



Making agri-food systems work for the rural poor in eastern and southern Africa

Item Type	monograph
Authors	Odongkara, K.
Publisher	National Fisheries Resources Research Institute (NaFIRRI)
Download date	12/02/2023 12:11:29
Link to Item	http://hdl.handle.net/1834/32819

Project Title: Making Agri-Food Systems Work for the Rural Poor in Eastern and Southern Africa.

IDRC Project Number: 105790-002

By: Konstantine Odongkara

Report Type: First Technical Progress Report

Period covered by the report: January – December 2010

Date: 7th February, 2011

Country/Region: Uganda

Full Name of Research Institution: National Agricultural Research Organisation (NARO)

Address of Research Institution: Plot 1 Lugard Road
P.O. Box 295 Entebbe, UGANDA

Research Team Members:

Name	*Institute	Email
Konstantine Odongkara	NaFIRRI	socio-econ@firi.go.ug
Patrick Kalunda	BuZARDI	pmkalunda@yahoo.com
Beatrice Akello	MuZARDI	lbakello@yahoo.com
Prossy Ntakyo	MbaZARDI	ntakyop@yahoo.co.uk
Bwambale Mbilingi	NaFIRRI	bwawinston@yahoo.com
Damalie Akwango	NAROSEC	dakwango@naro.go.ug
Michael Kaidhiwa	NaFIRRI	mkaidhiwa@yahoo.co.uk
Agnes Nasuuna	NaFIRRI	agnesnasuna@yahoo.co.uk
Robert Omadi	NaSAARI	jromadi@hotmail.com
Helen Mutenyo	MbaZARDI	helmutenyo@yahoo.com
Godfrey Biso	MuZARDI	godbiso@yaoo.com
Agnes Alaso	NaCRRI	agnesalajo@yahoo.com

Acronyms

ACODE	Advocates Coalition for Development and Development
AI	Appreciative Inquiry
ASARECA	Association for Agricultural Research for Eastern and Central Africa
ENR	Environment and Natural Resources
ESA	Eastern and Southern Africa
FGD	Focus Group Discussions
IDRC	International Development Research Centre
KARI	Kenya Agricultural Research Institute
KII	Key Informant Interview
LC	Local Council
MbaZARDI	Mukono Zonal Agricultural Research and Development Institute
MGC	Memorandum of Grant Conditions
MuZARDI	Mukono Zonal Agricultural Research and Development Institute
NAADS	National Agricultural Advisory Services
NaCRRRI	National Crop Resources Research Institute
NaFIRRI	National Fisheries Resources Research Institute
NARO	National Agricultural Research Organisation
NaSARRI	National Semi-Arid Agricultural Resources Research Institute

Acknowledgement

The Research Team would like to thank NARO for all the support provided during this first year of implementation of the project, especially to NaFIRRI for hosting the project and providing for its day-to-day needs. They would like to acknowledge the financial support from IDRC, without which it would have been impossible to implement the project and special thanks go to the Program Officer for the technical guidance and the Grant Administrator for administrative support.

Thanks go to the collaborating institutions on the project for sharing plans and technical ideas on the project. In particular, we acknowledge the contributions of our national collaborators, ACODE, for the joint planning, field activities and dissemination workshops conducted with them.

The contributions of the District and Sub-county Agricultural Officers, Chairmen and Chiefs are acknowledged. Special thanks go to the members of the participating farmer groups for their patience, dedication and commitment, without which the project would not have been implemented.

