formal land title. This was revealed in West Nile, one village in Central region and one in the North Western Region.

Fallowing of land

Given the on-going population pressure exerted on the continuously diminishing land resources available, it would be imagined that the practise of fallowing would be more than extinct by now. However according to the village diagnostic survey conducted, fallowing of land does still occur in 4 of the 10 villages surveyed, with varying reasons as can be seen in table 4 below.

On the whole, 9 out of the 10 villages surveyed said the length of the fallow period had decreased greatly with many of the households unable to fallow due to land shortage. In the village of Temamasanga, key informants gave an opposite view mentioning that the only people who can afford to fallow land in their village do so for longer periods of time but unintentionally because of old age and sickness. Their relatives or would-be beneficiaries have settled in urban areas and are not yet willing to come back and farm the land.

Table 4: Proportion of land fallowed and the reasons for fallowing.

REGION	VILLAGE	% of Land fallowed	% of farmers fallowing	Months fallow	Reasons for Fallowing
North Western	Mpumwe	20	20	6	For soil fertility rehabilitation.
South Western	Kahondo	40	80	3	For soil fertility rehabilitation.
Central	Temamasanga	30	21	6	Sick and aged, can only grow crops for 1 season. Not enough labour.
Central	Lubuguma	12	5	6	A few landlords with a lot of land. Not enough labour to cultivate land.

The highest proportion of land fallowed and households fallowing was found to be in Kahondo village, South Western Uganda. The proportion of 80% households practising fallowing was unbelievable given the severe land constraints in a village characterized by a hilly terrain subjected to a lot of soil degradation.

A critical examination of the response given revealed that the unfavourable soil conditions due to the existing terrain was the very reason why it was almost mandatory for each household to keep however small a plot of land for soil fertility rejuvenation. However due to the severe land shortage, fallowing can only be done for 3 months at most.

The Landless and the poor households

Table 5: Proportion of landless households, landless who are female-headed and landless who depend on agricultural labour.

VILLAGE	Est. no. of landless households	% proportion of the landless in the village	% of landless female headed	% of landless in agric. labour	No. of poor households based on the 1 USD criterion	Proportion of the poor who are landless
Masamba (N=80)	10	12.5	60	100	10	100
Mpumwe (N=300)	50	17	70	100	100	50
Nyamaroby (N=130)	20	15	30	60	0	0
Busowa (N=600)	0	0	0	0	60	0
Khamoto (N=104)	5	5	0	100	15	33
Kahondo (N=110)	10	9	20	100	10	100
Kihororo (N=50)	0	0	0	0	0	0
Lubuguma (N=155)	77	50	40	66	10	100
Temamasanga (N=143)	0	0	0	0	15	0
Asevu (N=75)	10	13	40	100	27	50
Overall Means	26	17	43	89	31	72

The landless households

The highest numbers of landless households were found in Lubuguma village in the Central Region. This constituted 50% of the total number of households in the village and the highest proportion of households in all the villages visited.

As earlier mentioned Lubuguma received one of the highest (180) number of migrants in the past year alone, a condition they attributed to displacement of people in neighbourhood due to road construction. The key informants said that most of the new settlers are either renting houses within the village or could only afford plots on which to construct a house but have no land to farm on. The majority of these are either government employees or workers in a flower farm nearby.

There were 2 major reasons mentioned for landlessness across the regions surveyed. The most important reason given was land scarcity, which was mentioned in 7 out of the 10 villages visited. The other common occurrence is women losing their land upon divorce.

Villages with no landless households

From table 5 above, we note interestingly that there were no landless households in Busowa, Kihororo and Temamasanga villages.

In Busowa, Eastern region, the key informants claimed that every resident in their village has some land to farm on but that some people are not productive due to terminal illnesses or old age. Many of these they said, end up selling most of their land in order to survive, while others rent it out.

In Kihororo, South Western region, the situation was rather unique. As a way of preserving the land remaining after years of land fragmentation, families in the entire village decided to stop sub-dividing the land and farm it together as families. In Kihororo they emphasize that no single person owns land on their own. Land is co-owned by family members, so if one desires to build a house, the clan decides on a designated area or else one goes and purchases land elsewhere. When it comes to farming, the banana plantations belong to the entire family, but other crops can be grown individually on what is considered to be family land. Sales of any crop can be handled separately as long as

land is not sub-divided. Hence there argument is that no one lacks land to farm on in their village.

For Temamasanga, in Central region, it was kind of evident that there is enough land to go around. This village is 40 km off the main highway and is surrounded by forested areas and virgin land. The key informants said that landlessness was not an issue in the village but instead there were many who are weak or aged whose land remains unutilized.

The poor households based on the 1 USD Criterion

When farmers in the village are asked about the poor in their village, it is common for them to imagine and claim that the whole village is very poor and in dire need of any help. However when the 1 US dollar criterion was explained to them, they were astounded to find that the majority of households were actually not poor, to the extent that in 2 of the 10 villages surveyed, no poor households were identified.

While the largest number of poor households (100) was reported in Mpumwe village, the highest proportion of poor (36%) were found in Asevu village, West Nile region, followed by 33% in Mpumwe, 14% in Khamoto, 13% in both Lubuguma and Masamba, 10% in both Busowa and Temamasanga, 9% in Kahondo and finally 0% in Nyamaroby and Kihororo villages. Figure 1 below shows the poverty levels at regional level.

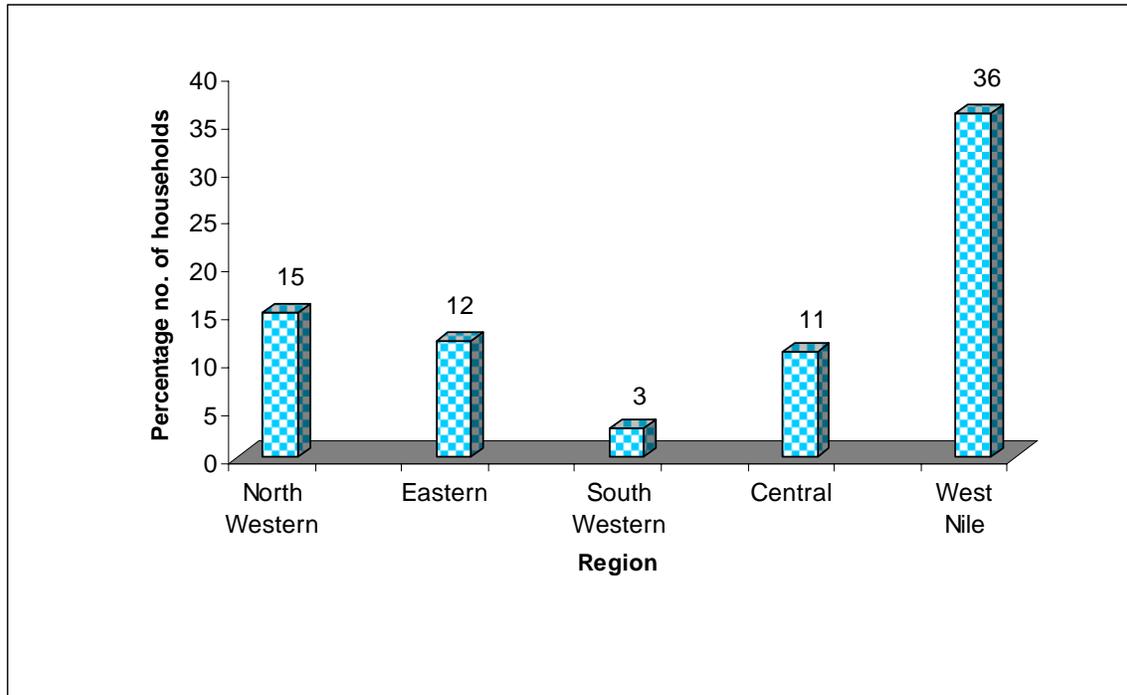


Figure 1: Mean proportion of households classified as poor in the 5 regions surveyed

In the process of analysing the monetary value of food consumed by rural households, farmers realised that they had not been valuing the food they grow and the many resources at their disposal.

In Nyamaroby, no poor households were identified, citing reasons that everybody in that village had a chance to offer labour in the nearby tea estate, where wages of not less than 3000/= (about 2 US \$) are paid to each person on a daily basis. The informants claimed that it was almost impossible to find a person who couldn't afford a meal because even those who concentrated on their farms were earning daily by selling food stuffs to permanent employees of the tea estate.

In Kihororo village whose agro-ecological potential was the highest among the villages surveyed, it was very evident that people had plenty of food to survive on. According to the key informants, even the most disadvantaged household is able to feed a family of 5 to 6 household members on average, a meal of potatoes for breakfast, bananas and beans

for lunch and millet porridge with a snack in the evening. This translates into more than 5 US dollars at the current market prices in the area.

Characteristics associated with landlessness

Landless households have often been associated with poverty, dependency on agricultural labour or being female-headed. Results from the village diagnostic study showed that on average 43% of the landless households identified were female-headed households, 89% were dependent on agricultural labour, while 72% of the landless households on average were classified as poor.

3.4.3 Credit provision and Prevalence of HIV/Aids

Only 3 villages out of the 10 surveyed reported having some form of credit provision in their villages. These were Busowa in the East, Kahondo T/C in the South West and Lubuguma A in the Central region. Of these, only Lubuguma received credit services from a formal government agency. The other 2 villages depended on credit from rotating saving clubs.

All the 3 villages said that credit was available for staple food production and the collateral required was mainly land, cattle, deposits or other assets such as sofa sets or beds.

Nearly all the villages surveyed described the HIV/Aids status in their villages as modest, with a mean prevalence rate of 11% households per village. HIV prevention programmes have been streamlined in each of the sub-county activities and were reported to be available in each of the villages visited.

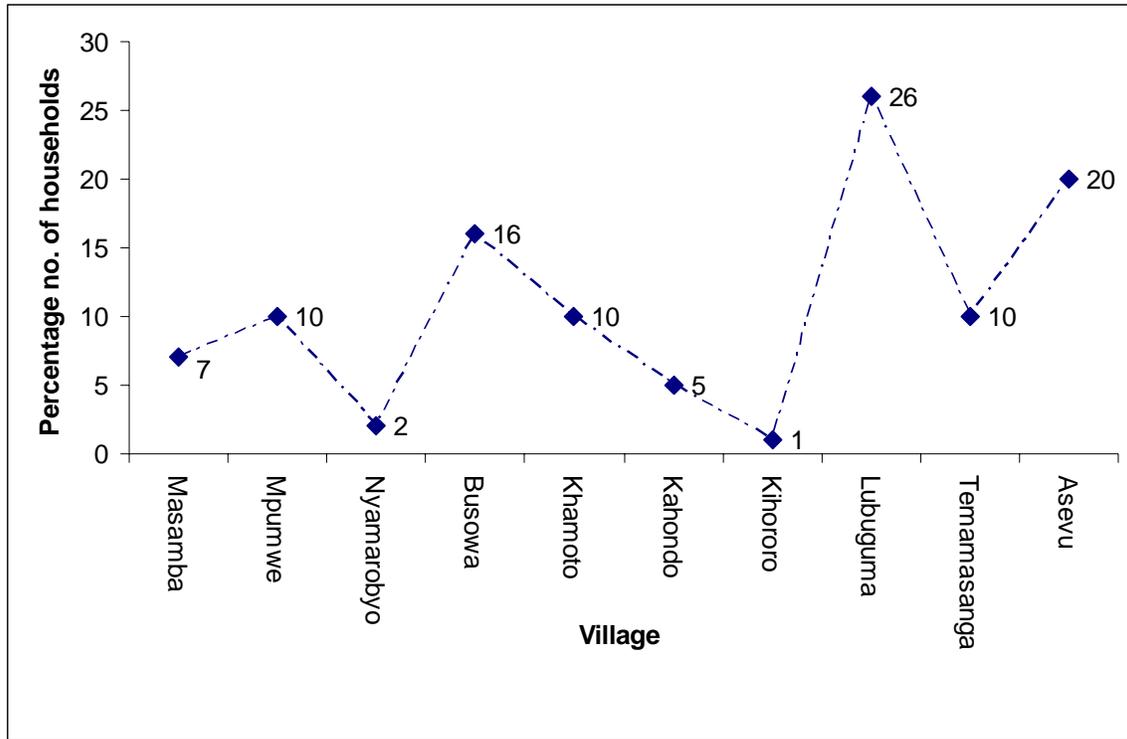


Figure 2: Estimated HIV/Aids prevalence rate in the 10 villages surveyed

3.4.4 Commercial Contract farming

Contract farming was reported in 4 villages namely: Asevu, Masamba, Mpumwe and Nyamaroby. The proportion of farmers in the village involved in contract farming was 15%, 38%, 50% and 30% respectively.

Of the farmers involved in contract farming, the proportion of females estimated was 100% in Asevu, 17% in Masamba, 50% in Mpumwe and 10% in Nyamaroby.

The crops targeted for contract farming were majorly Non-food cash crops such as Tobacco and Sunflower; Staple food crops such as Sorghum and Rice; and Other food crops such as Soya beans. A critical examination of gender involvement against the targeted contract crops revealed that female involvement was more where other food

crops such as Soya beans were targeted, rather than the more paying non-food cash crops or staples such as rice.

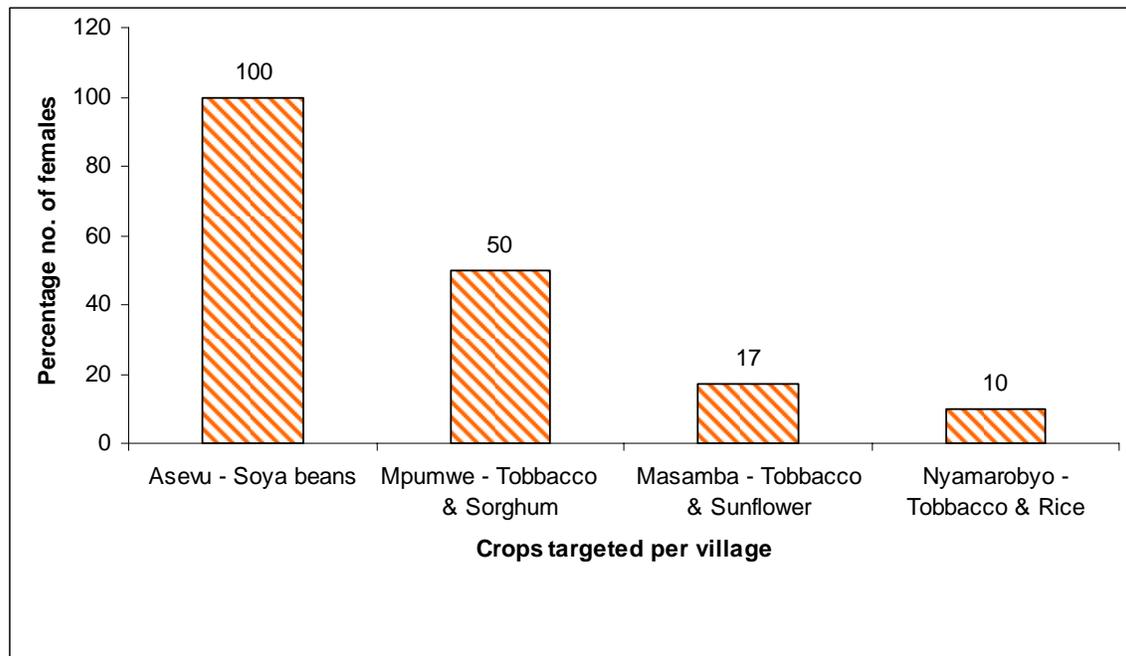


Figure 3: Proportion of females involved in contract farming against the crops targeted

The services mostly provided by the contractors to the farmers included seeds, fertilizers, pesticides, quality control and confirmation of standards as well as spraying pumps. These inputs were mentioned by 3 or all the 4 villages involved, while inputs such as credit, land fumigation and extension were reported in only 2 villages each.

The main destination of the produce is the capital city market and on a smaller scale, the other major urban markets.

3.4.5 Livestock Grazing

Cattle was mentioned to be equally grazed on common pastures, individual fields or as tethered in the 6 of the 10 villages surveyed. In Asevu and Kahondo however, the only

option available for grazing cattle was to utilize common pastures, while in Kihororo cattle have to be tethered. In Temamasanga, grazing of cattle is done on individual fields.

For the case of grazing small stock, the most common practices mentioned in 7 of the villages surveyed were grazing on individual fields mostly subjected to short fallow or tethering the small ruminants.

The main purpose for keeping cattle and small stock in the villages was found to be for saving purposes. Interestingly the villages in the Eastern region kept livestock for commercial purposes mostly. It is therefore a major source of income for the people in the Eastern region.

The possibility of pastoralists grazing their stock on harvested fields in exchange for dung was not appreciated by farmers as a profitable practice to them. Instead they complained that the animals would trample their fields into hardpans and also encroach on fields they are not entitled to. The idea was not welcomed and is not entertained.

3.5 Agricultural Dynamism: Agro-ecological and Environmental Problems

3.5.1 Irrigation

According to the key informants in the various villages surveyed, no active irrigation was being carried out except growing of crops like rice and vegetables in the swamps. This may contradict with the various perceptions of the respondents in the micro-study, but the calibre of key informants selected for the meso-study did not agree to the existence of the practise of irrigation in their villages.

In fact those in major rice growing areas like Busowa emphasised that they made no effort to channel water for purposes of irrigating dry fields apart from maintaining clear boundaries and constructing ridges to contain water in particular fields.

However in Khamoto, where rice and other crops are grown by the banks of a river, it was mentioned that when the river overflows, that water runs into the nearby maize fields but they did not agree to this being a form of irrigation.

3.5.2 Rain water harvesting

Rain water harvesting is becoming a common practise as was reported in 8 of the 10 villages surveyed with the exception of Asevu and Lubuguma. On average 48% of the farmers in the villages visited were practising rain water harvesting in their farming while 52% were not. The observation was however that rain water harvesting has increased in the last 5 years but with area under rain water harvesting equally increasing and decreasing. Rain water harvesting in Uganda has been solely managed by individual households.

3.5.3 Rainfall patterns over the last 3 seasons

The most recent season was characterized by heavy rains in most parts of the country, to the extent that flooding was experienced in several parts of the country, a condition that has not occurred since the El Nino rains.

This rainfall pattern was supported by the findings of this study which showed that 5 of the villages surveyed received above average rains, while 2 other villages felt it was average rain. It was surprising though to find that 3 villages had experienced below average rains and these were all from the North Western region of the country as can be seen in Figure 4 below.

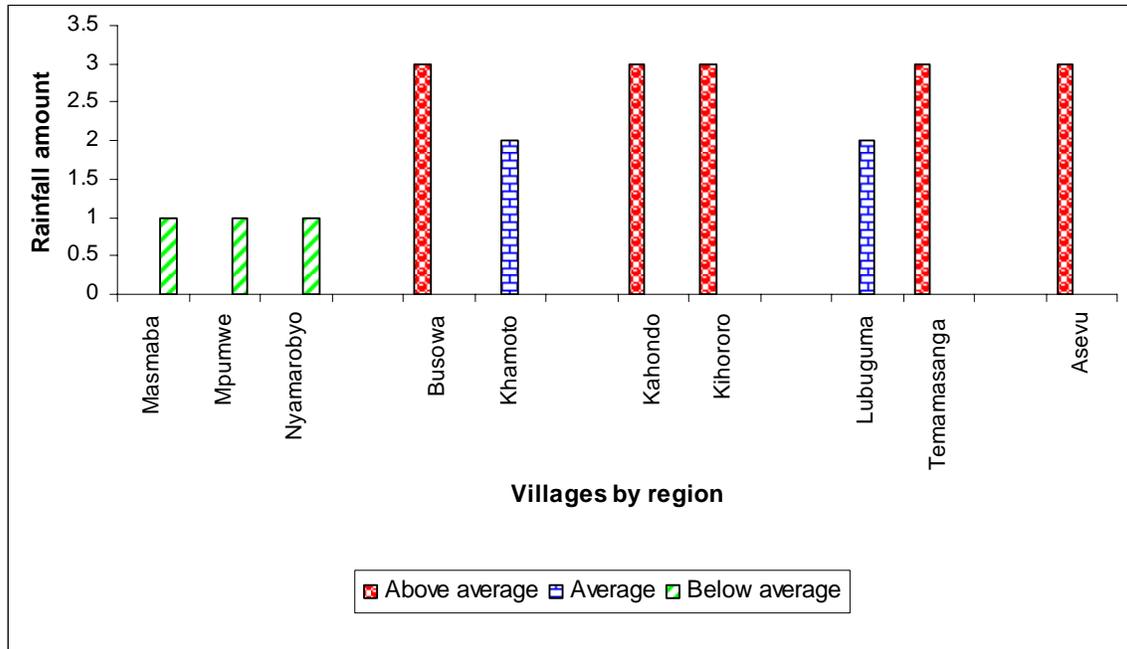


Figure 4: Rainfall pattern of the most recent rainy season

In the season before the most recent, 7 villages had average rainfall, 2 had below average and 1 had above average.