Table of Contents

	Page
Acronyms	i
Acknowledgments	ii
1. Synthesis	1
2. The research problem	2
3. Research findings	3
4. Project implementation and management	8
5. Project outputs and dissemination	12
6. Capacity building	13
7. Impact	13
8. Recommendations	14
9. References	14
Appendix 1: TOPIC GUIDE FOR FOCUS GROUP DISCUSSIONS	15
Appendix 2: TOPIC GUIDE FOR APPRECIATIVE INQUIRIES	16
Appendix 3: KEY FEATURES, DRIVERS AND TRENDS OF FOOD VULNERABILITY IN TORORO, MUKONO AND NTUNGAMO DISTRICTS	17
Appendix 4: ADAPTIVE STRATEGIES, LOCAL INNOVATIONS AND THE PATHWAYS USED BY THE RURAL POOR AND WOMEN TO COPE WITH FOOD INSECURITY IN THE PROJECT SITES	28
Appendix 5: INTERVENTIONS TO STRENGTHEN AGRI-FOOD SYSTEMS IN THE PROJECT SITES	34
Appendix 6: COMMUNITY-BASED PARTICIPATORY MONITORING AND EVALUATION PLAN	39
Appendix 7: PROCESSES AND OUTCOMES OF PARTICIPATORY VARIETAL SELECTION AND FARMER EXPERIMENTATION	46

1. Synthesis

The overall goal of the project is improved food security and sustainable natural resource management in Eastern and Southern Africa (ESA) region, to be achieved through enhanced adaptation of pro-poor agri-food system innovations.

The specific objectives and outputs are:

- i) To identify and promote local innovations and adaptation strategies that work for the poor rural men and women to cope with food security vulnerabilities.
- ii) To adapt and scale up technology and market innovations for promoting orphan crops that enhance food security, increase incomes and ecosystem integrity in selected areas of Malawi, Kenya and Uganda.
- iii) To analyze and promote specific policies and governance mechanisms for sustainable agri-food systems.
- iv) To determine mechanisms for scaling up agri-food systems and sustainable agriculture.

Several interventions have been implemented to address food security in the region. However, what is new in this project is that it takes the holistic agri-food system approach, has a pro-poor focus, emphasises 'orphan' crops and integrates natural resource, market and governance aspects within the approaches.

The significance of the 'orphan' crops approach is that they are important for food and nutrition of poor farmers; provide income opportunities for the vulnerable groups, particularly the women; help to diversify the farming systems and spread risks and are usually more resilient to seasonal and climate change.

In Uganda, the project has been implemented in three districts, namely Tororo, Mukono and Ntungamo. Among the districts, Tororo is considered a highly food insecure area, while Mukono is considered a food secure area. Ntungamo may be described as moderately food secure with food security being threatened by widespread ecological and demographical changes.

Achievements during the year included:

- i) Annual and regional workplans preparation to guide implementation of the project during the year.
- ii) Reconnaissance visits to research sites carried out to prepare the stakeholders at project sites for project implementation.
- iii) Baseline/ diagnostic surveys and participatory studies carried out to establish the nature of food insecurity among poor farmers, identify the causes of food insecurity, identify the groups vulnerable to food insecurity and document the local adaptative strategies.
- iv) Participatory studies carried out to strengthen the information on vulnerabilities, local strategies and innovations to deal with food security issues.
- v) Farmer crop trials conducted to improve variety choice and seed access as well as providing hands-on training and group mobilization among poor farmers.

- vi) Training to farmers was conducted to build capacity of farmers in crop selection, crop management, NRM practices and group approach.
- vii) Development of Community-Based Participatory Monitoring and Evaluation plan, started to provide farmers with a tool and mechanism to monitor the results and learn from them.
- viii) Dissemination of results conducted through three stakeholder workshops in Tororo, Mukono and Ntungamo Districts to deliver results to stakeholders and solicit their feedback.

2. The research problem:

Despite its rich natural resource endowments, Uganda continues to experience cases of chronic and acute food insecurity problems. An estimated 60% Ugandans are reported to be malnourished (UBOS 2010). Food insecure people increased from 12 to 17.7 million in 2007 (MAAIF 2009). Real growth in agricultural output declined from 7.9% in 2000/01 to 2.6 in 2008/09 (MFEP 2009). Some 50 out of the 80 Districts in Uganda required food relief in 2007. The quality of ENR has been declining, attributed to land degradation, soil erosion, destruction of wetlands, deforestation etc (NEMA 2009)

Agricultural productivity has been impaired by inadequate use of innovations, declining soil fertility, degradation of natural resources, inefficient markets, weak institutions and policies. Improving agricultural productivity is considered crucial in resolving food crises, enhancing food security and accelerating pro-poor growth. However, some of the successful innovations and technologies for agriculture and natural resource management developed by the research institutions in Uganda have not been adequately recognized or promoted. As a result, the poor farmers, particularly the women, have not been empowered to access and utilize their resources and institutions and to tap into emerging market opportunities, through the innovations and technologies.