Two seasons before the most recent one, 5 villages reported average rainfall while the other 5 reported below average rainfall.

The general trend shows that rainfall amounts have been increasing over the seasons with the exception of the north western region where the amounts were surprisingly low at a time when the whole country was having plenty of rainfall.

3.5.4 Environmental Problems

The most common problem mentioned in all the villages was soil mining, followed by deforestation in 7 villages, and soil erosion in 5 districts. Other problems mentioned included:- the use of polythene bags; stubborn weeds attacking rice mainly, prolonged droughts, leaching of soils and wild life attacks on crops from the national park.

Table 6: Environmental problems experienced in the villages surveyed.

Village/Region	Soil mining	Soil erosion	Deforestation	Other problems
North Western				
Masamba	Yes	Yes	Yes	-
Mpumwe	Yes	No	Yes	Wild life attacks on crops.
Nyamaroby	Yes	Yes	Yes	Leaching of soils.
Eastern				
Busowa	Yes	No	Yes	Stubborn weed attacking upland rice.
Khamoto	Yes	No	No	Prolonged droughts.
South Western				
Kahondo	Yes	Yes	No	Droughts.
Kihororo	Yes	Yes	No	Drought due to clearing of swamps.
Central				
Lubuguma	Yes	No	Yes	-
Temamasanga	Yes	No	Yes	-
West Nile				
Asevu	Yes	Yes	Yes	Use of polythene bags.

3.6 Use of Improved Varieties and Marketing of Staples

3.6.1 Utilization of improved varieties currently and 5 years ago (2002)

Improved Maize Varieties

Only 2 villages out of the 10 surveyed were found growing hybrid maize currently and had also grown it in 2002 (See table 7 below). The two villages were Mpumwe and Busowa with increasing and decreasing use of the varieties respectively, since 2002. Two other villages which were growing the hybrid maize in 2002 had abandoned it, saying that the seed was very costly and needed to be changed every season.

The use of improved open pollinated varieties was popular in all the villages, except in Kihororo and Kahondo where maize does not grow favourably. All the villages have been increasingly using the improved OPV varieties since 2002.

The main supplier of both hybrid and the improved open pollinated varieties has been and still is the private trader, who farmers said has seed available when needed. The North West is the only region which complained of poor quality seed.

The Mean distance moved to the nearest outlet for improved maize seed was calculated to be 6.9 kms, with the minimum being 0 kms in Busowa and the maximum 23 kms in Nyamaroby.

The price of hybrid seed was found to be at a min and max of 1.5 and 1.6 US \$ per kg, while the improved open pollinated cost a min of 0.9 and max of 1 US \$ per kg. The price of improved maize seed was reported to be higher today in 6 villages than it was in 2002. Only 2 villages said the price of seed had not changed yet.

Improved Cassava Varieties

Improved cassava varieties are currently grown in only 5 of the 10 villages surveyed namely: Busowa, Kihororo, Lubuguma, Temamasanga and Asevu. In 2002 there were only 4 villages growing the improved cassava. The use of improved cassava has reportedly increased in the villages since 2002, with the prevalence of cassava mosaic currently standing at a mean of 64%.

The main supplier of improved cassava cuttings currently and in 2002 was reported to be the government agencies through the ministry of agriculture; however the farmers' major multiplication source is their own farm.

The mean distance to the nearest retail outlet for cassava cuttings is 1.86 kms, with the maximum distance (5 kms) in Khamoto.

Table 7: Use of Improved Varieties currently and in 2002 by village.

Village/Region	Hybrid Maize		Improved OPV Maize		CMV-resist Cassava		BBW-resist Bananas		NERICA Rice		Improved Sorghum	
	Now	2002	Now	2002	Now	2002	Now	2002	Now	2002	Now	2002
North Western												
Masamba	0	0	1	1	0	0	0	0	0	0	0	0
Mpumwe	1	1	1	1	0	0	0	0	1	0	1	0
Nyamaroby	0	1	1	1	0	0	0	0	1	1	0	0
Eastern												
Busowa	1	1	1	1	1	1	1	1	1	0	0	0
Khamoto	0	1	1	1	0	0	0	0	1	0	0	0
South Western												
Kahondo	0	0	0	0	0	0	0	0	0	0	0	0
Kihororo	0	0	0	0	1	0	1	0	0	0	0	0
Central												
Lubuguma	0	0	1	1	1	1	1	0	0	0	0	0
Temamasanga	0	0	1	1	1	1	1	0	1	0	0	0
West Nile												
Asevu	0	0	1	1	1	1	0	0	1	0	0	0

Note: 1 represents a Yes; 0 represents a No.

Improved Banana Varieties

It was alarming to find that only 4 of the 10 villages surveyed were using improved banana varieties, despite the widely spread disease epidemics that have threatened the economic importance of this crop. These villages were Busowa, Kihororo, Lubuguma and Temamasanga. Only Busowa had started using the improved banana varieties as far back as 2002. This indicates that other villages have only recently started using the improved varieties.

In some villages like Khamoto, Nyamaroby and Asevu, farmers deliberately replaced banana plantations with other food crops such as cassava, sweet potatoes and maize,

citing reasons like improved banana suckers not being readily available, suckers being very costly and that it takes long to re-establish a banana plantation.

Sadly though, farmers noted that the number of staples they once relied on was fast dwindling and that the yields of the staples remaining were also continuously being affected by disease & pest incidences, declining soil fertility and low input use.

In Kahondo, farmers claimed their traditional banana varieties had survived being infested and that they were superior in many ways to the improved ones, so they are unwilling to use improved banana varieties. They even feared that the improved varieties will introduce diseases in their plantations. The researchers were actually surprised to find local banana varieties that were hardly infested.

The prevalence rate of the banana bacterial wilt (BBW) in Kahondo was estimated to be 0%, while the mean rate in all the villages surveyed stands at 58%. In Busowa and Khamoto the BBW incidence is 100% and 95% respectively.

Government agencies, the local government and farmer organizations were equally identified as the main suppliers of improved banana suckers, however lack of availability was a major complaint for 86% of the villages surveyed, lack of required amounts by 100%, and not the promised quality by 75% of the villages surveyed.

The mean distance to the nearest source of improved banana suckers was estimated to be 14 kms while the longest is 40 kms away from Temamasanga.

Improved Rice Varieties

Traditionally rice was never a commonly grown crop in Uganda, so it surprising and commendable to find that 6 out of the 10 villages surveyed are currently growing rice and more specifically improved rice varieties. The villages include: Mpumwe, Nyamaroby, Busowa, Khamoto, Temamasanga and Asevu.

Out of the 6 mentioned villages growing improved rice varieties, only Nyamaroby village has grown the varieties since 2002, but the growing of the improved rice varieties was said to be decreasing.

Farmers in this village, which happens to be 23 kms away from the market, said that they were discouraged by the poor germination experienced; low yields and the lack of commitment from contractors who had promised to provide transport as well as market/buy the produce. This particular village was given SUPERICA 1 & 2 by government agencies, while NERICA is still under multiplication.

Although farmers cited government agencies, the local government NGO's as major sources of the NERICA varieties, the farmers felt that they could more reliably get seed of the improved rice varieties from the private traders.

The availability, quantity and quality of the NERICA/SUPERICA varieties were not as is expected in over 50% of the villages using the improved varieties. Also the distances moved to access the varieties were as long as 17km on average, ranging from 5kms to 40kms, with the exception of Busowa which accesses the varieties at almost 0 kms.

The price of 1 kg of improved seed is about 1 US \$ across all the villages, with the minimum as 0.59 US \$ and the maximum 1.18 US \$. There has been no change in the price of seed since 2002.

Improved Sorghum Varieties

Sorghum has not been on the priority list of researchers in Uganda probably because of the non-existence of diseases associated with it. Sorghum is drought resistant and adapts well to varying soil conditions. However one or two varieties have been released from the National Agricultural Research Centres, with superior qualities such as improved yields,

shorter varieties to reduce lodging and improved taste (sweetness) for beer brewing purposes.

Hence it was not surprising to find that only one village, Mpumwe in the North West, has attempted to grow improved sorghum. The key informants reported that a new sorghum variety was introduced by officials of Uganda breweries, to have farmers grow it on contract for the beer brewing company.

However, farmers were considering abandoning growing the improved sorghum variety (called Epuri Epuri) because one of its major advantages, which is its sweet taste, unfortunately makes it more susceptible to attacks by birds. Farmers said they were experiencing huge crop losses after investing a lot in terms of labour and time. Staying in the fields to chase birds away was also robbing time that would be devoted to other activities.

Improved sorghum was said to be readily available and in the required amounts, except it was being obtained from Masindi town which is 40 kms away, but given free of charge to contract farmers to multiply.

3.6.2 Marketing of staple food crops in the 10 villages surveyed

In Uganda, staple food crops are fast replacing the traditional cash crops such as coffee, cotton, tea, tobacco, cocoa and vanilla, as major income sources for most farming households in the country. This could be attributed to various factors which continue to affect the production of the traditional cash crops. These include:- the unstable world market prices; the low prices offered by middle men; disease and pest incidences in the recent past; labour constraints due to increased urbanization; as well as the increasing pressure on the already exhausted land.

On the other hand the demand for food crops is on the increase with the liberalization of markets, increased regional tiers, urbanization, declining yields, better access to markets

and increased prices. The food crops also provide a ready source of income for rural households to meet their basic needs.

The current trend of events however threatens the food security situation in the country. The farmers interviewed appreciated the fact that while food prices were increasing, and therefore tempting farmers to sell most of their produce, the yields of several crops were declining due to soil exhaustion, low technology or input use, climatic changes, prevailing disease and pest incidences, and the reduced land sizes, among other things. Farmers were encouraged to adopt the use of improved high yielding, disease resistant varieties and recommended agricultural practices, in order to reduce the gap between what is demanded and what is produced.

Table 8 below shows the marketing of different staple food crops and the prices being offered.

Table 8: Marketing of staple food crops and other crops in the 10 villages surveyed.

<i>Crops</i>	<i>% no. of households marketing</i>	<i>Marketing channels & % no. of households using the channel</i>			<i>Average price per 100kgs (US \$)</i>		<i>Distance closest to market (km)</i>	<i>Cost of transport to market (US \$)</i>
		1st	2nd	3rd	Min	Max		
MAIZE	90	Farm gate (78)	Market Out of village (44)	-	12	22	12	1.5
CASSAVA	80	Farm gate (88)	Market Out of village (50)	Market in the village (12)	9	11	9	1.4
BANANAS	40	Farm gate (100)	Market Out of village (25)	-	6	10	6	2
RICE	63	Market Out of village (80)	Farm gate (40)	Market in the village (20)	44	55	15	1.5
SORGHUM	50	Farm gate (60)	Market Out of village (40)	Market in the village (20)	23	31	5	1

Rice can be seen to offer a premium over the other staple food crops, followed by sorghum though yields are often not that high, then maize, cassava and finally bananas. It is surprising to find that cassava offers more than bananas in terms of returns to the farmer.

This serves to show that while bananas are highly priced in the urban centres (i.e 6000/= or 3.5 US \$ per average bunch of 25 kgs), farmers are still being offered peanuts by the middle men (i.e 2000/= or 1.2 US \$ per 25kg bunch).

3.7 Other food and Non-cash crops grown

The main other food crop grown were found to be Sweet potatoes, mentioned in 7 of the 10 villages surveyed. Also mentioned in 3 different villages were Beans, Groundnuts and Millet.

The other food crops are marketed in all the villages at the farm gate mainly. When compared with 2002, the price of other food crops was reported to have increased according to 56% of the respondents, while 11% said it has decreased.

The main non-food cash crop was found to be coffee, mentioned by 4 of the villages, followed by Tobacco according to 3 of the villages, and then cotton and fruits in each of the other villages.

All the villages except one reported that the prices of the non-food cash crops had increased since 2002. Its only Busowa which complained of a decrease in the price of coffee.

3.8 Use of chemical fertilizers

In general only 3 villages mentioned that they use fertilizers. These were Busowa in the Eastern region, then Mpumwe and Nyamaroby in the North Western region. However they all complained that the fertilizers were not affordable, and for Nyamaroby the availability was not constant.

On average the nearest outlet for the fertilizers was calculated to be 12km away, while the prices ranged from US \$ 9.41 to US \$ 15.29 per kilogram.

Chemical fertilizers are not subsidized in Uganda and the price was reported to be higher today than in 2002.

3.9 Agricultural Techniques and the machinery available in the villages

All the agricultural techniques investigated upon were common in all or at least some of the villages, except improved fallowing. In all the 10 villages visited, the key informant said they had never witnessed anybody practising improved fallowing. What was commonly known according to them is fallowing but not improved fallowing.

Table 9: Number of villages where different Agric. Techniques are practiced

Techniques	Number of villages
Crop rotation	10
Intercropping	10
Intercropping+ legumes	10
Fallowing	3
Improved fallowing	0
Animal manure	4
Minimum tillage	2
Breaking the hard pan	3
Green manure/compost	6
Chemical fertilizer	4
Soil/water conservation	9
Improved practices	10
Integrated Nutrient Management (INM)	4
Integrated Pest Management (IPM)	6
Agro forestry	3
Pesticides	7

On inputs or machinery available in the villages, 4 villages namely, Busowa, Lubuguma, Masamba and Mpumwe had tractors available for hire, while no village had drying floors or modern stores.

Six of the villages had a maize mill, 2 had a rice mill (Busowa & Nyamaroby), 1 had a cassava grater (Lubuguma) while Nyamaroby had a maize sheller and Kahondo a sorghum mill.

3.10 Extension Services in the villages

All the 10 villages said they were at present receiving extension services, mainly on staple foods (in 7 villages), other foods (in 6), non-food cash crops (in 3), cattle (in 3), small stock (in 7), Fowl (in 5), and bee-keeping (in 2 villages).

Some 3 villages said that extension staff targeted certain categories and among these are the women, youths and progressive farmers.

Provision of extension services was mainly accredited to the government extension staff by 9 villages, then 2 villages mentioned NGO's, 1 village mentioned the farmers' organizations or co-operatives, and another 2 said extension was also provided through out grower schemes.

The inputs given mainly include:- seeds mentioned by all the 10 villages, fertilizers, improved breeds and veterinary services were also mentioned in some of the villages. No village received credit from extension providers.

Table 10: Trainings provided by extension service providers

Trainings	Number of villages
Integrated Pest Management (IPM)	5
Improved planting practices	10
Processing	2
Animal fattening	9
Poultry rearing	3
Bee-keeping	3
Business skills	9
EU production standards	3
Payment for services	
Payment for extension services (Note: it's a subsidized contribution to NAADS)	9
Extension services in 2002	6
Payment for extension in 2002 (Note: it's a subsidized contribution to NAADS)	1

3.11 Most important Sources of Income

All the 10 villages visited ranked crop sale as the most important source of income for the households, followed by animal sales mentioned by 6 villages and then petty trade according to 4 villages.

Table 11: Important sources of income by region and village

Village/Region	First rank	2nd rank	3rd rank
North Western			
Masamba	Crop sales	Animal sales	Petty trade
Mpumwe	Crop sales	Animal sales	Petty trade
Nyamaroby	Crop sales	Petty trade	Salaries
Eastern			
Busowa	Crop sales	Animal sales	Petty trade
Khamoto	Crop sales	Animal sales	Labour for cash
South Western			
Kahondo	Crop sales	Animal sales	Petty trade
Kihororo	Crop sales	Animal sales	Salaries
Central			
Lubuguma	Crop sales	Animal sales	Food for work
Temamasanga	Crop sales	Animal sales	Natural resources
West Nile			
Asevu	Crop sales	Animal sales	Petty trade

3.12 Gender dynamics in relation to crop production

There are crops that are considered as women's crops and there are those considered as men's crops.

The women's crops include bananas, millet, sorghum, sweet potatoes, beans, groundnuts, tomatoes, cassava, Irish potatoes, peas, simsim and vegetables. In all the villages, these crops were considered as grown for either subsistence or equally for subsistence and cash.

The men's crops on the other hand included:- bananas, coffee, maize, onions, cabbages, cassava, Eucalyptus, rice, tobacco, vanilla, cotton, pineapples, sunflower and sweet potatoes. These crops were said to be grown mainly for subsistence and cash, or for cash only.

It is therefore evident that the men control all the crops that are associated with ready cash or much cash and also control the use of money in the homes.

3.13 Food Security in the villages and in the households

The means of obtaining food cited by all the villages were through own production and making purchases. No village mentioned hunting or relief except that some 2 villages namely, Kahondo in South Western Uganda and Khamoto in the East had ever experienced serious food shortages to the extent that they had to be aided by government. This was in 1992 and 1980 respectively.

All the 10 villages said they cultivate famine crops which are cassava mentioned by 5 villages, cocoyams by 3 villages and other crops by 2 villages. For most of the villages the length of the lean season was said to be about 3 months and nearly all the villages said they have to reduce the number of meals during this period. Only one village, Kihororo in South West, differed saying it was the amount of food which had to be reduced, not the number of meals.

Table 12: Major food security threats in the villages

Food security threats	Number of villages
Prolonged dry spells	8
Unpredictable weather	9
Natural hazards (floods, landslides, fires)	3
Crop pests & diseases	10
Animal pests & diseases	8
Human epidemics	3
Insurgencies	1
Raids	0
Thefts	5
In-migration	2
Post-harvest losses	1
Excessive selling of food	2
Monkeys	1

Among the major food security threats, crop pests and diseases, unpredictable weather, prolonged dry spells and animal pests and diseases were the most commonly feared amongst the villages.

Table 13: Ways of coping with food security threats

Coping mechanisms	Number of villages
Sale of crops	9
Mortgaging of crops	0
Sale of livestock	9
Sale of land	4
Sale of other assets	5
Sale of labor	8
Petty trade	5
Collecting wild foods	0
Family support	4
Food aid	0
Out migration	1

The villages cope by selling food crops, livestock, labor, assets, land, or engaging in petty trade and receiving family support.

3.14 Coping with actual food shortages

Households cope with actual food shortages by consuming less preferred food (in 9 villages), reducing on number of meals (9 villages), borrowing food (5 villages), purchasing food (10 villages), consuming seed (3 villages), sell of animals (10 villages), sell of assets (5 villages), and out migration (3 villages).

4.0 HOUSEHOLD SURVEY RESULTS

A total of 400 households were interviewed from the five selected regions of Uganda, namely: the North Western region, Eastern region, South Western region, Central region and West Nile region.

Table 14: Percentage no. of household types interviewed overall

Type	Percent
Nuclear	46
Extended	19
Polygamous	9
De jure female headed	18
De facto female headed	6
Not yet married males	2

Overall most of the interviewed households were male headed with 46% from the nuclear type of family, 19% from extended families and 9% from polygamous homes. The *de jure* female headed were 18% while another 6% were *de facto* female headed. Only 2% of the households interviewed comprised of single unmarried males.

The average age of the household head was found to be 44.2 years and most had attended school for at least 6 years. The minimum age of the household head was 13.5 while the maximum age was 80 years. There was no significant difference between the age and educational level of the household head and the farm manager, which implied that often times than not, the farm manager happened to be the household head.

Overall, 73% of the respondents interviewed were farm managers, 23% were spouses, while 2% each happened to be a grown up child or relative.

Table 15: Sex of household head and farm manager (%)

Sex of household head	Region					Whole sample (N=398)
	North Western (N=120)	Eastern (N=80)	South Western (N=78)	Central (N=80)	West Nile (N=40)	
Male	83	89	62	64	87	77
Female	17	11	38	36	13	23
Sex of farm manager						
Male	82	89	60	64	87	76
Female	18	11	40	36	13	24

The percentage count of farm managers reveals a very high level of correlation between household headship and farm management responsibilities.

4.1 FARM AND CROP MANAGEMENT

The micro-level household survey in Uganda, sought among others to establish, the current status of staple food crops such as Maize, Cassava, Bananas, Sorghum and Rice; other food crops like Peas, Beans, Groundnuts, Sweet potatoes, Millet, Vegetables etc.; and non-food cash crops such as Coffee, Cotton, Tobacco; in relation to food security and poverty reduction.

Among the five most important staple food crops selected for the study, Cassava was the most predominantly grown with 84% households, followed by Maize, Bananas, Sorghum and Rice with 80, 46, 28 and 23 percent households growing the crops respectively. Figure 5, below highlights the production of the different crops over the years.

The trends observed reveal that Cassava and Maize have been increasing in importance as major staples country wide, while Bananas and Sorghum are on a downward trend in terms of production. The significant increases in maize and cassava production can be attributed to the escalating use of improved varieties of these crops, while for bananas,

the rate of technology use still lags far behind the disease pandemic threatening the very existence of bananas in the country. In the case of sorghum, improved varieties seem to be none existent, although a few are known to have been released and yet the yield potential of the local sorghum varieties is fast declining.

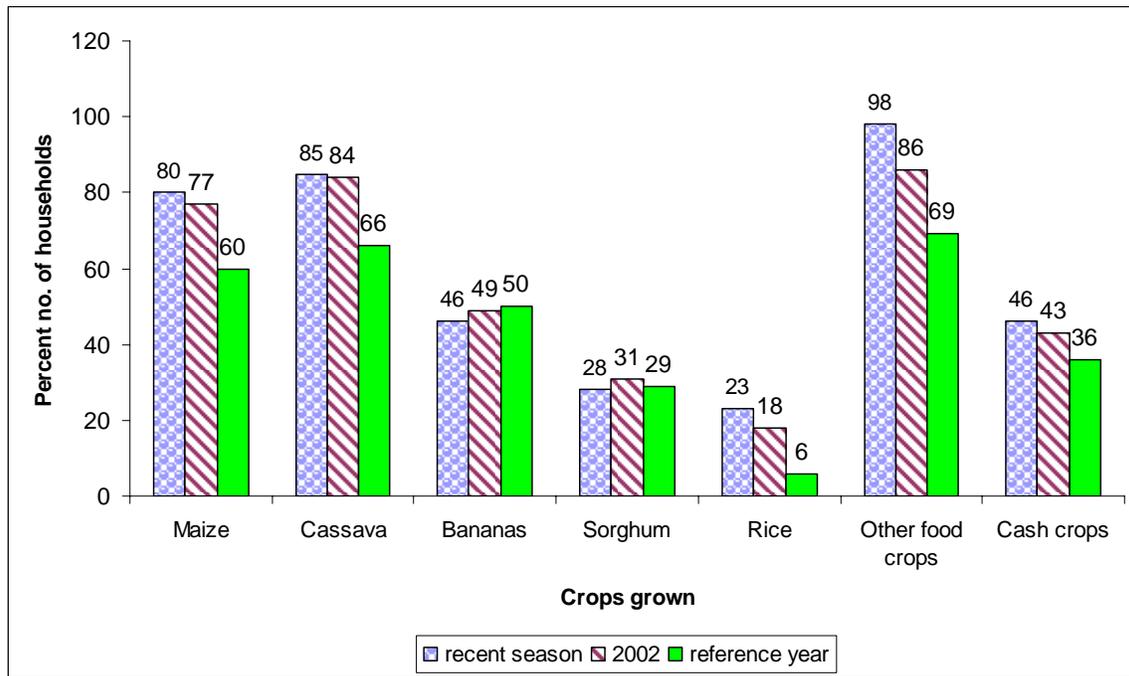


Figure 5: Cropping patterns in the recent season, 5 years ago and reference year

On a surprising note, rice production registered a significant leap of 17%, from 6% households in the reference year, to 23% households in the most recent season. The observed trend can be confidently attributed to the on-going promotion of the improved Upland NERICA rice varieties country wide. Rice production in Uganda was before limited to a few swampy areas mostly in the Eastern region but with the introduction of upland rice, more households are taking advantage of this high yielding staple food crop, which offers a premium price in comparison to other traditionally grown staples.

Other food crops and cash crop had also increased throughout the three periods examined, probably because of better prices offered, however the increase in cash crop production

between now and 5 years ago is not that significant probably due to constraining factors such as land shortage and disease set backs, amidst the unstable global market prices.

At the regional level as can be seen in table 16 below, Cassava has been and still is a major crop in West Nile and Central Region, initially though for different purposes. In West Nile region Cassava has always been the main staple food for the people in that region, whereas in central region it was initially grown as a food security crop by nearly all the households. However with the recent disease attacks on bananas, cassava is more appreciated as an important food crop in the central region than in the past.

Table 16: Regional preferences of staples and other crops grown in the reference year and the most recent season.

	Region (% no. of households)					
	Staple food crops	North Western (N=120)	Eastern (N=80)	South Western (N=78)	Central (N=80)	West Nile (N=40)
Reference year	Cassava	47	50	64	97	100
	Maize	48	50	51	91	67
	Bananas	14	39	97	85	20
	Sorghum	3	33	61	4	85
	Rice	6	18	0	1	5
	Other crops					
	Other food crops	50	50	89	99	68
	Non-food cash crops	8	40	32	79	40
Most recent season	Staple food crops					
	Cassava	89	79	64	95	100
	Maize	93	100	50	81	58
	Bananas	16	26	99	78	13
	Sorghum	1	42	68	1	60
	Rice	27	69	0	0	5
	Other crops					
	Other food crops	99	95	99	100	95
Non-food cash crops	34	41	32	75	63	
% Change	Cassava	42	29	0	-2	0
	Maize	45	50	-1	-10	-9
	Bananas	2	-13	2	-7	-7
	Sorghum	-2	9	7	-3	-25
	Rice	21	51	0	-1	0
	Other food crops	49	55	10	1	27
	Non-food cash crops	26	1	0	-4	23

The increasing importance of this drought resistant crop was revealed more in the North West and Eastern regions where results showed a 42% and 29% increase in the number of households growing cassava.

Maize production too increased significantly in the North West and Eastern regions of the country but declined by 10% and 9% in the Central and West Nile regions respectively.

Bananas which are a major staple in the South West and Central regions, registered a fall of 7% in the Central region but with an increase of 2% in the South Western region. The Central region was the first to be hit by the banana bacterial wilt, black sigatoka, the banana weevil and nematodes long before effective interventions could be disseminated. Its recovery in terms of banana production has been slow and is more out of keeping a traditional crop. Some villages which had adopted bananas as a staple are abandoning the crop because of the losses encountered and the high cost of re-establishing new banana plantations. This change is reflected by the declines of 13% and 7% in the Eastern and West Nile regions respectively.

Sorghum production has over time become a major staple in the Eastern and South Western regions of Uganda as is expected with the soil fertility declines and the extensive selling of other staples such as rice and bananas. However the sharp fall (25%) in sorghum production registered in West Nile is quite alarming for such a major producing region in the country. Sorghum production which used to be at 85% in West Nile has declined probably due to the severe soil exhaustion in the area coupled with low inherent yield potential of the local sorghum varieties. Much of the land is also devoted to tobacco growing which farmers said depletes the soil greatly. No new sorghum varieties are adopted yet.

Rice production in the Eastern and North Western regions has increased by 51% and 21% respectively, a boost attributed to the introduction of upland rice which is high yielding and very marketable. The adoption of upland rice in the country is much more than is reflected by the above results because production is yet to pick up in other regions.

Many other food crops are being produced in areas where they were not important before for various reasons. Households are diversifying crop production to create a balance between food security and crop sales as major sources of income. Also changes in climatic and soil conditions demand that several drought resistant crops are adopted no longer as famine crops only but as part of the diet on a daily basis. These include Yams, Sweet potatoes, Millet and others. Hence the highly significant and increased production of other food crops country wide as can be seen in table 3 above.

The production of traditional Non-food cash crops such as Coffee, Tea, Tobacco and Cotton has been more or less maintained in most regions of the country despite the fluctuations of prices on the world market. However 2 regions namely North Western and the West Nile regions seem to have got a boost or incentive to produce more of these cash crops. The 2 regions are mainly targeted for Tobacco growing which currently offers a good price, required inputs and immediate pay on harvesting. Some other cash crops such as Sunflower have been introduced in these regions.

On the whole the scores for each crop by region show the degree of importance of that crop in a particular region and adaptation due to different soil types and fertility levels.

4.2 MAIZE PRODUCTION, TECHNOLOGY USE AND MARKETING

4.2.1 Crop stand and area under maize cultivation

As earlier reported, 80% of the households surveyed grew maize as a major food and source of income. Most of the households surveyed (52%) said they planted maize as an intercrop while 48% grew maize as a pure stand only. The strategy of intercropping seems to be aimed at maximizing the utilization of limited resources but also the growing importance of maize as a major cash crop with a high demand from neighboring countries, makes the growing of maize as a pure stand the better option for maximum output.

The mean area under maize leading to the most recent harvest was found to be 0.56 ha per household and though the area had increased over the last 3 seasons, it had not changed significantly.

Table 17: Comparing the size of land under maize in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year)%	In 2002 %
Didn't grow maize at that time	5	8
Area decreased since then	38	32
Area unchanged	19	28
Area increased since then	38	32
Total	100	100

When compared with the area under maize in 2002 and when the household was formed, an equal percentage of 38% and 32% households respectively, reported increases and decreases in the area of land under maize cultivation in the most recent season. In other words the area of maize has both increased and decreased since 2002 and the reference year.

Table 18: Mean area under maize by region for the different seasons

	Area under maize leading up to the most recent harvest (ha)	Area under maize during the season before the most recent harvest (ha)	Area under maize two seasons before the most recent harvest (ha)
North Western	0.93	0.87	0.83
Eastern	0.46	0.47	0.48
South Western	0.42	0.48	0.48
Central	0.29	0.26	0.24
West Nile	0.15	0.17	0.21

Regionally, the North West had the highest mean area of 0.93 hectares occupied by maize while West Nile had the least mean size of 0.15 hectares in the most recent season. This tally's well with the production figures of maize obtained for these regions, which indicated that the biggest contribution to total maize output in the country in the recent season, was from the North Western region, while West Nile was among the lowest.

4.2.2 Maize Production and Utilization

The overall mean output of maize in the most recent season was computed to be 983.59kgs, with the greatest amount (1935.5kg) coming from the North Western region, followed by the Eastern region (757kgs), Central region (421kgs) and the West Nile region with 145kgs. The South Western region produced the least amount because maize is known not to grow well in that region.

Table 19: Mean production of maize by region for the different seasons

		Total production of Maize (grain) after your most recent harvest (kg)	Total production of maize during the harvest before the most recent one (kg)	Total production of maize two seasons ago (kg)
North Western	Mean	1935.49	1660.78	1711.54
Eastern	Mean	757.00	724.17	881.30
South Western	Mean	124.47	123.11	129.71
Central	Mean	421.23	442.42	339.42
West Nile	Mean	145.09	140.73	138.42

Despite the reported increase in percentage number of households growing maize in the country, the yields seem to be declining over the years.

Table 20: Maize production in the most recent season compared to other periods.

	When the household was formed (reference year)%	In 2002 %
Didn't grow maize at that time	4	7
Yields have decreased	60	57
Yields unchanged	14	18
Yields have increased	22	18
Total	100	100

Table 20 indicates that 60% and slightly less (57%) households had reported decreased maize yields in the reference year and in 2002 respectively, while only 22% and 18% households had registered increased yields in the same periods respectively.

Many households are currently relying on non-traditional cash crops such as maize to meet their other basic needs. This is largely due to the increasing pressure on the ever diminishing land resources, which no longer favors the maintenance of the perennial

traditional cash crops, at the expense of food production and shorter term sources of income. However the selling of food crops in the midst of increased demand poses a serious threat to the household's food security.

Figure 6, below clearly illustrates that rural households rely heavily on staple food crops for income, with 61% of the harvest obtained being sold, compared to a proportion of 13% only, left for home consumption.

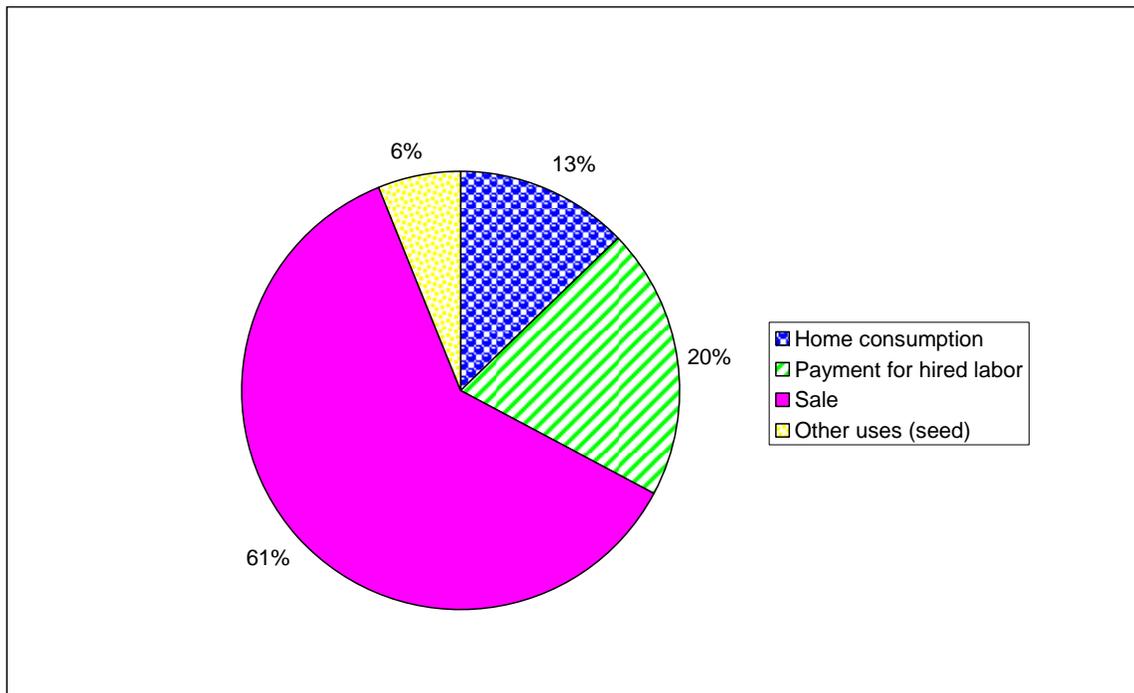


Figure 6: Utilization of maize produced in the most recent season

4.2.3 Maize Technologies and Input use

Improved maize varieties

Results from the household survey show that, the use of the improved ‘open pollinated varieties’ (OPV) of maize seed by farmers, is fast replacing the use of the low yielding local varieties.

Figure 2 below indicates that, while only 16% households used improved OPV maize seeds at the time when the household was formed, the proportion had increased to 48% in the recent season. On the other hand, the percentage number of households using traditional maize varieties had dropped by almost half, from 82% households in the reference year to 49% in the recent season.

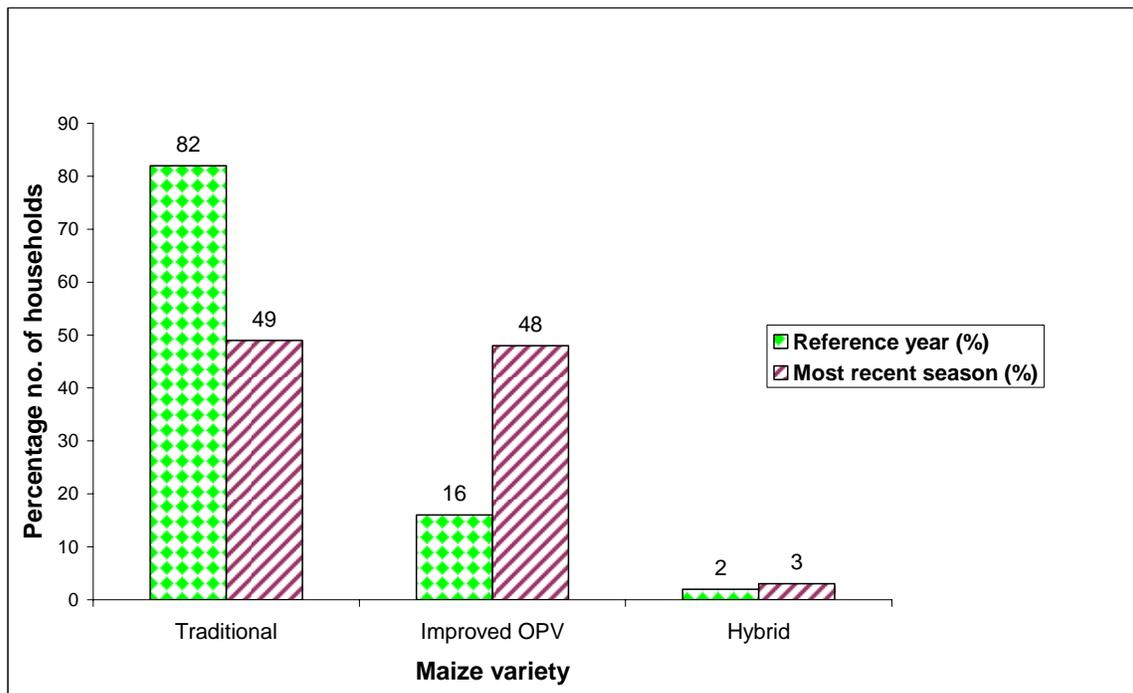


Figure 7: Main varieties of maize planted in the different periods

It is also evident from figure 7 that, the improved OPV maize variety is more preferred to the hybrid maize varieties. This is mainly due to high costs involved in buying hybrid seed every season because it cannot be re-cycled whereas the improved OPV's can be replanted season after season.

On the whole, 56% of the seed used for planting in the recent season was reported to have come from the farmer's own stock, 35% purchased from the market, 8% from neighbors, and only 1% was received or purchased from extension workers or other agents.

Despite the convenience of keeping own seed, farmers need to realize that re-cycled seed eventually loses its yield potential, which could be responsible for the high yield decreases registered.

Maize variety planted by region

Table 21: Percent no. of households planted varieties by region in the reference year and most recent season

Region	Variety	Traditional	Improved (OPV, composites)	Hybrid
North Western	Reference year	53	38	8
	Most recent	16	83	1
Eastern	Reference year	100	0	0
	Most recent	73	18	9
South Western	Reference year	100	0	0
	Most recent	100	0	0
Central	Reference year	87	13	0
	Most recent	60	38	2
West Nile	Reference year	79	21	0
	Most recent	13	87	0

The West Nile region and North Western region were found to have the highest adoption rates (87% and 83% households respectively) for the improved maize varieties, and subsequently the lowest use of traditional varieties.

The Eastern region and surprisingly the Central region on the other hand, had the lowest adoptions of improved varieties, with 18% and 38% households respectively. The South Western region could be excused for not adopting improved varieties because maize does not grow well in the region due to agro-ecological limitations.

The trend observed in the use of improved maize varieties by region and the output obtained, serves to emphasize that output and adoption are highly correlated and that higher adoptions of improved maize varieties will greatly boost maize production in the country. Consequently low adoption rates coupled with the declining soil fertility will yield very little.