The majority of food security initiatives and research and development efforts tend to focus on promoting new technologies in high potential areas. However, resource-poor farmers are often found in large numbers in pockets of low potential areas that are largely ecologically degraded, lacking infrastructure and services, and are poorly linked to markets. These areas and the populations therein have long been left behind in mainstream agricultural research and development efforts, and are likely to be bypassed by current “Green revolution” initiatives.

Large-scale existing food security initiatives are likely to be captured by the well-to-do farmers who have resources to access improved seed varieties, fertilizers, markets and information. The poorest of the poor, women and the vulnerable often lack the prerequisites underlying participation, which includes education, income and market access.

Poor rural women and men need to increase agricultural productivity and increase their income by taking advantage of opportunities that exist in research and development. However, most food security initiatives tend to focus on a narrow base of key major crops such as maize, cassava, rice. However, it is the neglected “orphan crops” or other underutilized crops, which are locally important for income and food of the poor and resistant to climatic shocks.

Although there is recognition of the need to design and implement specific policies and governance mechanisms that must be community-driven, the question of governance is notably absent in most initiatives and narratives on food security. Important questions also remain on the extent of participation of local communities and small scale, resource poor farmers and women, in decision-making processes to voice their interests, needs and concerns in the formulation and implementation of these initiatives.

Lastly, not much has been learnt from participatory research approaches and community-based natural resources management experiences on how to make food security initiatives more sustainable and relevant to the needs of resource poor farmers. Consequently, the extent to which these approaches have informed better and robust policies and resulted into better analytical syntheses is still limited.

Therefore, the concern is how the fragmented or isolated success stories can be multiplied to a scale whereby ‘marginal areas’ and the men, women and farming households therein, gain the technologies, skills and policy support to largely meet their needs and take charge of their own production bases and destinies.

3. Research findings:

During the year, the research was carried out mainly under Objectives 1 and 2 of the project, for which the findings are summarised here.

Objective 1: To identify and promote local innovations and adaptation strategies that work for the poor rural men and women to cope with food security vulnerabilities.

The objective aims at establishing baseline conditions necessary for understanding the trends and key drivers of vulnerability to food insecurity as well as the different pathways that small-scale farmers, particularly women and the most vulnerable, use to cope with food insecurity.

The planned outputs, towards which the studies were conducted to contribute to were as follows:

- i) Participatory diagnostic and baseline studies conducted to identify the key features, drivers and trends of vulnerability in the project sites.
- ii) Adaptive strategies, local innovations and the pathways used by the rural poor and women to cope with food insecurity in the project sites identified and documented .
- iii) Opportunities identified and best fit interventions to strengthen agri-food systems in the project sites designed.
- iv) Practical community-based participatory monitoring and evaluation tools developed.

Highlights of the results generated are, therefore, presented under these outputs. More detailed results are presented in the Appendices.

3.1 Key features, drivers and trends of food vulnerability

The project examined the main features of food security vulnerability in rural poor households, resulting in lack of sufficient food of the desired kinds. A baseline/

diagnostic survey was carried out in three districts, namely Tororo representing the food insecure districts, Mukono for the food secure and Ntungamo for the districts with mid situations and covering 360 respondents as described in para. 4. below. It provided the basis for analysis of vulnerabilities as highlighted below

The key features of food insecurity vulnerabilities were identified as:

- Food insufficiency of desired types was an indicator of vulnerability, whereby the affected households did not always have enough to eat and the kinds of food they wanted to eat all the time.
- Inadequate asset ownership was another feature, whereby the vulnerable households did not own essential productive and consumption assets.
- Low quality of shelter exhibited by vulnerable households, whereby they had shelters with walls made of mud or cow dung, floor made of mud plain and roofs made of grass.