Labour input in maize production

On average the farm managers were found to offer 52% of the labour required in maize production. However, 12% of the farm managers interviewed were reportedly not involved in maize production, while 16% were 100% involved in the management of the maize crop. On the whole 40% of the households interviewed had farm managers offering 50% and above of the labour required in maize production.

The other number one person most involved in maize production, apart from the farm manager, was found to be the spouse, according to 82% of the respondents interviewed. The second person most involved was found to be a male member of the household indicated by 11% households. The female reported were only 4%.

Fertilizer and Pesticide use in maize production

As far as the use of fertilizers is concerned, only 2% of the respondents interviewed reported use of chemical fertilizers on maize, at a mean cost of 60 US \$ per household, per season. Fertilizer use in maize appears to be recently adopted as 87% of the respondents indicated no fertilizer use in their early years of farming, while nearly 13% had no change in fertilizer use. The high cost of chemical fertilizers stands in the way of farmers appreciating the urgent need to adopt fertilizer use.

Pesticide use was also very minimal with only 5% of the respondents saying they had applied pesticides to their maize crop. This could also be largely attributed to the high cost of purchasing pesticides, where the output market price may not justify this expenditure. The equally small percentage (6%) of households, who indicated use of pesticides at the time when the household was formed, is an indication that, either the pesticides were still expensive back then, or farmers do not know how to apply them, or that farmers find their use on maize irrelevant.

Other Inputs used in maize production

A higher percentage of the respondents (31%) were now found to use oxen ploughs than in the reference year (12%). Correspondingly there were fewer households (69%), using than the hand hoe in the recent season compared to 84% in the reference year. However, less than 1% of the households interviewed used tractors in the most recent season, compared to 4% in the reference year. This is an indication that tractor use at present could be limited by the highly fragmented pieces of land.

Agronomic practices carried out on maize

In the most recent season, crop rotation was the most used agronomic practice as noted by 84% of the respondents. This was followed by intercropping (68%), intercropping with nitrogen fixing crops (beans, legumes etc) (67%), use of improved planting practices

(66%), while green manure/compost/residue incorporation was 63%. The others practices scored below less than 15%.

In the reference year, fallowing, green manure/ compost/ residue incorporation, soil and water conservation, and animal manure, were practiced by 65%, 63%, 23% and 19% households respectively, instead of the lower percentages recorded in the most recent season.

Only 1% of the respondents reported growing maize on the basis of a pre-arranged contract with a private trader. The rest however did not enter into such agreements.

4.2.4 Marketing of Maize, most recent season, previous seasons and reference year

Table 22: Percentage no. of households who sold maize at the different periods.

	Percentage
If any maize was sold following the most recent harvest	66
If maize was sold after the harvest before the most recent one	62
If maize was sold after the harvest two seasons before the most recent one	59
If any maize was sold after the harvest in 2002	52
If any maize was sold at the time when this household was formed	34

According to the survey, 66% of the households interviewed, sold maize following the most recent harvest, while 34% did not sell any maize this season. Previous seasons also show that almost the same percentage of households, has been selling maize in each of the seasons.

In 2002 and the reference year, the percentage no. of households selling maize was 52% and 34% respectively, indicating that maize marketing has been on the increase, making it a major source of income for the rural poor households.

The mean amount of maize sold in the recent season per household was computed to be about 1052kgs, an equivalent of 10 and a half, 100kg bags. The maize was sold at an average price of 20.23 US \$ for the lowest price offered, and 34.13 US \$ as the highest offer, per bag.

The main market outlet for maize was found to be at the farm gate mentioned by 61% of the respondents. Another 29% respondents had their main outlet as a market outside the village. The remaining 10% sold their maize in a market within the village.

Table 23: Changes in the amounts of maize sold, the price and market access over time.

	% no. of households		
AMOUNT SOLD	Less maize sold now	No significant change	More maize sold now
Change in amount of maize sold since you formed your household.	17	6	77
Change in amount of maize sold since 2002.	28	19	53
PRICE RECEIVED	Worse price today	No significant price change	Better price today
Price today as compared to when the household was formed.	2	10	88
Price today as compared to 2002.	6	8	86
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now
Change in access to market outlets for maize since you formed your household.	1	8	91
Change in access to market outlets for maize since 2002.	4	12	84

A quick glance at table 23 above, shows that the amounts of maize sold are ever increasing, the prices offered are better and market access is getting better both in the short-run (2002) and in the long-run (when the household was formed).

4.3 CASSAVA PRODUCTION, TECHNOLOGY USE AND MARKETING

4.3.1 Crop stand and area under cassava cultivation

Of the 336 farmers who were found to be growing cassava, 54% grew cassava as a pure stand while 46% intercropped it with other crops. Due to the wide spacing of cassava because of its fibrous rooting system, coupled with the prevailing land shortage, more farmers would be expected to intercrop than to plant cassava as a pure stand. However, with the increasing importance of cassava as a major staple food crop, more homesteads seem to focus on maximizing the output.

The mean area of cassava planted (pure stand equivalent), in the past year was 0.27 ha per household, which is about half of what was allocated to maize growing. Over the past 3 years, the mean area allocated to maize ranged from 0.23 - 0.26 hectares, an indication that more cassava was being grown, probably to meet the increasing demand for food by the growing population.

Table 24: Comparing the size of land under cassava in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year)%	In 2002 %
Didn't grow cassava at that time	4	6
Area decreased since then	37	32
Area unchanged	26	39
Area increased since then	37	23
Total	100	100

Between the past year and 2002, the area planted to cassava had decreased (32%) more than it had increased, as is mentioned in the above table, by 32% and 23% respondents' respectively.

Nevertheless, West Nile region which largely depends on cassava, registered the highest proportion of households (53%), who had increased the area allocated to cassava production over time. This increase probably compensates for the noted decline in sorghum production in West Nile. On the other hand, 90% of the respondents in the Eastern region reported that less land was being allocated to cassava due to the rampant cassava mosaic disease, predominant in that area.

4.3.2 Cassava Production and Utilization

A greater percentage of respondents (57%) acknowledged that their yields had decreased in the most recent year compared to reference year, and a nearly equal percentage reported declined recently compared to 2002. Only 20% and slightly above, mentioned increased yields between now and past time periods. (See table 25 below).

Table 25: Cassava production in the most recent season compared to other seasons

	When the household was formed (reference year) %	In 2002 %
Didn't grow cassava at that time	4	6
Yields have decreased	57	56
Yields unchanged	15	18
Yields have increased	24	20
Total	100	100

The decreased cassava yields are largely attributed to the cassava mosaic virus which has spread to nearly all parts of the country, low improved technology use and the decreased soil fertility. Unfortunately, decreased yields were more pronounced in regions like West Nile (68%) and Eastern (93%), which are major producer of cassava.

Overall, 84% of the respondents interviewed across the regions, said much of the cassava harvest in the past year was for home consumption. The second most important use was for sale, mentioned by 21% households, while 14% indicated that gifts, seed etc was the 3rd most important use of the cassava harvested. Payment of hired labor was the fourth use for 6% of the households surveyed.

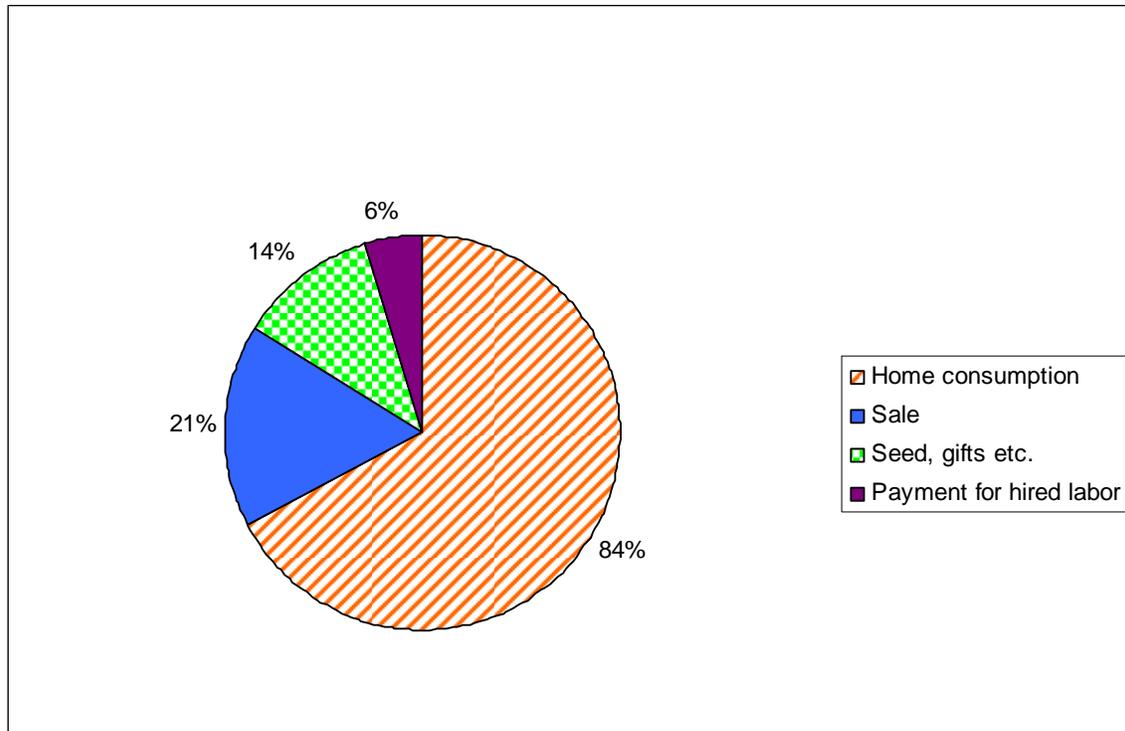


Figure 8: Percentage use of cassava harvested by importance

4.3.3 Cassava Technologies and Input use

Improved cassava varieties

Results from the study showed that, despite of the high prevalence of the cassava mosaic virus, only 33% of the households surveyed were using the improved disease-resistant cassava varieties. At the regional level, the highest percentage of users (72%) were from

the Central region, followed by 50% in West Nile region, 21% in the Eastern, 19% in the North West and only 4% in the South West.

Interestingly this trend coincides closely with the results displayed in figure 9 below, on access to improved stem-cuttings through formal agencies.

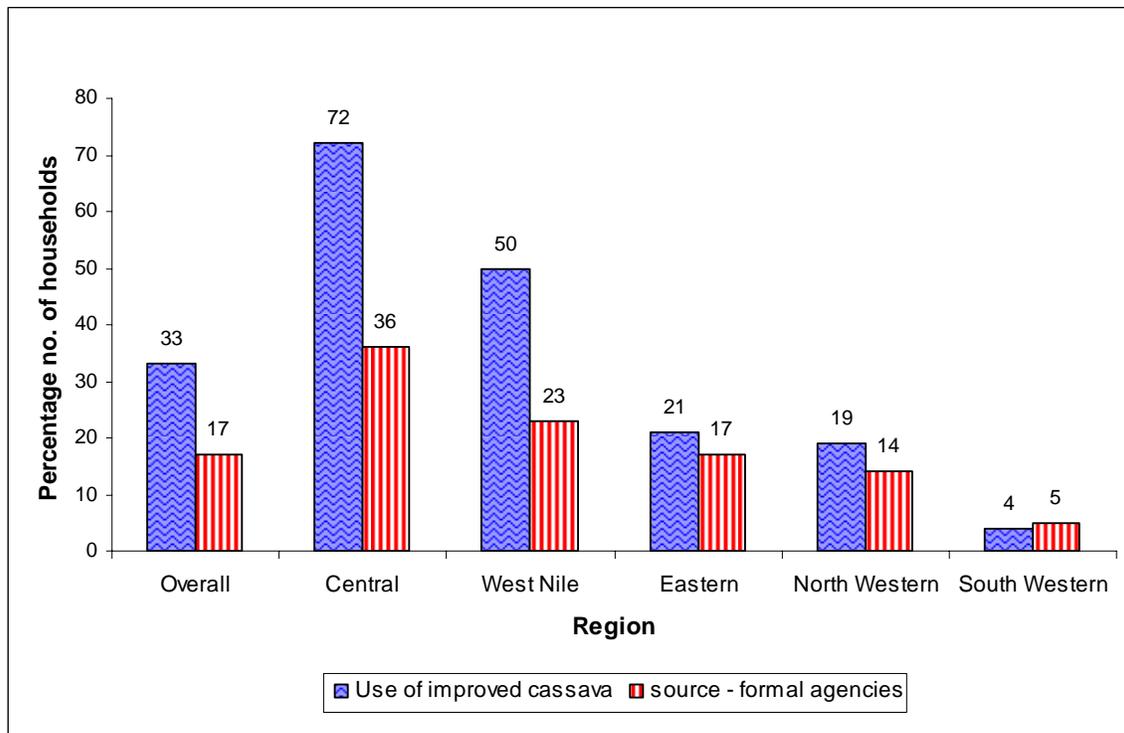


Figure 9: Use and Access to Improved Cassava Varieties

It is not surprising to find that more households in the Central region (36%) accessed stem-cuttings through the formal agencies, than other regions. This is because the Central region is the closest region to the National Agricultural Research Stations responsible for disseminating the improved cassava varieties.

However, the importance attached to a crop by a particular region, as well as the presence or absence of alternative staples, seemed to also contribute significantly to accessing the improved stem-cuttings. For example, the West Nile region which happens to be the furthest of the 5 regions surveyed had the second highest percentage of households (23%

and 50%), accessing and using the improved varieties respectively. As already mentioned, cassava constitutes a major part of the diet for the people of the West Nile region.

Labor input in Cassava production

The growing importance of cassava as a major staple cannot be over-emphasized, considering that the farm managers, who are mainly male heads of households, are devotedly offering 51% of the required labor, for a crop which predominantly used to be taken care of by females. Results also showed that 21% of the farm managers interviewed offered 100% of the work required in cassava production, alone. Only 17% of the farm managers offered zero labour.

The other most involved members of the household were found to be the spouse, indicated by 82% households, and a female member reported by 30% households.

Fertilizer and Pesticide use in cassava production

No fertilizers were applied on cassava in the recent season or 5 years ago. It has not always been common to find fertilizers at use in cassava production nor has it been recommended by extension agencies.

On pesticide use, only 2 % or a total of 5 households, specifically from the East, were reportedly using pesticides.

Other Inputs used in cassava production

Currently, 75% of the households interviewed are using the hand hoe to plough fields for cassava production, while 25% particularly found in the Eastern region, use oxen ploughs. In the reference year, hand hoes were used by 85% of the cassava growing farmers, 11% used oxen ploughs, while 5% used the tractor.

Agronomic practices carried out on cassava

Among all the recommended agronomic practices, crop rotation remains the most practiced across all the crops. In the case of cassava 80% households practiced crop rotation, 75% intercropping, 65% breaking the hard pan, 56% compost/residue incorporation, 52% fallowing and 20% soil and water conservation. Animal manure was only applied by 14% of the households surveyed.

4.3.4 Marketing of Cassava, the recent season, 5 years ago and in the reference year.

Table 26: Percentage no. of households who sold cassava at the different periods.

	Percentage
If any cassava was sold during the past year	36
If any cassava was sold during the year before the last year	30
If any cassava was sold two years ago	26
If any cassava was sold after the harvest in 2002	26
If any cassava was sold at the time when this household was formed	17

The marketing of cassava amongst households seems to be very limited, which proves that cassava is a major food security crop for most rural households. Unlike in the case of maize where 66% households were found selling the crop, only 36% households were reported to have marketed cassava in the course of the past year.

Table 26 however, shows that cassava marketing has been steadily rising over the years, from 17% at the time when the household was formed, to 30% in the year before last. Over the past 5 years alone, an increase of 10% households marketing cassava has been registered.

The total amount of cassava sold during the course of last year was about 1593kgs on average, fetching a maximum of US \$ 42.77 and a minimum of US \$ 32.65 on average, per 100kg bag.

Most of the cassava that was marketed (74%), was sold as fresh tubers, while 29% is sold in the processed form. The main marketing channel for cassava is at the farm gate, mentioned for by 87% households. The market outside the village accounted for 8% of the sales, while 4% was sold in a market within the village.

Cassava marketing by Region

Table 27: Cassava marketing across the 5 regions surveyed

		Region					Total
		North Western	Eastern	South Western	Central	West Nile	
% households who sold cassava in the course of the past year	Yes	45	30	34	39	15	36
Was cassava mainly sold as tubers or in processed form (% households)	As tubers	100	32	29	97	17	74
	Processed form	0	68	71	3	83	26
What is your main market outlet (% households)	farm gate	92	84	88	100	0	87
	Village market	4	5	12	0	0	4
	Market outside village	4	11	0	0	100	8
Total amount of cassava (tubers equivalent) sold in the past year (kgs)	Mean	3065.63	501.05	273.06	920.69	250.00	1592.54
Lowest price received for the tubers per 100kgs (US \$)	Mean	6.54	10.23	14.10	103.25	23.73	32.65
Highest price received for the tubers per 100kgs (US \$)	Mean	8.82	13.98	19.75	134.20	28.92	42.77

At a regional level, cassava marketing was highest (45%) in the North Western region, particularly Masindi district which is well known to supply most of the cassava consumed in the urban centers. West Nile on the other hand, had the least proportion of households (15%) marketing cassava, as is expected from this region which cherishes cassava as its main staple.

However, in accordance with the law of demand and supply, the North West which had the highest quantity of cassava to sell (3065.63kgs), received the lowest returns per 100kgs, i.e between 6.54 and 8.82 US \$, while West Nile which sold a mean of only 250kgs per household received between 23.73 and 28.92 US \$.

Most of the cassava in West Nile, South Western and Eastern regions, was/is marketed in the processed form, while the North West and Central regions market their cassava as tubers.

Only one farmer grew cassava on the basis of a pre-arranged contract with a private trader. The rest did not.

Table 28: Changes in the amounts of cassava sold, the price and market access over time.

	% no. of households		
AMOUNT SOLD	Less cassava sold now	No significant change	More cassava sold now
Change in amount of cassava sold since the household was formed.	29	28	43
Change in amount of cassava sold since 2002.	22	32	47
PRICE RECEIVED	Worse price today	No significant price change	Better price today
Price today as compared to when the household was formed.	4	22	74
Price today as compared to 2002.	10	22	68
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now

Change in access to market outlets for cassava since the household was formed.	2	16	82
Change in access to market outlets for cassava since 2002.	2	23	75

The marketing of cassava is indeed on the rise as can be seen in table 28 above. Over 40% of the households surveyed have increased the amounts of cassava they sell and in just the last 5 years, 47% households had further increased the amounts sold.

The incentive definitely seems to be the better prices offered and increased access to markets today than in previous periods.

However as cautioned in the case of maize, it is important that increased marketability, be matched with increased production, if a food security crisis is to be avoided.

4.4 BANANA PRODUCTION, TECHNOLOGY USE AND MARKETING

4.4.1 Crop stand and area under banana cultivation

In most regions of the country, bananas were traditionally grown as a pure stand, with the exception of the Central region, where it was common to intercrop bananas with some leguminous creepers and pumpkins for mulching purposes. In this study, 61% of the respondents said the bananas were planted pure stand, while 39% intercropped bananas with other crops. The Central region had the lowest percentage (44%) planting bananas as a pure stand. Unlike in the past where intercropping was done to provide a mulch, today it is the issue of land shortage and reduced plant density due to disease, which is encouraging intercropping.

The overall mean area under bananas (pure stand equivalent) in the past year was 0.57 ha, in the year before last it was 0.55 ha, and 2 years ago it was 0.60 ha. The area planted appears to be maintained at the same size, however with the high disease incidences, it is bound to decrease over-time, if access to improved banana suckers is not improved.

Table 29: Mean area under bananas by region for the different seasons

	Average area under bananas during the past year (ha)	Average area under bananas the year before last (ha)	Average area under bananas 2 years ago (ha)
North Western	0.22	0.22	0.23
Eastern	0.17	0.17	0.19
South Western	1.07	0.99	1.07
Central	0.21	0.23	0.25
West Nile	0.18	0.07	0.00

Regionally, South Western produces the largest proportion of bananas in the country and this was supported by the results of this study, which show the South West as having 5 times the area planted by any other region. The North Western and central region follow with 0.22 and 0.21 ha on average, but the trend shows a reduction in the area planted over the seasons.

Table 30: Comparing the size of land under bananas in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year)%	In 2002 %
Didn't grow bananas at that time	14	25
Area decreased since then	26	26
Area unchanged	33	35
Area increased since then	27	14
Total	100	100

The majority of respondents (33-35%) said the area planted to bananas had remained the same over the years, whereas 26% said the area planted to bananas had decreased since the household was formed and even more so in the last 5 years.

It was not surprising to find that the highest percentage of farmers (51%), who were reported to have decreased the area under bananas, were from the Central region. Unfortunately, this region whose main staple food crop is bananas was the most hit by the banana disease pandemic and faces severe land pressure due to the escalating urbanization.

The 14% households, who reportedly increased the area planted to bananas since 2002, were mostly from the South Western region, while the majority of those abandoning bananas (83%), are from the Eastern region. Preliminary surveys have shown that because the East has alternative foods such as rice, sweet potatoes and maize, they have put little or no effort into re-establishing their banana plantations.

It can also be noted that the percentage number of those who did not grow bananas has increased from 14% since the reference year to 25% since 2002. This shows that more efforts should be geared towards increasing the adoption of the already released banana technologies, by addressing the issues of accessibility and the high cost of suckers, which farmers have raised as hindrances to adoption.

4.4.2 Banana Production and Utilization

Nearly 50% of the households interviewed, reported declines in the yields of bananas from when the household was formed as well as in the last 5 years. It is evident from table 31 below, that the rate of yield increase in banana production, lags far behind the rate of decline in yield, hence interventions to close the gap are a matter of urgency.

Table 31: Banana production in the most recent season compared to other seasons

	When the household was formed (reference year) %	In 2002 %
Didn't grow bananas at that time	14	25
Yields have decreased	45	44
Yields unchanged	13	11
Yields have increased	28	20
Total	100	100

On utilization, Bananas just like Cassava, are grown primarily for food consumption as was confirmed by 80% of the respondents interviewed. The second most important purpose for banana growing was reported by 28% households, to be for sale, while the 3rd and 4th most important uses, were gifts, seed etc. mentioned by 19% and hired labour mentioned by 10% respectively.

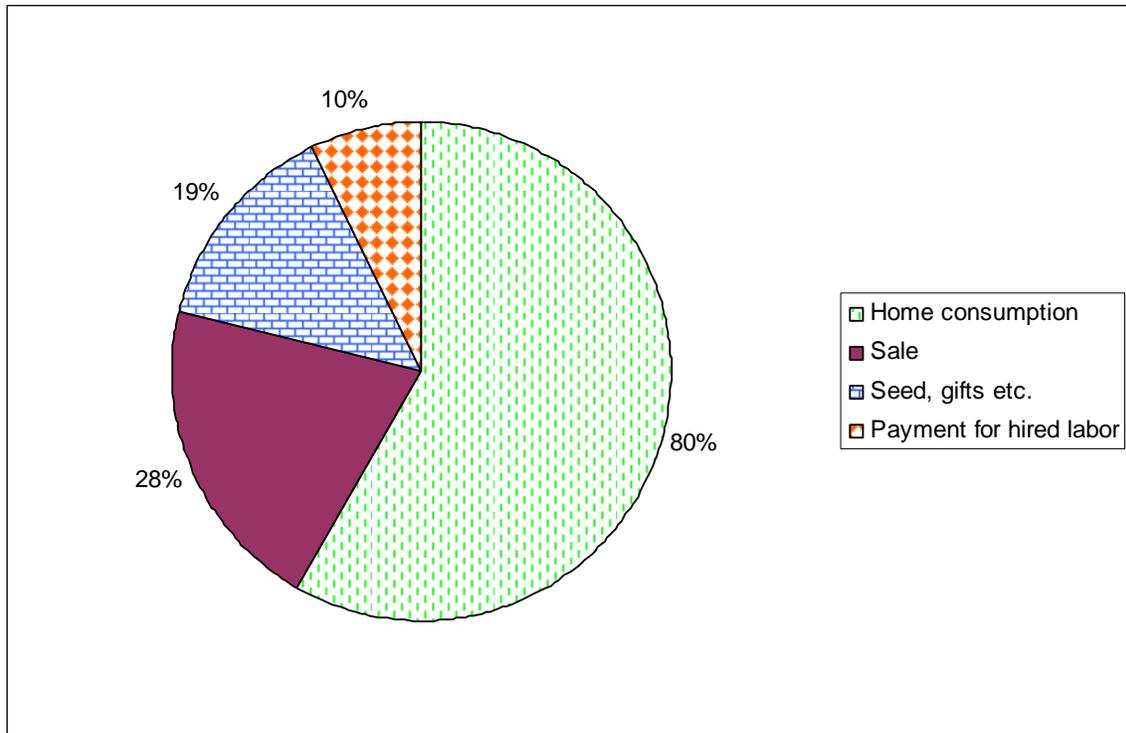


Figure 10: Percentage use of bananas harvested by importance

Table 32: Banana utilization across regions

Utilization	Region (% no. of households)					
	N.western	Eastern	S.western	Central	W.Nile	Total
Home Consumption (Most important)	79	100	66	91	60	80
Sale (2 nd most important)	16	14	44	14	40	28
Gifts, seed (3 rd most important)	11	0	40	0	40	19
Payment of hired labour (4 th most important)	5	0	22	0	20	10

4.4.3 Banana Technologies and Input use

Improved banana varieties

Table 33: Percentage no. of households using improved banana varieties by region

	N.western	Eastern	S.western	Central	W.Nile	Total
If using any new banana varieties today compared to when household was formed	11	33	7	17	20	14
If using any new varieties today as compared to what parents used	5	29	7	11	20	11
If ever purchased or received banana suckers from a formal agency or NGO	5	14	7	7	20	8

Overall the use of improved banana varieties is more today compared to when the household was formed, with Eastern region taking the lead (33%) in the use of new varieties. However the overall proportion of households using the improved varieties (14%) in the regions surveyed is still very low considering to the devastating effects of the disease and pest attacks.

The South Western region which currently produces the largest proportion of bananas in the country was found to have the lowest percentage (7%), of households using the improved banana varieties probably due to the lower banana disease incidences in the region.

Labour input in banana production

Results from this survey showed that, the farm manager alone carries out 52% of the work involved in banana production, while the spouse is the other number one person involved, as was reported by 68% of the respondents interviewed. The male members of the household also offer a helping hand.

Fertilizer and Pesticide use in banana production

Chemical fertilizer use on bananas seems to be a very rare occurrence as only one person was found using fertilizers on the crop in the past year and before. In the case of pesticide use too, only 7 households or 4% of the respondents said they had applied pesticides on bananas during the most recent season, the majority (4), of these were from Eastern region.

The majority of banana farmers (96%) use the hand hoe to cultivate their pieces of land while 4% and 1% use oxen ploughing and the tractor respectively. The use of these inputs in banana cultivation has not changed significantly except that tractor use is down from 2% using in the reference year, while the use of oxen has increased from 3% to 4% currently.

Agronomic practices carried out on bananas

Particular agronomic practices seem to be central to banana production as can be witnessed in table 34 below. The most outstanding agronomic practice in banana production was found to be green manure/compost/residue incorporation, reported by 84% of the households surveyed in the 5 regions. This was followed by Intercropping

with other crops or with legumes (60%), Soil and water conservation (57%), use of animal manure (54%) and use of improved planting practices (49%). Intergrated pest management is also an important practice in banana production, mentioned by 35% of the respondents interviewed, with 51 and 47% being from south western and the north western regions.

The choice of agronomic practices in banana production reveals that banana output is more or less directly dependent on the level of input use, to such an extent that even the regions where bananas are not so important, such as West Nile and the Eastern region, a lot of effort is put into carrying out these practices. While this is commendable, the hidden high input costs involved could also be responsible for inconsistencies seen between disease/pest prevalence and the response towards establishing new disease-free plantations.

Table 34: Agronomic practices on bananas by region during recent year

Practice	% no. of households					
	N.western	Eastern	S.western	Central	W.Nile	Total
Crop rotation	5	10	23	23	20	20
Intercropping	63	19	65	68	60	60
Intercropping with Nitrogen fixing crops-bean	68	33	68	55	60	59
Fallowing	5	10	13	29	0	17
Improved fallowing	0	0	0	0	0	0
Animal manure	58	38	52	65	0	54
Zero or minimum tillage	0	0	3	2	0	2
Breaking the hard pan	21	14	3	68	60	29
Green manure/compost/residue incorporation	63	71	91	86	80	84
Soil and water conservation	37	57	50	74	20	57
Improved planting practices	26	71	17	86	80	49
Integrated (soil) Nutrient management (INM)	21	0	26	2	0	14
Integrated pest management (IPM)	47	14	51	23	0	35
Agro forestry	16	24	7	44	0	22
Pesticides / Herbicides	0	19	3	7	0	5

At the time when the household was formed, the same agronomic practices were viewed as important but with fewer households practicing some off them. For example, green manure, compost/residue incorporation was done by 68%, soil and water conservation-mulching, grass strips, terracing etc, 38% and animal manure by 45%.

4.4.4 Marketing of Bananas most recent years, 5 years ago and in the reference year.

Table 35: Percentage no. of households who sold bananas at the different periods.

	Percentage
If any bananas were sold during the past year	50
If any bananas were sold during the year before the last year	35
If any bananas were sold two years ago	37
If any bananas were sold after the harvest in 2002	43
If any bananas were sold at the time when this household was formed	42

The marketing of bananas has been quite uneven over the years. According to table 35 above, banana marketing at 43% by 2002, was not much different from when the household was formed. However the last 5 years have been marked by pronounced declines in banana production, falling to 35% during the year before last year, and then remarkably rising to 50% in the most recent year of harvest.

The initially high percentage (42%) of households marketing bananas in the regions surveyed, suggests that there was at that time enough produce for both food consumption and sale. However the small rise (1%) captured in the sale of bananas by 2002, could be attributed to several of the already mentioned constraining factors, and the subsequent declines in the recent past reveal that the interventions promoted had not had significant impact on banana production and marketing as yet.

The sudden high increase in banana marketing in the most recent year (i.e from 35% to 50% in a year), cannot be comfortably attributed to the use of improved banana varieties in the light of the registered decline in banana production and low improved technology

use. However just like any other crop, increased marketability could be attributed to the increasing demand for food, irrespective of the prices offered.

The total amount of bananas sold during the course of last year was about 3051.7kgs on average, at a price of US \$ 21 maximum and US \$ 34 minimum on average, per 100kgs sold. Unfortunately, despite the costly management involved in banana production, the crop attracts one of the lowest prices per unit, probably due to its very short shelf life and bulkiness which attaches high transport costs.

Value-addition such as processing into powder for will go along way into improving the marketability and price offered for bananas. Bananas are still by far and large marketed as fresh bunches, with a shelf life of 7 days at most and weighing 25kgs per bunch on average.

The main outlet for bananas is at the farm gate, used by 90% of the households surveyed, while only 8% make an effort to market this bulky product outside the village.

Banana marketing by Region

Table 36: Banana marketing across the 5 regions surveyed

	Region						
		North Western	Eastern	South Western	Central	West Nile	Total
% households who sold bananas in the course of the past year	Yes	42	19	81	21	80	50
Total amount of bananas sold in the past year (kgs)	Mean	1132.50	243.75	3950.36	1549.00	152.33	3051.7
Lowest price received for the bananas per 100kgs (US \$)	Mean	5.48	2.00	6.70	106.80	6.86	20.84
Highest price received for the bananas per 100kgs (US \$)	Mean	8.23	4.85	13.72	161.33	11.96	34.10

At regional level, the South Western region which reported 81% households selling bananas is known to be the highest producer and supplier of bananas to the urban centers and the capital city. The selling price ranged between US \$ 6.70 and US \$ 13.72.

Although West Nile region it is not a major producer of bananas, it registered a high percentage (80%) of households marketing bananas because of the ready market in Arua town and across the border in Congo. Probably the high demand and low supply of bananas in this region is responsible for the better prices offered compared to other higher producing regions as can be seen in table 36 above.

The central region on the other hand, attracts a premium price (US \$ 106.80 – US \$ 161.33) incomparable to the other regions, given its close proximity to major urban markets, which have an insatiable demand for bananas on a daily basis.

Changes in banana marketing overtime

As is in the case of maize and cassava previously discussed, the marketing of bananas has increased over the years, and more than it has decreased mainly due to the incentives of better market access and prices offered. According to table 25 below, 46 and 47% households were selling larger amounts of bananas than in the reference year and 2002 respectively, while only 36 and 30% mentioned selling less amounts respectively.

While only 2% households claimed to be getting worse prices for their bananas today than in the past, 80% and above, of the respondents interviewed said that the prices were far better than in the past. Better market access was also registered by over 80% of the household surveyed.

Table 37: Changes in the amounts of bananas sold, the price and market access over time.

	% no. of households		
AMOUNT SOLD	Less bananas sold now	No significant change	More bananas sold now
Change in amount of bananas sold since the household was formed.	36	18	46
Change in amount of bananas sold since 2002.	30	23	47
PRICE RECEIVED	Worse price today	No significant price change	Better price today
Price today as compared to when the household was formed.	2	18	80
Price today as compared to 2002.	2	15	83
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now
Change in access to market outlets for bananas since the household was formed.	5	11	84
Change in access to market outlets for bananas since 2002.	1	17	82

4.5 SORGHUM PRODUCTION, TECHNOLOGY USE AND MARKETING

4.5.1 Crop stand and area under sorghum cultivation

Although sorghum is a major staple for some regions, it was only grown by 28% of the households surveyed. In most of the regions surveyed, sorghum was grown as a pure stand with the exception of the Eastern region and West Nile. In these two regions,

sorghum was grown as an intercrop by 52% and 63% households, while overall 70% of the households producing sorghum grew it as a pure stand.

The mean area under sorghum in the most recent season was found to be 0.40 ha per household and about the same in the two previous seasons. The South Western region had the highest mean area of 0.66 ha planted to sorghum, while the rest of the regions had less than 0.20 ha each. Sorghum has a high socio-economic value to the people of South Western region, where its mainly used to make a local brew or fermented porridge, which people drink on a daily basis as they socialize.

Table 38: Comparing the size of land under sorghum in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year)%	In 2002 %
Didn't grow maize at that time	9	8
Area decreased since then	21	22
Area unchanged	28	38
Area increased since then	42	32
Total	100	100

Overall, the area allocated to sorghum has increased since over the years as was indicated by 42% of the respondents. 28% of them said that the area had not changed in the most recent season compared to the reference year while 21% of the respondents said the area had actually decreased.

In the short-run (since 2002), much of the area under sorghum has not changed as is indicated by 38% of the respondents, however 32% said the area under sorghum had increased while 22% had decreased the area allocated to sorghum.

4.5.2 Sorghum Production and Utilization

The overall mean production of sorghum in the most recent season was computed to be 223.32kgs across the 5 regions surveyed. The highest sorghum output by region was registered in the South West where 53 farmers produced a mean of 282kgs each, followed by the East with 215kgs each amongst 33 farmers and West Nile had 24 farmers producing 110kgs each. Central and North Western had a single farmer producing sorghum from each region.

Table 39: Sorghum production in the most recent season compared to other seasons

	When the household was formed (reference year) %	In 2002 %
Didn't grow sorghum at that time	10	7
Yields have decreased	43	40
Yields unchanged	15	19
Yields have increased	32	34
Total	100	100

According to the respondents interviewed, Sorghum yields have decreased over time more than they have increased. Almost 50% of the households interviewed reported decreased sorghum yields, with the West Nile and South Western regions registering yield declines from 63% and 47% households respectively.

If the yields of this drought resistant crop can decline this significantly in two-different agro-ecological zones, then the introduction of new high yielding varieties is a matter of urgency, since the other available food choices have also exhibited the same trend, on top of being major sources of income.

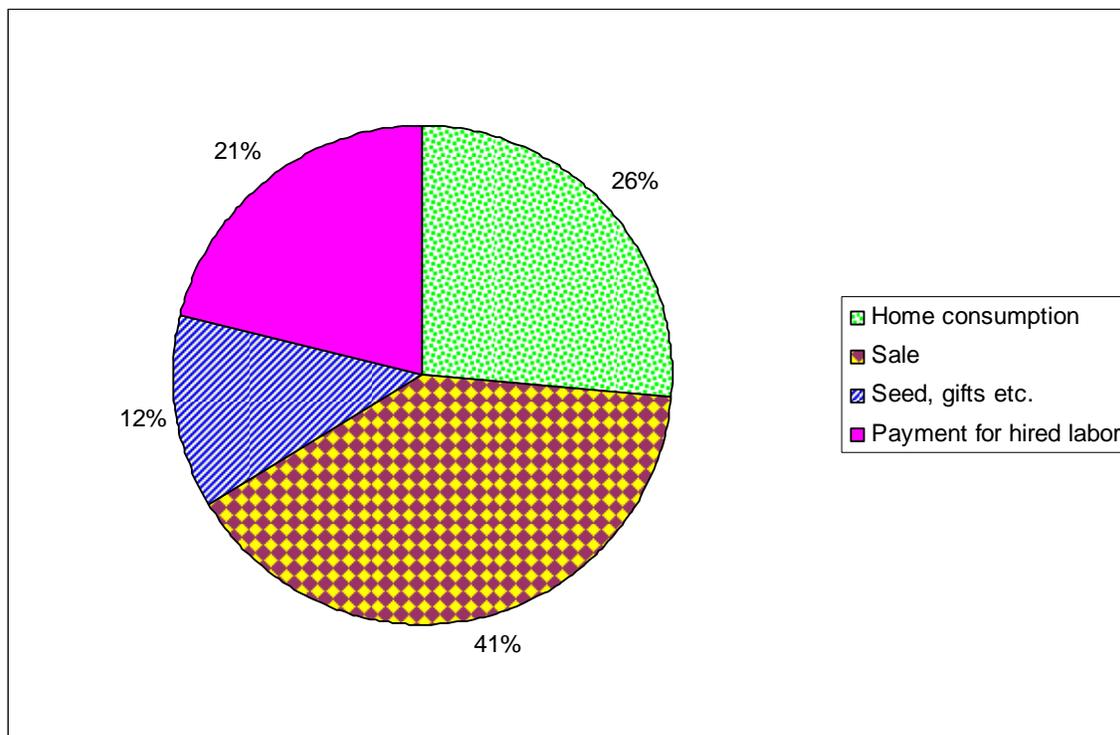


Figure 11. Utilization of sorghum produced in the recent season

During the most recent season, much of the sorghum produced (41%) was sold rather than consumed at home. Only 26% was kept for home consumption, while 21% was used as payment for hired labor. The demand for all kinds of food staples seems to be growing exponentially with the increasing urbanization, liberalization and integration of markets across the borders, at the expense of food security. The only plausible remedy is to boost production through more vigilant dissemination of technologies.

4.5.3 Sorghum Technologies and Input use

Use of Improved Sorghum varieties

Out of the 398 households interviewed, only 3 households were found growing an improved variety of sorghum. The rest of the farmers who constituted 97% of the households surveyed had never grown the improved sorghum variety before, even those who were found growing it currently. Unfortunately the few, who attempted to grow it,

are already complaining that despite the labor invested, the variety is eaten by the birds before ripening because of the high sugar content in the seeds. Hence farmers are discouraged from growing it. Two of the farmers who grew the new variety were from the Eastern region while one was from the South Western region.

Overall 92% of the farmers used their own stock as seed for planting in the most recent season, while 6% of rest bought it from the market.

Labor input into sorghum production

On average, 54% of the work required in sorghum production is done by the farm manager alone and at the same time, 17% of the farm managers interviewed, were found to be managing the sorghum crop 100% or alone. The other number one person involved in sorghum production was found to be the spouse, supported by 77% responses, who is more assisted by a female member of the household, according to 33% of the respondents.