Drivers of vulnerability were, however, identified as follows:

- Unfavourable demographic characteristics, consisting of large household sizes with high proportions of children, hence the need to feed many mouths, causing a strain on the available food.
- Lack of alternative cash sources, where members were unable to participate in cash income employment, due to lack of qualifications/ skills, limited their capacity to buy food.
- Low participation in growing the main crops of the region during the main seasons, which contributed to the low food production and availability for the households.
- Insufficient land holdings, whereby land holdings the farmers used for crop production were small and often could not meet the needs of the large households.
- Limited use of productivity innovations as some farmers did not use fertilizers but only some manure and compost.
- Low emphasis on indigenous minor crops that are essential for consumption and supplementary income.
- Limited livestock assets meant that they lacked essential assets which they could sell to cope with situations of food shortage and were, therefore, prone to food insecurity.
- Limited application of water and environmental conservation practices was a threat to their productivity.
- Distant farming services, supply and market centres and the lack of transport have often hindered farmers from taking full advantage of the facilities for production or marketing their produce.

The output report is given in Appendix 3.

3.2 Adaptive strategies, local innovations and the pathways used by the rural poor and women to cope with food insecurity.

Innovations that communities had been using for agricultural production, natural resource management and food security were identified and examined for their contribution to sustainable agriculture, food security and natural resource management. They included:

- Strengthening cash income sources by rural households through taking up of paid employment in such activities as farm labour, trading in farm produce or teaching.
- Participation in growing the main the crops of the area during the main seasons. This is because agriculture is the backbone of the rural economy and other income sources are limited.
- Improving access to more land, to address the problem of land shortages, by renting or borrowing land from parents, relatives and friends.
- Improving land preparation beyond manual preparation by making use of oxen and ploughs, acquired through group action.
- Improving access to seeds, both indigenous and improved, through proper post-harvest handling, purchasing from the shops or obtaining them from Government sources.
- Improving soil conditions to enhance productivity by applying manure and compost.
- Promoting important indigenous minor crops which are important food sources and also income earning.
- Adapting important post-harvest handling techniques such as drying, sorting and storing to maintain quality of crops and improve their shelf life.
- Promoting livestock ownership, notably chicken and goats, which could be sold to buy food during periods of poor crop yields.
- Improving water and environment conservation, through application of mulching, terraces and crop rotation.
- Promoting ownership of productive assets, such as bicycle, ox-cart, mobile phone and radio to improve productivity and marketing of crops.
- Promoting membership of groups, to enable farmers access extension services, market and credit.

The output report is given in Appendix 4.

3.3 Interventions to strengthen agri-food systems in the project sites

Results of Appreciative Inquiries revealed that farmers put in place a number of measures to strengthen their agri-food systems as highlighted below:

- Adapting mechanisms for improved food security, such as planting crops that can grow in whatever conditions e.g. sweet potatoes, pumpkins, local yams; offering labour in return for money or food during period of poor yield, and practicing intercropping in order to reduce the risks of relying on one crop.
- Coping mechanisms for acquiring and managing seed, namely keeping planting seeds from harvests, buying seeds from the market and for potatoes and cassava, planting near homesteads or in shade where one can monitor.
- Mechanisms for improved soil management, including use of cow dung, digging contours and mulching using bio-degradable materials which helped to alleviate soil erosion.
- Mechanisms to cope with the changing climate, such as afforestation, in response to the high deforestation which may exacerbate climate change, relying on weather forecast on radio and making trenches and channelling water to gardens during prolonged droughts.
- Mechanisms for improving farming skills, for example copying from fellow farmers and listening to media like radios and reading newspapers .
- Mechanisms for improved market access, namely selling farm produce (usually grains and legumes) to the schools, selling off livestock items such as chicken, pigs, goats and selling produce as a group to save farmers from exploitation by middlemen.

The output report is given in Appendix 5.