Use of fertilizers and pesticides in sorghum production

No chemical fertilizers were used on sorghum in the most recent season or in the past years. Then for pesticides, 13% households reported having used pesticides in sorghum at the time when the household was formed, but currently no farmer indicated using pesticides. Could it be that these inputs have become more expensive for the farmers to afford or that the incentive to do so amidst the dwindling yields is no longer existent?

Other Inputs

The main implement in sorghum cultivation as well as other crops still remains the hoe with 83% households using it currently compared to 82% at the time the household was formed. Use of oxen ploughing has increased over the years from 14% at the time the household was formed to 17% currently. The Use of oxen is mainly restricted to areas

with a flat terrain where animals can easily move. That's why it is commonly found in the Eastern and West Nile regions of Uganda. While tractor use was at 4% in the past years, it is currently at 0%, probably because of the ever reducing fragmented pieces of land which do not warrant tractor use.

Agronomic practices carried out on sorghum in the most recent season

In the most recent season, crop rotation was the most used agronomic practice on sorghum as noted by 72% of the respondents, followed by intercropping at 58%, fallowing 45% and green manure compost/residue incorporation 39%. The highlighted practices show that farmers recognize the need to put in as much effort as possible, if they are to obtain some reasonable yields from sorghum production.

When compared with the reference year, the same importance was attached to the above mentioned practices.

4.5.4 Marketing of Sorghum, most recent season, previous seasons and reference year

Table 40: Percentage no. of households who sold sorghum at the different periods.

	Percentage
If any sorghum was sold following the most recent harvest	45
If any sorghum was sold after the harvest before the most recent one	47
If any sorghum was sold after the harvest two seasons before the most recent one	38
If any sorghum was sold after the harvest in 2002	13
If any sorghum was sold at the time when this household was formed	12

Results from the survey show that the generally the proportion of households selling sorghum has been increasing but more so between the last 5 years and now, where an increase of over 30% has been registered. The sudden increase in the sale of sorghum seems to suggest an increased interest in the crop which at one time used to be considered a famine crop. However as already mentioned, there is evidently an increased demand for

each kind of staple, increased market prices but low supplies due to significant declines in the yields of nearly all the crops being investigated.

The average amount of sorghum sold in the recent season was 178.6kgs at US \$ 16.51 minimum and US \$ 25.10 maximum, per 100kg bag. At regional level, the South Western region sold the largest share of 194.84kgs on average, at US \$ 16.62 minimum and 25.84 maximum, while other regions sold between 30 and 83kgs on average per household.

Table 41: Changes in the amounts of sorghum sold, the price and market access over time.

	% no. of households		
AMOUNT SOLD	Less sorghum sold now	No significant change	More sorghum sold now
Change in amount of sorghum sold since the household was formed.	30	15	55
Change in amount of sorghum sold since 2002.	23	23	54
PRICE RECEIVED	Worse price today	No significant price change	Better price today
Price today as compared to when the household was formed.	5	10	85
Price today as compared to 2002.	2	23	75
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now
Change in access to market outlets for sorghum since the household was formed.	8	13	80
Change in access to market outlets for sorghum since 2002.	2	19	79

Over 50% of the households that sold sorghum said they had increased the amounts they sell, irrespective of whether the amount produced has declined or not. The price offered

per unit of sorghum as well as the market access were also reported to have increased on the account of 80% and above households since the household was formed, and for over 70% households since 2002..

4.6 RICE PRODUCTION, TECHNOLOGY USE AND MARKETING

4.6.1 Crop stand and area under rice cultivation

Rice is one of those crops that has for a long time been grown by only a few households in Uganda, 6% to be exact, where it was restricted mainly to the Eastern region of the country where conditions were suitable for paddy rice production. Not until recently, after the introduction of upland rice in the form of NERICA varieties, has the percentage number of households growing rice risen to 23%.

In the Eastern region where much of the rice being grown is paddy, 38% of the farmers claimed they were practicing irrigation and were planting more than one crop per year.

Overall, the mean area planted to rice in the most recent harvest was found to be 0.45 hectares, computed from only 3 regions which were found involved in rice production. The regions were Eastern with 0.50 ha of rice on average, the North Western region with 0.37ha and West Nile with 0.05hs so far.

Table 42: Mean area under rice by region for different seasons

		Area under rice leading up to the most recent harvest (ha)	Area under rice during the season before the most recent harvest (ha)	Area under rice two seasons before the most recent harvest (ha)
North Western (n=33)	Mean	0.38	0.36	0.36
Eastern (n=55)	Mean	0.51	0.50	0.50
West Nile (n=2)	Mean	0.05	0	0

Table 43: Comparing the size of land under rice in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year)%	In 2002 %
Didn't grow rice at that time	63	49
Area decreased since then	5	10
Area unchanged	13	27
Area increased since then	19	14
Total	100	100

It is encouraging to note that the percentage number of households which were not growing rice at the time the household was formed had reduced from 63% to 49% by 2002. The reported increase in area mentioned by 19% respondents, from the time the household was formed and for 14% households since 2002, promises more food supplies for the ever increasing population in Uganda.

4.6.2 Rice Production and Utilization

On average the amount of rice that was produced in the most recent season was found to be 1038.61kgs, with the highest amount produced from the North Western region as can be seen in table 44 below.

Table 44: Mean production of Rice by region for different seasons

		Total production of rice (grain) after your most recent harvest (kg)	Total production of rice during the harvest before the most recent one (kg)	Total production of rice two seasons ago (kg)
North Western (n=33)	Mean	1198.48	950.00	1437.14
Eastern (n=55)	Mean	978.64	976.89	1140.09
West Nile (n=2)	Mean	50.00	-	-
Total (n=90)	Mean	1038.61	966.76	1224.39

Table 45: Rice production in the most recent season compared to other seasons

	When the household was formed (reference year) %	In 2002 %
Didn't grow rice at that time	68	42
Yields have decreased	5	21
Yields unchanged	10	16
Yields have increased	17	21
Total	100	100

The impact of the NERICA rice varieties on rice yields within the past 5 years or so is yet to be established, as an equal percentage of farmers (21%), mentioned both decreases and increases in the yields of rice over time. The trend over the long haul however suggests that there have been more yield increases in rice, indicated by 17% of the respondents, than decreases, mentioned by 5% of the rice farmers.

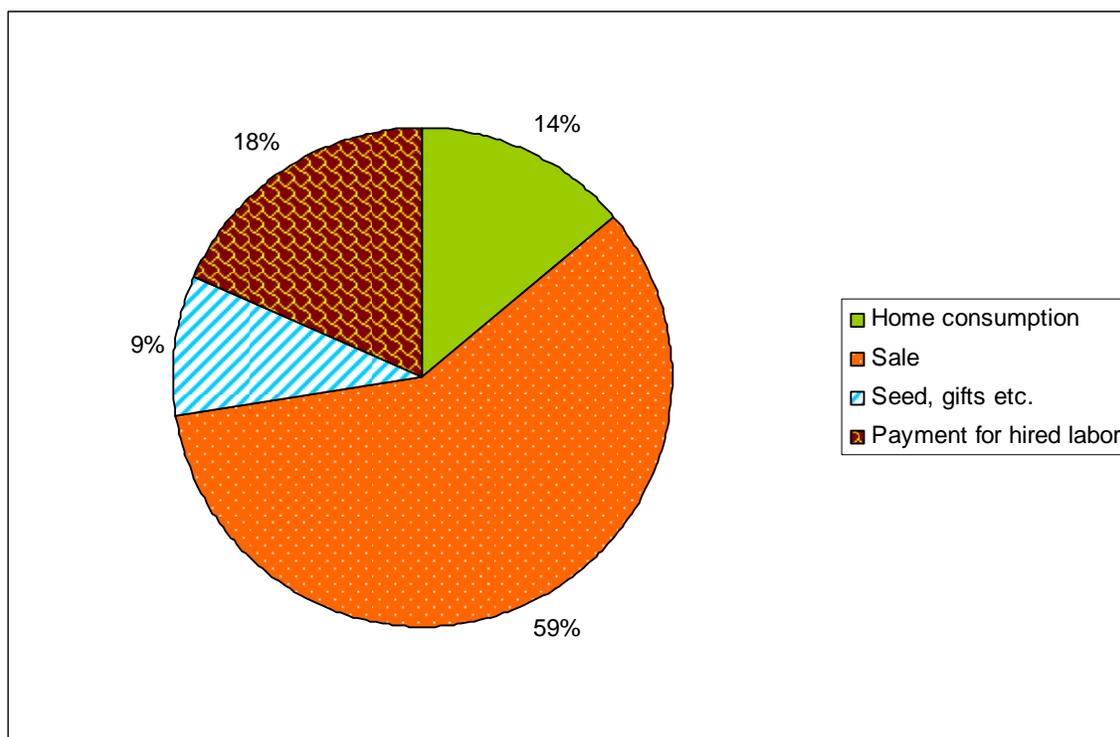


Figure 12: Percentage use of rice harvested by importance

As in the case of maize, the largest portion (59%) of the rice produced (824.6kgs on average) was used for sale, whereas the second largest portion (18%) equivalent to 258.7kgs on average, was used to pay for hired labor (Figure 12 above). The 3rd and 4th portions (14% & 9%) were used for home consumption (194.28kgs) and for seed/gifts (126.32kgs), respectively.

It can be seen that rice requires high labor investments, if one is to reap a good harvest. Where a household cannot hire labour, rice production demands the input of nearly every member of the household, whether young or old and for several hours a day to chase away birds from the rice fields among other things. During the survey, it was learnt that increased rice growing was having a negative impact on education because young children on their way to school, were being offered a small fee to forego school and assist some farmers chase away birds from their rice fields.

4.6.3 Rice Technologies and Input use

Improved rice varieties

Results from the household survey showed that while 62% of the farmers who grew rice in the recent season were still growing the traditional varieties, 38% had adopted the new improved NERICA rice varieties. In comparison to when the household was formed, the percentage number of households growing the traditional rice varieties has reduced, from 94% in the reference year to 62% currently, while the use of the improved rice varieties has risen from 6% in the reference year to 38% currently.

Figure 13 below shows that, while the Eastern region has been the major producer of rice in the country, only 4% of the households in that region had adopted the improved rice varieties, while 96% were growing their popular local paddy rice varieties. This could be due to the fact that having large expanses of paddy rice; they see no urgency in taking on the new upland rice. Others commented that upland rice had so far not yielded well in the

area and that it had attracted the parasitic stubborn weed known as ‘striga’ and so they were not willing to continue with it.

The North Western region on the other hand, took full advantage of the new NERICA varieties, registering an adoption rate of 91% households’ currently growing upland rice.

West Nile had 100% adoption of the NERICA varieties, although only 2 farmers had so far grown the varieties, in the village visited.

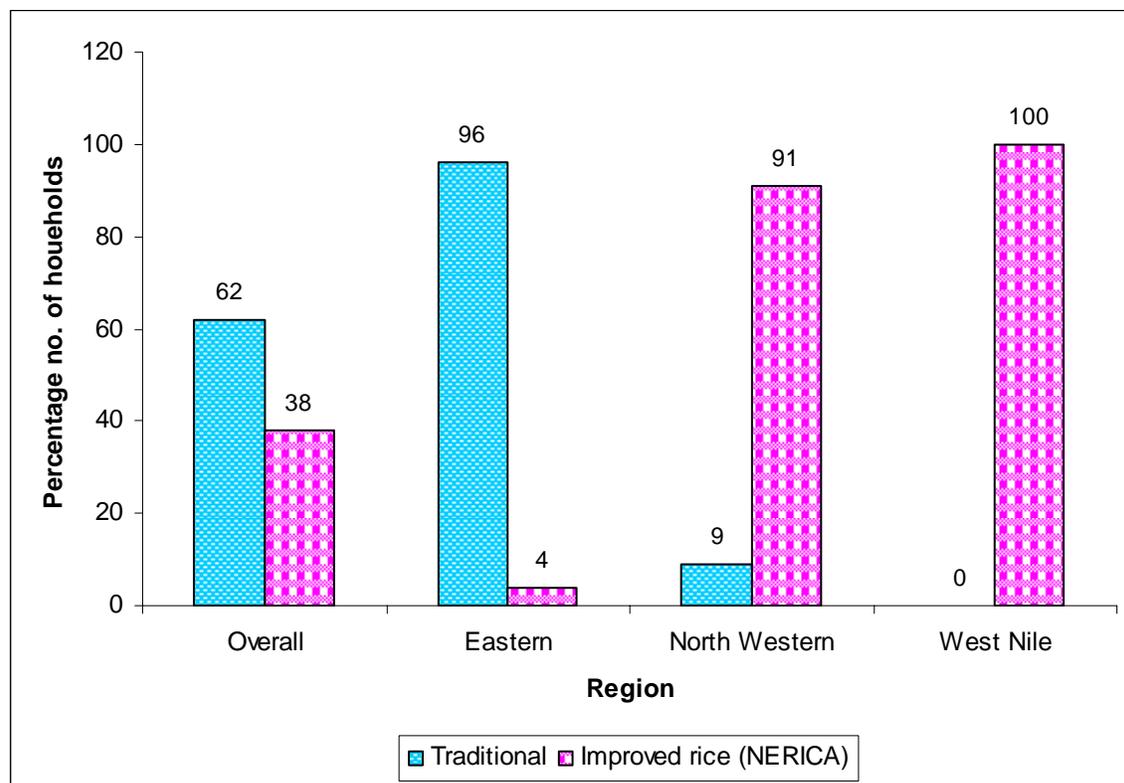


Figure 13: Rice varieties planted by region in the most recent season

Most of the rice seed planted (60%) in the recent season, was from the farmers own stock, while 28% was purchased from the market. Of the remaining, 10% was obtained from neighbors and fellow farmers, while only 2% was received from extension agents, NGOS or others.

Regionally in the Eastern region, 93% and 7% of the rice seed planted was from own stock and fellow farmers respectively; In the North West it was 9% own stock, 15% from other farmers and 73% purchased; while in West Nile it was 50% purchased and 50% from extension agents and NGO's. This reveals that much of the improved rice seed planted is currently obtained by farmers through shops or supermarkets and from fellow farmers.

Farmers in the North Western region actually said that although the extension agents were the initial source of the improved varieties, they never have enough seed for farmers except sample for demonstration plots and multiplication by farmers. So if the farmers want enough rice seed to plant, they just have to buy it or book with fellow farmers.

Labor input in rice production

Fifty-three percent of the labor required in rice production was provided by the household head alone, and for the rest of the work, he/she was assisted by the spouse and a male household member, as reported by 74% and 19% respondents respectively.

On average, 13% of the farm managers interviewed, were reportedly not involved in rice production at all.

Fertilizer and Pesticide use in rice production

During the most recent season, only 3 households out of the 398 households surveyed, applied fertilizers to their rice fields. These 3 households were from the North Western region of Uganda and they each spent on average US \$ 82.35 on fertilizers to replenish their relatively poor soils. It was established that the 3 farmers had actually planted the NERICA rice varieties and that 2 of them had purchased their seed from the market, while the other one had obtained it from an extension agent. Only 2 farmers from the Eastern region did apply fertilizers at the time the household was formed.

Pesticide use appears to be an important management practice in rice production, as is indicated by 43% households recently and 45% households at the time the household was formed.

Other Inputs used in rice production

Seventy nine percent of the rice farmers used hoes to cultivate their fields in the most recent season, 19% used oxen ploughing, while 2% used tractor ploughing. It's evident that the use of tractors is not a common practice yet commercialization of agriculture necessitates so.

At the time when the household was formed, 89% of the households growing rice used the hand hoe for land preparation while 11% used oxen ploughing. It is encouraging to note that currently there is an increase in the use of oxen ploughs, tractors and a 10% reduction in the use of the hand hoe in rice cultivation.

Agronomic practices carried out on rice in the most recent season

The most important agronomic practices influencing yield increases in order of importance were, use of improved planting practices (62%), zero or minimum tillage (62%), breaking the hard pan (51%), soil and water conservation (33%), crop rotation (30%), green manure/composition/ residue incorporation 27%, integrated soil and nutrient management (7%) integrated pest management (6%) animal manure (4%), and intercropping with nitrogen fixing fertilizers (3%).

In the reference year however, the agronomic practices included: Fallowing (56%), breaking the hard pan (33%), soil and water conservation (33%), integrated soil and nutrient management (28%) crop rotation (11%) and green manure/composition/ residue incorporation 11%.

It is clear from the above practices that rice by nature is difficult to intercrop, hence there is need to have enough land if one is to engage in rice growing. However with the introduction of upland rice, crop rotation as well as proper soil nutrient management will enable farmers to diversify and maximize outputs despite their limited land sizes.

4.6.4 Marketing of rice, most recent season, previous seasons and reference year

Table 46: Percentage no. of households who sold rice at the different periods.

	Percentage
If any rice was sold following the most recent harvest	89
If any rice was sold after the harvest before the most recent one	86
If any rice was sold after the harvest two seasons before the most recent one	76
If any rice was sold after the harvest in 2002	14
If any rice was sold at the time when this household was formed	6

Results from the survey show that the percentage number of households selling rice, has shot up tremendously within the last 5 years, moving from 14% in 2002 to 89% households in the most recent season. The significantly high increase in rice marketing can be attributed to the increased production with the introduction of the improved upland rice, the premium offered on the new rice varieties as was already noted and the ready market for rice in all the urban centers in the country.

The average amount of rice sold in the recent season was found to be 777.6kgs, sold at US \$ 31.17 minimum and US \$ 52.43 maximum, per 100kg bag.

At the regional level, the North Western region which mainly grew the new NERICA varieties, supplied more rice (845kgs) to the market than the Eastern region (747.45kgs) which has almost double the number of rice growers as the North Western region.

Table 47 below, also shows that the NERICA varieties in the North West and West Nile regions, commanded a higher price (US \$ 61.76 – US \$ 94.12 maximum), compared to the local varieties majorly produced in the Eastern region (US \$ 45.18 maximum).

The West Nile region tends to attract the best prices for each the produce sold in the region mainly because of its location at the border of two countries namely: Sudan and Congo, both of which heavily rely on Uganda for a supply of food stuffs. At the same time the production of staple food crops from the West Nile region is much lower than from the other regions.

Table 47: Descriptive statistics on amount of rice sold, lowest and highest prices for the recent season by region.

	Total amount of rice sold after the most recent harvest	Lowest price received following the most recent harvest	Highest price you received following the most recent harvest
N.western	845.00	36.95	61.76
Eastern	747.45	36.36	45.18
West Nile	24.00	82.35	94.12
Total	777.43	37.17	52.43

Almost 50% of the rice producers reported that they sold their rice at the market outside the village, majorly because after harvesting they have to take the rice for shelling before selling it off. Another 36% said they sold much of their rice unshelled, at the farm gate, probably due to lack of transport to the market or storage facilities. Among the rest, 11% sold their rice in the village market, while 1% sold their rice through the state marketing board.

Table 48: Changes in the amounts of rice sold, the price and market access over time.

	% no. of households		
AMOUNT SOLD	Less rice sold now	No significant change	More rice sold now
Change in amount of rice sold since the household was formed.	12	0	88
Change in amount of rice sold since 2002.	36	7	57
PRICE RECEIVED	Worse price today	No significant price change	Better price today
Price today as compared to when the household was formed.	6	6	88
Price today as compared to 2002.	4	5	91
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now
Change in access to market outlets for sorghum since the household was formed.	6	6	88
Change in access to market outlets for sorghum since 2002.	0	9	91

The percentage number of households reporting increases in the amounts of rice sold, better prices and better access to markets, are between 7-15 times higher than the those claiming that the situation is worse in terms of the above 3 measures.

Interestingly, nearly all the negative responses on amounts sold, price and market access for rice, were registered in the Eastern region, where over 95% of the rice crop grown is of the traditional varieties. For example all the 36% households who said they sell less rice today compared to 2002, where from the Eastern region and they represented 40% of

the rice farmers in the region. One of the possible reasons could be reduced production due to increased land shortages coupled with extensive soil mining.