3.4 Community-Based Participatory Monitoring and Evaluation Plan

A Community-Based Participatory Monitoring and Evaluation plan started to be developed, as a tool for the communities to provide feedback to their members for collective analysis, learning and decision-making. After the initial draft drawn up by the research team, community members were facilitated to identify those output and outcome areas of interest they wanted to monitor and develop indicators and methodologies, for their participatory monitoring. They also selected monitoring and evaluation committees that will be trained to conduct regular monitoring and seasonal evaluations.

A summary of the draft is presented in Appendix 6.

Objective 2: To adapt and scale up technology and market innovations for promoting orphan crops that enhance food security, increase incomes and ecosystem integrity in selected areas.

The objective is to involve participatory testing, validation and adaptation of productivity enhancing and sustainable natural resource management innovations, to

exploit the opportunities that exist in the food system and to subsequently scale up and out the innovations in selected areas.

Under this objective, work was carried out only on one output.

3.5 Participatory varietal selection and farmer experimentation

On- farm trials have been conducted in response to lack of access to suitable seeds as a major production constraint identified by farmers for the selected crops. Other limitations identified under the baseline as well as the participatory studies included limited use of productivity innovations and inadequate land and environment conservation practices. Availing seed was taken up as a first intervention to improve productivity of the minor crops in each district. The trials would also provide opportunity to demonstrate the innovative practices that went with the crops.

The approach used under the trials was as follows:

- Participatory processes, involving farmers, district extension workers, and researchers.
- Farmers provided land and labour and managed the trials while the project paid for land preparation and provided seed, technical backstopping and chemicals for pest control.
- Farmers made observations/evaluation of the performance of varieties under their management conditions.
- Extension staff mobilised farmers, provided technical advice and monitored farmers' progress.
- 15 trials were established in each district, that is, 5 in each sub-county.

The observations made during the monitoring visits were as follows:

- Most of the trials were well managed and were performing well.
- A few trials were not well managed leading to stunting of the crops.
- Cases of low germination were reported in some varieties.
- Pests and diseases affected some varieties, despite the spraying.
- Farmers showed interest in learning from the trials.

The output report is given in Appendix 7.

4. Project implementation and management:

4.1 Activities

The following activities were carried out in the process of implementing the project during the year.

- i) Preparation of workplans: A national workplan was developed jointly at a meeting between NARO and ACODE in January, 2010 to guide implementation of the project during the year. Subsequently, the team participated in a workshop in Nairobi to develop a regional workplan. The workshop also laid out plans for developing harmonized data collection tools, particularly the questionnaire for the baseline survey.
- ii) Reconnaissance visits to research sites to prepare for implementation: Joint NARO and ACODE teams made reconnaissance visits to the 3 research sites, namely Tororo, Mukono and Ntungamo to collect preliminary information on the sites and meet with stakeholders within the local governments, namely the CAOs, Production Co-ordinators, District Agricultural Officers, Sub-county Chiefs and Agricultural Officers. Political heads, namely District and Sub-county Chairpersons were also met. Discussions were also done with the farming communities to prepare for project implementation.
- iii) Planning meetings held before each activity in each district, involving research team, Local Government officials and participating farmer representatives.
- iv) Baseline/ diagnostic surveys: These were carried out to establish the nature of food insecurity among poor farmers, identify the causes of food insecurity, identify the groups vulnerable to food insecurity and document local strategies for dealing with the food insecurity. The findings were used to prepare reports on features and drivers of vulnerability; local strategies to address productivity, natural resource management and food insecurity. Coverage of the survey is given in Table 1.

Table 1: Survey coverage

District	Sub-counties	No. of respondents
Mukono	Nabbaale	40
	Nagoje	40
	Ntenjero	40
Tororo	Mela	40
	Osukuru	40
	Kisoko	40
Ntungamo	Itojo	40
	Nyabihoko	40
	Rugarama	40
Total		360

- v) Planning meetings: held before each activity in each district, involving research team, Local Government officials and participating farmer group representatives.
- vi) Participatory diagnostics: FGDs were conducted to establish vulnerability indicators, distribution and causes and mapping of vulnerable areas, resources and degradation in environment and natural resources. AIs were also used to document success stories of local innovations and create new ideas for developmental change. The results were used to prepare reports on local strategies to address productivity, natural resource management and food insecurity and opportunities and best-fit interventions to strengthen agri-food systems. Coverage of FGDs and AIs are given in Table 2.