4.7 Non-Food Cash Crops Grown In Recent Season

4.7.1 Crop stand and area under non-food cash crops

In the most recent season, 45% of the households surveyed were reportedly growing non-food cash crops, while 55% did not grow them. The total area devoted to the non-food cash crops in the recent season was 0.33 hectares on average, with more households reducing on the land devoted to non-food cash crops today than those who can afford to increase.

Table 49: Comparing the size of land devoted to non-food cash crops in the most recent season, with that in the reference year and 2002.

	When the household was formed (reference year) %	In 2002 %
Area decreased since then	42	34
Area unchanged	28	42
Area increased since then	30	24
Total	100	100

Table 49 shows that 42% of the newly sampled households had decreased the area planted to non-food cash crops over the years, while 34% had further reduced the area of these crops within the last 5 years. This suggests that with the prevailing competition for the limited land resources, farmers have to prioritize their crop production, to the extent of doing away with part of the already established perennial non-food cash crops, in case they are not as beneficial as the other crops being foregone.

According to table 50 below, coffee took the largest percentage share (49%) of households growing the non-food cash crops, followed by cotton with 15% households, fruits & vegetables (14% households), Tobacco (12% households), then spices and sugarcane with 5% and 4% households respectively. Other non-food cash crops including tea were grown by 17% households in total.

Regionally and traditionally, coffee is most grown in the Central and South Western regions of the country by 92% and 88% households respectively; Cotton was only grown in the Eastern region by 88% households; Fruits & Vegetables were mainly from West Nile (92% households); Tobacco was grown by 44% households in the North West, while spices like ginger & vanilla were grown by 12% households in the Central region. A collection of other unspecified crops were grown by 56% household in the North Western region of Uganda.

Table 50: Percentage no. of households growing non-food cash crops by region

Crop	Region (% households)					
	North western	Eastern	South Western	Central	West Nile	Total
Cotton	0	88	0	0	0	15
Sugar cane	5	0	8	3	4	4
Cashew nut	0	0	0	0	0	0
Cocoa	0	0	0	0	0	0
Tobacco	44	3	0	5	0	12
Coffee	7	19	88	92	16	49
Tea	2	0	0	0	0	1
Sisal	0	0	0	0	0	0
Pyrethrum	0	0	0	0	0	0
Fruits and vegetables mainly for export	2	0	4	0	92	14
Flowers	0	0	0	0	0	0
Spices, like ginger and vanilla	2	0	0	12	4	5
others	56	0	16	2	4	16

Nineteen percent of the farmers, who grew the non-food cash crops, did so it on the basis of a pre-arranged contract with a private trader, most especially the tobacco growers.

4.7.2 Inputs used on non-food cash crops in the recent season

Overall, 15% of the respondents reported that they had used chemical fertilizers on the non-food cash crops, with the percentage distribution by region as follows: N.western 56%, Eastern 6%, South western 4%, central 2% and west Nile had 0%. This difference was statistically significant at the 1% confidence level and corresponding to the

requirements of the main cash crop in the area. For example the production of Tobacco which is pre-dominantly grown in the N. Western region, is accompanied by fertilizer application hence the high fertilizer use registered.

Other inputs used included animal manure which was used by 22% of the farmers; Green manure used by 32% of the farmers, and pesticides by 27% of the farmers growing non-food cash crops.

4.7.3 Marketing of non-food crops in recent season and previous seasons

According to the respondents, the most profitable non-food cash crop happened to be the main cash crop that the household grew, with coffee getting 48% responses, followed by cotton with 15%, fruits & vegetables 12%, others 11% and Tobacco 10%. It was not possible to establish which of the crops actually earned more in real value terms, because of research limitations.

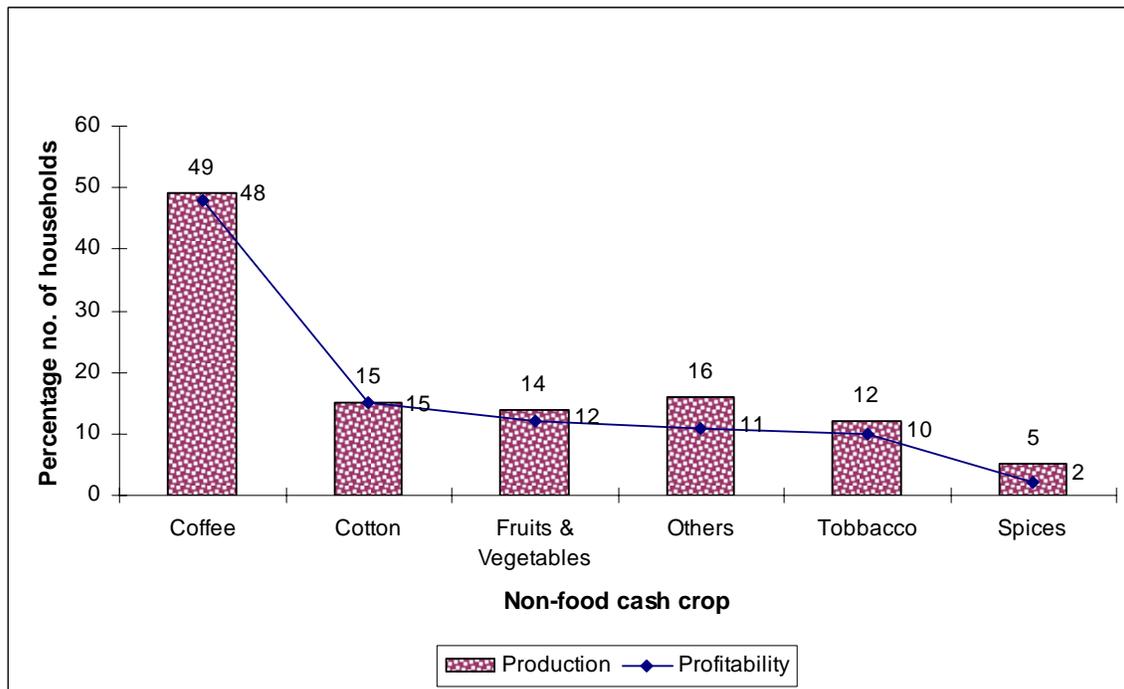


Figure 14: Production and Profitability of the Non-food cash crops

When the farmers were asked about the price fluctuations over time, 80% of them said they were receiving better prices today than when the household was formed, while 9% said the prices had worsened while 3% experienced no significant change in the prices. Market access too closely corresponded with price changes noted.

Likewise the price changes over the last 5 years exhibited the same trend as mentioned above, with even fewer households complaining about the prices and market access. This confirmed that the prices of most non-food cash crops are improving despite the shake ups in the global market prices in the past.

4.7.4 Division of labor in the production of the non- food cash crops

Outstandingly, Non-food cash crops received the highest labour input (72%) in terms of crop management activities, done alone by the farm manager. Results also showed that nearly 50% of the farm managers interviewed had taken on the full management of the cash crops (i.e 100% involvement), single handedly.

A gender analysis of these households where the farm managers solely produced the cash crops revealed that, 75% of the farm managers were male household heads while 25% constituted the females. It can therefore be deduced that non-food cash crops are male dominated in terms of production and marketing, most probably because of the monetary value associated with them.

This is not a surprising trend in Africa or in Uganda in particular, given the fact that men traditionally own most of the productive resources in the home and therefore tend to control the most rewarding outputs from those resources.

Interestingly were the involvement of another person was solicited, only 17% mentioned the involvement of the spouse or alternatively another male member of the household.

Then 32% of the respondents said the other sex (men or women) could be responsible for the production of any other cash crops.

4. 8 Other Food Crops Grown In Recent Season

4.8.1 Crop stand and area under other food crops

Ninety eight percent of all the households interviewed in the recent season grew other crops which included among others, pulses and vegetables which are used as sauce to accompany the staples grown for food. Hence while different staples may be limited to a few regions, the other food crops grown, cut across all the regions although the concentration may differ.

The mean size of land devoted to other food crops (pure stand equivalent) was found to be 0.63 hectares, which is higher than what is allocated to any of the staples being investigated. This suggests that the collection of crops under other food crops is beneficial to the household, both in terms of food and income.

For example beans, sweet potatoes, groundnuts and millet, which are grown by 92%, 86%, 60% and 32% households respectively, form an integral part of the diversified diet of most Ugandans on a regular basis. Vegetables, Irish potatoes, as well as Yams which used to be reserved for periods of food scarcity, are gaining importance amongst several households.

Table 51: A regional diagnosis of other food crops grown

Crop	Region (% households)					Total
	North western	Eastern	South Western	Central	West Nile	
Beans	93	90	100	94	71	92
Peas	9	5	36	0	16	13
Irish potatoes	20	9	36	25	42	24
Sweet potatoes	92	91	84	78	82	86
Millet	24	42	58	9	34	32
Groundnuts	68	45	65	56	61	60
Yams	10	17	53	10	18	21
Cocoyams	1	21	3	34	0	12
Vegetables for local markets	16	36	10	29	76	27
Fruits for local markets	11	8	9	11	53	14

4.8.2 Inputs used on other crops in the recent season

Chemical fertilizer use on any of the other food crops grown was reported by only 2% of the households interviewed, 15% mentioned use of pesticides, 13% animal manure and 33% green manure.

4.8.3 Marketing of other food crops

Of all the households which grew other food crops, 59% marketed some of their other food crops, while 41% did not. Figure 15 below illustrates the importance of the other food crops in terms of production, marketability and profitability.

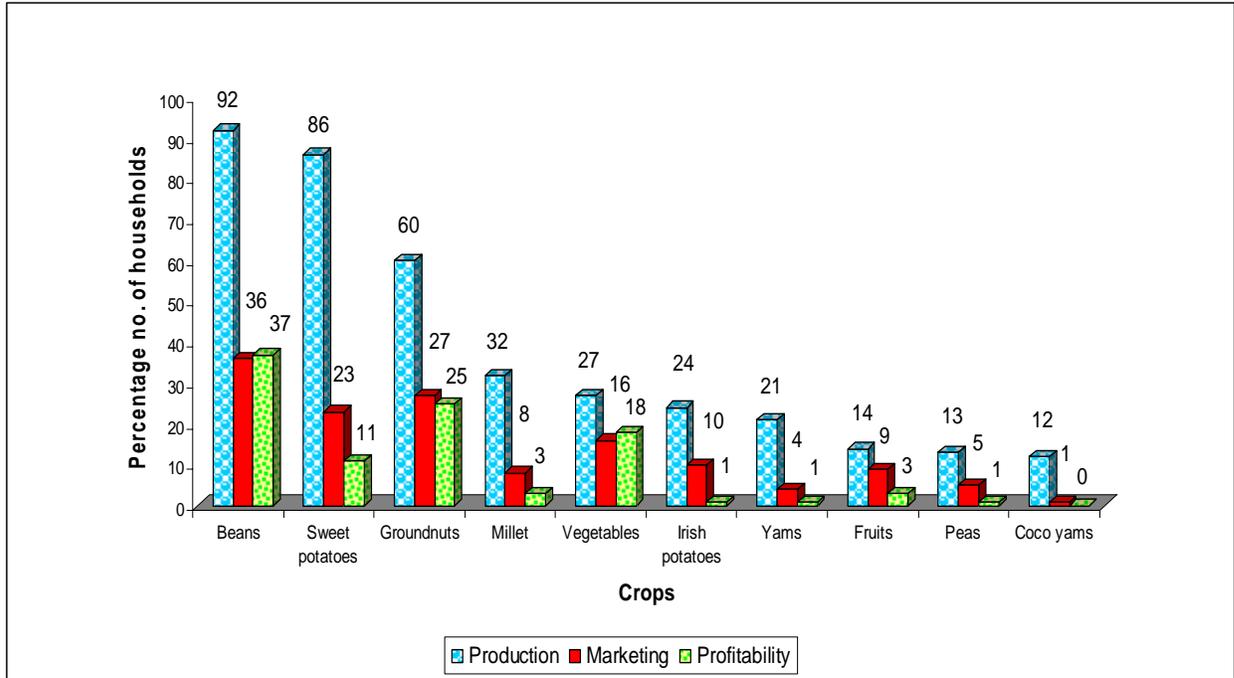


Figure 15: Production, marketing and Profitability of the other crops grown

Beans were found to be the most marketed and profitable for the majority of households, followed by groundnuts, sweet potatoes and vegetables. The others marketed though not as profitable as the previous are: Irish potatoes, Fruits, Millet, Peas and Yams in that order.

Table 52: Marketing of other crops currently compared with reference year & 2002

	(% no. of households)		
AMOUNT SOLD	Less of other crop sold now	No significant change	More of other crop sold now
Change in amount of other crop sold since the household was formed.	23	21	52
Change in amount of other crop sold since 2002.	15	21	56
MARKET ACCESS	Market access is worse now	Market access unchanged	Market access is better now
Change in access to market outlets for sorghum since the household was formed.	3	10	83
Change in access to market outlets for sorghum since 2002.	2	13	78

More of the most profitable crop is being sold now, with better market access both in the previous and recent years. As several factors seem to promote the sale of every other crop, the loop holes in terms of ensuring sustainable and increased production should be addressed urgently, in order to avert the possibility of a food security crisis.

4.9 AGRICULTURAL TECHNIQUES

4.9.1 Agricultural techniques farmers have enough knowledge

Table 53: Agricultural techniques farmers have enough knowledge about to practice and are Actually practicing by Region

Technique	N.western		Eastern		S.western		Central		W.Nile		Total(n=391)	
	Percentage no. of households											
	know	Pract	know	pract	know	pract	know	pract	know	pract	know	pract
Crop rotation	100	98	100	87	95	95	100	80	93	80	98	89
Intercropping	92	79	00	93	99	92	100	90	95	90	97	88
Intercropping+ legumes	98	92	87	88	99	96	97	80	92	80	95	88
fallowing	92	49	82	54	84	53	96	70	28	13	83	51
Improved fallowing	4	0	3	0	8	1	13	1	13	5	7	1
Animal manure	79	17	69	13	82	53	96	58	63	53	79	35
Minimum tillage	2	0	18	3	0	1	63	3	0	0	17	1
Breaking the hard pan	93	85	64	51	7	3	99	96	100	95	72	66
Green manure/compost	87	87	70	43	91	82	96	92	80	60	85	76
Chemical fertilizer	52	21	44	4	34	11	63	1	45	0	48	10
Soil/water conservation	34	16	52	37	82	57	90	62	60	33	61	39
Improved practices	73	66	77	68	39	16	97	92	78	53	72	60
Integrated Nutrient Management (INM)	31	21	5	1	38	28	18	0	23	0	24	12
Integrated Pest Management(IPM)	25	23	9	4	71	51	50	17	20	5	36	22
Agro forestry	33	6	56	18	23	11	94	50	55	15	50	19
Pesticides	60	38	57	36	35	15	62	8	40	23	53	25
Rain water harvesting	45	14	62	32	36	30	83	68	53	28	55	33
Irrigation	17	0	68	41	4	0	78	1	28	5	38	9

The agricultural techniques known and most practiced included:- crop rotation practiced by 89% households, intercropping with or without legumes (88%), green manure/compost (76%), breaking the hard pan (66%), Improved planting practices (60%) and fallowing (51%). The use of other practices was below 40% households.

4.9.2 Agricultural Techniques farmers know but are not practicing & the reasons why-

At least 50% and above of all the farmers were already practicing the agricultural techniques or were not familiar with them.

Table 54: Agricultural techniques farmers know but do not practice and the reasons.

Technique	(1) Too labor consuming	(2) Involves extra costs, not affordable	(3) Not relevant for me, makes no difference	(4) Demands community efforts	(5) Abandoned for economic or labor reasons	(6) No positive effects on my crops
	Percentage no. of households who gave the reason					
Fallowing					28	6
Improved fallowing	6					8
Animal manure	20	22				
Minimum tillage			13			
Green manure/compost	11					
Chemical fertilizer		51				
Soil/water conservation	9	6				
Improved practices	4	3				
Integrated Nutrient Management (INM)		17				
Integrated Pest Management (IPM)		15				
Agro forestry		13	8			
Pesticides		25	4			
Rain water harvesting	7	8				
Irrigation	8		8	8		

The 2 most outstanding reasons why farmers are not adopting some practices are:

- a) **The practices involve extra hidden costs, or they are not affordable.** This was mentioned in relation to practices such as chemical fertilizer use by 51% households; Pesticide use (25%) households, Animal manure (22%) households; INM (17%); IPM (15%); Agro forestry (13%); Soil & water conservation (6%); and Improved planting practices (3%).

- b) **The practices being too labour consuming.** This was an issue in relation to Animal manure use reported by 20% households; Green manure/compost incorporation (11%); Soil & water conservation (9%); Irrigation (8%); Rain water harvesting (8%); Improved fallowing (6%) and Improved practices (4%).

The other reasons given for not practicing the known agricultural techniques included:-

- c) **Not being relevant to the farmer or that the practice make no significant difference.** This was mentioned for Minimum tillage by 13% households; Agro forestry (8%); Irrigation (8%); and Pesticide use (4%).
- d) **Abandoning practice for economic or labour reasons,** mainly related to fallowing which 28% households abandoned due to land shortage and labour constraints.
- e) **Demands community efforts, which do not exist at this point.** This was associated with the practice of irrigation and reported by 8% households.

4.9.3 Sources of knowledge about the Agricultural Techniques- Overall

Interestingly the techniques that were most practiced without any complaints were learnt from the parents and these included: Crop rotation (69%), intercropping (68%), intercropping with legumes (46%), fallowing (45%), and Breaking the hard pan (53%).

On the other hand, the techniques which respondents learnt from extension agents were the least adopted for the reasons already noted. These practices included intercropping with legumes (5%), Animal manure (5%), use of green manure (6%), use of chemical fertilizers (12%), soil and water conservation (7%), improved planting practices (15%), integrated nutrient management (8%), integrated pest management (10%), pesticide/herbicide (12%).

4.9.4 When the farmer learnt of the Agricultural techniques practiced –Overall

Table 55: When the Agricultural technique was learnt.

Techniques	Not familiar with practice	Learnt last year	Learnt within the last 5 years	Learnt more than 5 years ago
	Percentage no. of households			
Crop rotation	3	1	5	91
Intercropping	2	1	6	91
Intercropping+ legumes	3	1	21	75
Fallowing	43	1	3	53
Improved fallowing	96	1	1	2
Animal manure	59	1	15	25
Minimum tillage	96	1	1	2
Breaking the hard pan	37	1	4	58
Green manure/compost	27	2	30	41
Chemical fertilizer	80	1	12	7
Soil/water conservation	59	3	22	16
Improved practices	40	3	33	24
Integrated Nutrient Management (INM)	85	1	8	6
Integrated Pest Management (IPM)	77	1	15	7
Agro forestry	74	1	6	19
Pesticides	70	2	15	13
Rain water harvesting	65	2	9	24
Irrigation	88	2	5	5

In accordance with the source of knowledge about the practices, it can be seen from table 55 above, that those practices which had been learnt from the parents, were correspondingly reported to have been learnt more than 5 years ago, by most respondents (40-91%).

These included: - Crop rotation, intercropping, intercropping with legumes, fallowing, breaking the hard pan, as well as use of green manure compost.

On the other hand, the techniques which respondents learnt from extension agents were mostly learnt within the last 5 years, but with higher percentages of households claiming not to be familiar enough with them to practice.

This shows that extension services are still much needed for farmers to be comfortable enough to practice. The techniques that farmers still lack knowledge about the most include:- Improved fallowing mentioned by 96%, minimum tillage (97%), chemical fertilizer use (80%), Integrated nutrient management (85%), Integrated pest management (77%), Agro forestry (74%), pesticide use (70%), Irrigation (88%) and rain water harvesting (65%).

Knowledge on the rest of the practices can probably be acquired through farmer to farmer interactions.

4.9.5 Drying facilities

When the respondents were asked what type of drying facilities they used, 40% said they dry their produce on the ground, 37% said they used bags, tarpaulins, and mats , 20% said they use the tarmac road, while 1% said they use concrete drying floor.