Table 2: Coverage of FGDs and AIs

District	Sub-counties	No. of FGDs	No. of AIs
Mukono	Nabbaale	1	1
	Nagoje	1	1
	Ntenjero	1	1
Tororo	Mella	1	1
	Osukuru	1	1
	Kisoko	1	1
Ntungamo	Itojo	1	1
	Nyabihoko	1	1
	Rugarama	1	1
Total		9	9

- vii) Farmer trials of minor crops: These were aimed at improving variety choice, seed availability and crop management among the farmers. Two crops were identified for trial through participatory process in each District (Table 3). Farmer groups hosted the trials and participated in planting, weeding and harvesting and were responsible for looking after the gardens. The project personnel, in conjunction with the Local Government officers, provided technical guidance, supported the costs of land preparation and pesticide for spraying the crops.

Table 3: Distribution of crop trials sites

District	Sub-counties	No. of gardens	Minor crops
Mukono	Nabbaale	5	Groundnuts and yams
	Nagoje	5	Groundnuts and

			yams
	Ntenjero	5	Groundnuts and yams
Tororo	Mella	5	Cowpeas and sorghum
	Osukuru	5	Cowpeas and sorghum
	Kisoko	5	Cowpeas and sorghum
Ntungamo	Itojo	5	Groundnuts and sweet potatoes
	Nyabihoko	5	Groundnuts and sweet potatoes
	Rugarama	5	Groundnuts and sweet potatoes
Total		45	

- viii) Training to farmers: hands-on, conducted in the field related to the selected minor crops for farmer trial. It covered crop selection, crop management, NRM practices and group approach.
- ix) Developing a Community-Based Participatory Monitoring and Evaluation plan. It involved drafting a plan framework, facilitating the community members to identify those output and outcome areas of interest they wanted to monitor and develop indicators and methodologies, for their participatory monitoring. The process is still on-going.
- x) Dissemination of results through 3 stakeholder workshops conducted in Tororo, Mukono and Ntungamo Districts (Table 4).

Table 4: Stakeholders' dissemination workshops

District	Venue	No. of participants
Tororo	Sofitel Guest House	50
Mukono	MuZARDI	60
Ntungamo	Sky Blue Hotel	50

- ix) Research team retreat: held to write-up drafts for the first 5 outputs of the project, to be further developed to publishable levels as well as the technical and financial reports for the year (Table 5).

Table 5: Allocation project outputs/reports

Project outputs/ reports	Responsible persons
Key features, drivers and trends of food vulnerability in the project sites	K. Odongkara M. Kaidhiwa
Adaptive strategies, local innovations and pathways used by the rural poor and women to cope with food insecurity in the project sites	P. Kalunda
Interventions to strengthen agri-food systems in the project sites	K. Odongkara
Practical community-based participatory monitoring and evaluation tools	B. Mbilingi
Processes and outcomes of participatory varietal selection and farmer experimentation	B. Akello
Project interim technical report	K. Odongkara
Financial report	A. Oloka

4.2 Research methodologies and analytical techniques

The following research methodologies were applied in the research activities:

- i) Secondary data search: To review literature, reports and records of institutions.
- ii) Stratified random sampling survey: A semi-structured questionnaire, covering a number of sub-themes, was used. A total of 360 respondents were covered, broken down into 120 per district. Three sub-counties were selected representing the different ecological regions in each district and one parish randomly selected, from where 40 respondents were selected using the LC register of households as the frame. The data were input into SPSS and analysed using SPSS and Excel. Qualitative data summaries were presented using frequencies, cross-tabulations and charts while quantitative data were given as means, minimums and maximums.
- iii) Farmer crop trials: For each crop, 3 varieties were tried, including the local variety. Data was collected on garden plans, planting specifications, and later on establishment, growth, rates of infection, plant population at harvest, yields and quantities harvested and quality.
- iv) Focus Group Discussions (FGD) and Mapping : Nine FGDs were held using a topic guide (Appendix 1), 3 in each district, with mixed groups of farmers. A semi-structured instrument (SSI) was used. The data were recorded and analysed using Content Analysis method. Mapping was used to collect seasonal calendar data, resource maps and time lines.
- v) Appreciative Inquiries (AI): Nine AIs were conducted using a topic guide (Appendix 2), to document success stories of local innovations among poor