4.9.6 Storage facilities

On storage of produce, respondents reported that, 76% households stored their produce in bags inside the house, 20% stored theirs in the granaries, 3% put their produce in proper bags in proper stores 1% used other methods other than those listed above.

For those farmers who stored the bags inside the house, 54% said they put the bags straight on the floor, 41% said they put bags in the pallet on the floor to allow air circulation, 3% mentioned that they put their bags under the ceiling, and 1% fell under others.

4.9.7 Pesticide use and losses in storage

Overall 26% of the respondents said they used pesticides or any other technique to protect their stored crop e.g. rat poison or treating the seeds to protect from mould/insects before bagging them.

The mean percentage loss of produce during storage was found to be 16.56%, per bag of grain that is stored before selling or consuming. These losses were attributed to contamination by animals or destruction by moulds or insects.

4.9.8 Livestock and its uses

The overall mean number of cows was found to be 4 oxen 3, goats/sheep 4, camels/donkeys 4, pigs 3 and poultry 12.

Of those who owned livestock, 20% said they sold animal produce like milk, meat or eggs, while 37% said they regularly sold off the animals. Four percent said they used their animals for draught or transport purposes.

4.9.9 Fish rearing

Less than 1% of the respondents claimed that they had a fish pond, while another 1% said they had access to fishing water or do actual fishing. Forty percent carried out fishing for their own home consumption.

5.0 ACTIVE LABOR VS TOTAL NUMBER OF DEPENDANTS IN 2007 & 2002

In 2007, the mean active labor was computed to be about 4 people, whereas the total dependants on farm income in the same year were 7 on average.

In 2002, the mean active labor was about 4 people still, while the total number of dependants was 5 on average.

This shows a trend of increasing populations or no. of dependants against the same of no. of active adults or even lesser, having to support the families.

5.1 OCCUPATION OF THE HOUSEHOLD HEAD AND OTHER MEMBERS

Most of the household heads (84%) were mainly engaged in farming, 15% are employed in non-farm activities while less than 1% are actually retired. Similarly, 83% of the farm managers were found to be employed mostly in farming, 16% are occupied with non-farm activities while less than 1% are retired. This signifies that the farm manager is in effect the household head.

5.1.1 Employment outside the farm

According to the results of the household survey, the average number of adult household members who regularly take on employment outside the farm is 1.42 with a minimum of 1 person and maximum of 5.

Those who take on non-farm employment are 1.35 on average with a minimum of 1 and maximum of 5. Then the adults who are regularly involved in some kind of micro-business were 1.23, while those in a large-scale business were 1.57 on average.

With the mode at 1 adult for each of the above categories, it can be concluded that on average, only 1 or 2 household members were earning some income outside the farm and therefore the entire family depends more on farm income and any little extra earned outside the farm.

5.2 HIRING OF FARM LABOR AND THE TASKS HIRED LABOR FOR

In total, 49% of the households interviewed regularly hired farm labor, mainly for land preparation according to 91% of the households, 62% use it for planting, 71% for weeding, 12% for fertilizer application, 28% for watching crops, 58% harvesting, 44% for transporting and 27% for tending livestock.

6.0 INSTITUTIONAL CONDITIONS

Table 56: Percent households reached by Extension services, Farmer groups and Credit services

REGION	Gov't Extension			Non-Gov't Extension			Paying for Extension Services	Member of local farmers group	Obtain Agric. Input Credit
	<i>Never</i>	<i>Rare</i>	<i>Regular</i>	<i>Never</i>	<i>Rare</i>	<i>Regular</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
NORTH WESTERN	56	38	6	38	53	9	4	42	24
EASTERN	56	36	8	59	29	12	3	23	9
SOUTH WESTERN	40	37	23	47	30	23	19	22	6
CENTRAL	85	4	11	85	4	11	0	14	1
WEST NILE	58	40	2	58	42	0	17	38	25
OVERALL	59	31	10	55	33	12	8	28	13

A high percentage of 59% respondents said they had never received advice from any governmental extension staff at any one time during the last year. 31% said they rarely did and 10% confirmed that they regularly received advice from extension staff.

The trend above was not different from those who received advice from non-governmental extension services during the last year. It can be seen again that 55% of the sampled households never received advice from non-governmental extension services, 33% rarely did so, while 12% regularly benefited from this kind of arrangement.

Of those who received advice, 8% of the households mentioned that they paid for the advice given, which on critically examining was a contribution required for group membership in the government led initiatives under the NAADS programme.

It is a very rare occurrence for farmers in Uganda to directly pay for extension services. The opposite is what is common, where by farmers actually expect some lunch allowance or tangible reward for attending meetings intended to educate them on better farming methods.

Only 28% of the farm managers interviewed said they belonged to a local farmer group/ organisation/ club/association dealing with agriculture. This means that 72% of the farmers are still missing a chance to enhance their knowledge of crop management as well as obtaining other skills.

The majority of the farmers (87%) do not obtain any form of agricultural input credit from any body, while only 13% obtain this kind of credit, which they utilize to purchase inputs such as fertilizers, pesticides, hoes and seed.

6.1 Status of the land cultivated

6.1.1 Obtaining of land

Of the 304 households interviewed about how they first obtained land, 47% said they had inherited land already under cultivation. Another 31% said they had purchased land, 11% said they were allocated family land under fallow, 6% were allocated virgin land/pasture and 4% borrowed or rented the land they first cultivated on. This was significantly different across regions.

6.1.2 Ownership of the land currently cultivated on

On the status of most of the land that the farmers now cultivate, 77% farmers said they individually owned the land, 11% said they had use rights allocated by communal/ clan/ government authority, while 12% said they rented/ borrowed from other individuals/ families.

On control of all the land 83% said they had full control of all the land they now cultivate while 17% needed to consult any other person in order to obtain permission for cultivation, change crops/ land use, for some or all of their land.

6.1.3 Ownership of a formal land title or registration

Of all the surveyed households 18% had a formal title or registration of all or parts of their land, while 82% did not have.

A regional analysis showed that the eastern region had the highest (36%) percentage of households with a formal land title, followed by the N. Western region with 24% and the central region with 15%. S. Western and W. Nile regions reported no household as having a formal land title.

The whole process of obtaining a formal land title is not only complicated and costly but is also a source of insecurity for bona fide land occupants with the evolving land tenure systems.

6.1.4 Ways of expanding farm size in the village and at household level

Farmers were asked which alternatives would be possible to use in order to expand farm size in the village. The responses were as follow:- the majority (66%) said renting/ borrowing land would be the best option, 53% suggested buying land, 21% said bringing fallow land into permanent cultivation, 11% said clearing virgin land would be an option, and 6% said turning grazing land into cultivation.

Table 57: Appropriate measures for expanding farm size at household level

	Region					
	N.western	Eastern	S.western	Central	W.Nile	Total
Clearing virgin land	13	9	10	0	40	12
Turning grazing land into cultivation	1	0	3	3	8	2
Bringing fallow land into permanent cultivation	18	0	18	28	8	15
Renting/ borrowing land	60	40	45	38	43	47
Buying land	8	51	24	32	3	24

For the majority at household level, farm expansion would only be possible by either renting/borrowing mentioned by 47% of the households or buying land according to 24% of the respondents.

As for the children, the 2 main options through which they will mainly get land, were reportedly:- inheriting land under cultivation by 59% households or purchasing land (29% households). A regional analysis of the children's predicament in terms of obtaining land can be seen in table 58 below.

Table 58: How the children will mainly obtain land in the village by region

	Region (% no. of households)					
	N.western	Eastern	S.western	Central	W.Nile	Total
They will be allocated land not previously cultivated	6	1	1	0	18	4
They will be allocated family land now under fallow	3	4	3	6	3	4
They will inherit land already under cultivation	36	71	82	47	80	59
They will rent/borrow land	13	1	3	1	0	5
They will purchase land	42	23	12	46	0	29

7.0 THE INCOME OF THE HOUSEHOLD IN THE PAST YEAR

7.1 Income source that generated the most cash

According to the survey results displayed in table 59 below, when households were interviewed on which income source generated most cash for them in the course of the past year, 47% of the respondents cited the sale of food staples as the source that generated the most income for them.

Another 15% households mentioned non-food cash crops as their most rewarding source of income, 9% said it was the sale of other foods, 8% micro-businesses and 7% quoted non-farm salaried income as the most rewarding.

Table 59: Income sources for the household in the past year

	Income source that generated most cash for the household in the past year (% households) (N = 395)	Farm-income source which generated most cash for the household in the past year (% households) (N = 367)	Cash generated from crop sales and other businesses (Mean US \$) (N = 391)
Sale of food staples	47	59	280.11
Sale of other food crops	9	12	112.21
Sale of non-food cash crops	15	24	294.69
Sale of animals or animal produce	2	4	150.30
Leasing of machinery	0	1	226.21
Works on others farms	5	0	111.49
Non-farm salaried employment	7	0	679.36
Micro businesses	8	0	307.83
Large scale business	0		29.41
Rent, interest	1		127.73
Pensions	0		411.76
Remittances from absent household members	5		119.34
Overall mean income from all the 12 sources			633.80

7.2 Farm-income source that generated the most cash

Among the farm sources of income, the sale of staple food crops generated the most income for the majority (59%) of households surveyed, followed by the sale of non-food cash crops profiting 24% of the households. Other food crops scored highest for 12% of the households, while the sale of animals was most profitable for 4% households. Only 1% got their highest farm-income by leasing out machinery.

7.3 Cash generated from the various sources of income

According to table 59 above, the overall mean income earned per household from all the 12 sources of income identified was US \$ 633.80.

It can be seen that while staple food crops earned the highest for the majority of the farming households, it is actually the non-farm salaried income which brought in the highest income in value terms. The 58 households who have members employed in formal jobs earned a total of US \$ 679 on average.

The next highest value of income (US \$ 412) was from pensions, but this went to only 3 households.

Micro-businesses followed, earning 94 households an average of 308 US \$, Non-food cash crops earned 158 homes an average of 295 US \$, followed by staple food crops with US \$ 280, for 295 households, while leasing machinery brought in US \$ 226 for 23 households.

The remaining sources of income brought in less than US \$ 200 on average for the households, the least (US \$ 29) being from a large-scale business.

Figure 16 below gives a graphical illustration of what is earned on average from the different sources of income.

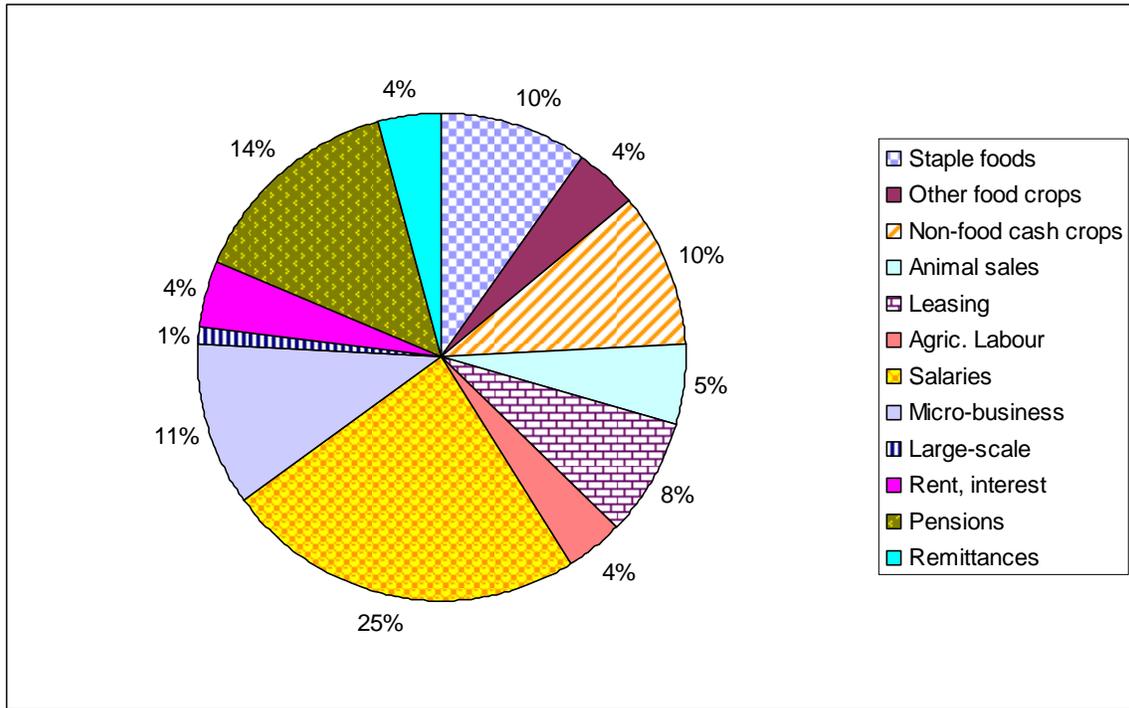


Figure 16: Amount of money earned from the different sources of income

7.4 A regional analysis of the total cash generated by each household

On analyzing the total mean income earned per household at the regional level, the North Western region surpassed other regions by nearly 3 times, followed by the South Western region, the Central, West Nile and the Eastern region in that order.

Several factors would need to be critically analyzed in order to explain this interesting trend, illustrated in figure 18 below.

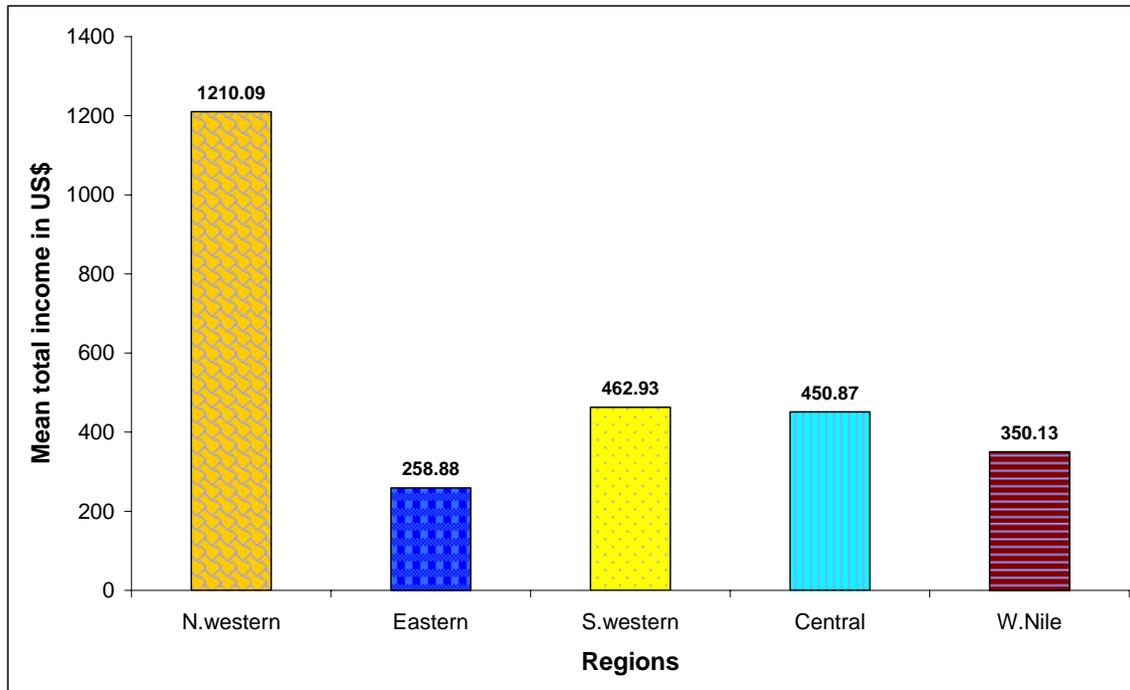


Figure 17: Mean total income generated per household by region in the past year

A quick assessment showed that the North Western region had income from 9 of the 12 sources named, while the Eastern region had only 5 of the income sources available. The types of sources of income are also critical in determining how much is earned.

The North West had 11% households earning from non-food cash crops, 8% from Micro-businesses, 5% on salaries and 60% from the sale of staples among other things. The Eastern region on the other hand had 83% earning from staples food crops, 6% from salaries, 4% from micro-businesses and 4% from non-food cash crops.

The implications are that if the majority of households are to earn substantially, they will need to invest also in non-farm sources of income like the micro-businesses or engage some more in the production of non-food cash crops as well, among other things.

The other regions like West Nile too had 7 income sources; South Western had 8 while the Central region utilized 9 sources of income.

8.0 ASSETS OWNED BY HOUSEHOLDS AND WEALTH CATEGORIES

8.1 Household assets

Some of the assets owned by the households included: wired electricity/power (3%), mobile or stationery telephone (31%), Diesel power generator or similar (2%), water piped to the house (0%), TV-set (8%), Radios (80%), Tape recorder (3%), Bicycle (68%), Sewing machine (7%), Kerosene stove or other modern stove (18%), battery torch (51%).

Sixty-six percent of those who do not own a mobile or stationary telephone said they still had access to either of them.

8.2 Means of transport

The most common means of transport is use of a bicycle (59%), followed by foot (30%), motor bike (7%), car, tractor or truck (4%).

8.3 Housing standard

36% of the sampled households have block/ brick houses with corrugated iron roofs, 34% have mud houses with thatched roofs, while 30% have mud with corrugated iron roofs.

8.4 Wealth categories

The assessment made on the possible wealth status of the different household interviewed revealed that overall 15% of the households fell in the very poor category, 36% are below average wealth, 40% are average in terms of wealth, while 7% households are above average. Only 2% households were classified as very wealthy. (See table 60 below).

Table 60: Wealth categories by region

	Region (% households)					
	N.western	Eastern	S.western	Central	W.Nile	Total
Very poor	16	15	10	9	28	15
Below average wealth	35	34	27	42	48	36
Average wealth	39	37	53	43	25	40
Above average	7	14	6	3	0	7
Very wealthy	3	0	4	3	0	2

On regional basis, the central region had the least (9%) percentage of households in the poorest wealth category, followed by South Western region (10%).

The Eastern region had 15% as very poor; North Western had 16% while West Nile had the highest percentage (28%) in the poorest wealth category. Again West Nile and the Eastern regions had 0% among the very wealthy category.

9.0 HOUSEHOLD EXPENDITURES FOR THE PAST YEAR

Table 61: Household expenditures in the past year

	% households			
	No Cash outlay	A low/small cost	A moderate cost	A very significant cost
Seeds	45	32	17	6
Chemical fertilizer	91	4	4	1
Pesticides	77	15	7	1
Hired labour	53	13	23	11
Land rented	74	7	9	10
Machinery/implements for land preparation	77	6	14	3
Transport	62	14	19	5
Land improvement measures	89	5	5	1

On expenditures, the households spent significantly high on renting land and hiring labour. Other inputs were moderate in terms of costs but for the majority of inputs, there was no cash outlay.

9.1 Purchases made in the past year

Among the food stuffs purchased in the past year, animal products like meat, fish and milk used up the most income, along with buying food crops like rice, vegetables, groundnuts, bananas, Irish potatoes and Maize in that order.

Table 62: Purchases made In the past year

Food Crops	% households	Animal Products	% households
Maize	32	Milk	64
Cassava	14	Meat	94
Sorghum	6	Fish	84
Rice	63	Egg	41
Bananas	37		
Beans	27		
Peas	8		
Irish potatoes	32		
Sweet potatoes	9		
Millet	21		
Groundnuts	43		
Vegetables	45		

In the past year, 47% of the farmers had borrowed money to be able to cover their expenditures. 50% of the respondents said they normally saved some money every year for future needs.

10.0 FOOD SECURITY

Table 63: Meals during the different seasons.

	Lean season	Plenty period
Break fast	46	78
Lunch	75	96
Dinner	94	98

During the lean season fewer households (49%) have breakfast compared to 78% in the season of plenty. Also the percentage no. of households who have lunch during the lean season is reduced from 96% in the plenty period to 75%. The results therefore reveal that meals are reduced to 2 or 1 a day in the lean season.