farmers and identify new ideas for developmental change. The data was analysed using Content Analysis.

4.3 Project design

- i) **Partnerships:** A regional partnership, involving institutions from Uganda, Kenya and Malawi, was maintained in the areas of planning and harmonisation of data tools. Within Uganda, partnership existed between NARO, ACODE and ASARECA. Even within NARO, there was collaboration between the semi autonomous Institutes, namely NaFIRRI, MuZARDI, MbaZARDI and BuZARDI.
- ii) **Interdisciplinary orientation:** The teams were multi-disciplinary, including social and crop scientists **from NARO and** lawyers from ACODE.
- iii) **Involvement of research users and beneficiaries:** The main research users of the project were the Local Governments of Mukono, Tororo and Ntungamo Districts, while the ultimate beneficiaries were the farmer groups. There was collaboration with these bodies in the planning, implementation and dissemination of results of the project.
- iv) **Gender issues:** The focus of the project was on minor crops. Given that men tend to go for the major crops while it is the women who attend to the minor crops, the project was involved with more women than men. However, measures were taken to bring men on board at the various group activities.
- v) **Administration by the research organization:** There was written commitment from the different NARO Institutes from which the researchers were drawn to support the participation of these researchers. However, sometimes the individual researchers were committed and project activities were delayed. However, this had no effect on the overall implementation of the project.
- vi) **Forecasted expenditures for the next reporting period and until the end of the project:** There had been underestimation in the budget for the first year, especially under Travel and Research Expenses. The specific budget items were Vehicle costs, Allowances for researchers, enumerators and drivers and Farmer experimentation costs, However, it was difficult to correct this in the forecasted budget for the next reporting period since the total budget is fixed.
- vii) **The project schedule:** There were no major challenges posed by the scheduling of activities under the project, except timing of the farmer trials had to be decided from research site to site.
- viii) **Technical and other support and administration by IDRC:** there was frequent communication from IDRC Program Officer providing guidance on various issues relating to project implementation, including sharing of literature. The grant administrator also ensured that issues related to the MGC were clear and handled properly and disbursement of funds was timely.

5. Project outputs and dissemination:

- i) **Information sharing and dissemination:** The following reports have been prepared and drafts are awaiting enriching before they can be finalised:
 - a) Key features, drivers and trends of food vulnerability in the project sites.

- b) Adaptive strategies, local innovations and pathways used by the rural poor and women to cope with food insecurity in the project sites.
 - c) Interventions to strengthen agri-food systems in the project sites.
 - d) Practical community-based participatory monitoring and evaluation tools.
 - e) Processes and outcomes of participatory varietal selection and farmer experimentation.
- ii) **Knowledge creation:** Still in process, involving analysis and further studies on the different areas.
- iii) **Training:** Training was done for data collectors at Mukono, Tororo and Ntungamo prior to baseline/ diagnostic survey implementation as shown in Table 6 below:

Table 6: Training workshops for data enumerators

District	Venue	No. of participants
Mukono	MuZARDI	12
Tororo	Sofitel Guest House	12
Ntungamo	Muko Hall	12

Three stakeholder workshops were conducted to disseminate results from the research activities during the year. These included results from the baseline surveys, FGDs, AIs and farmer trials.

6. Capacity-building:

The project contributed to building capacity of the institution as follows:

- Equipment, including 2 desk top computers, 1 laptop, 1 printer, 1 scanner and 1 camera have been provided.
- Research team members improved their research skills in the areas of survey planning, FGDs, AIs and crop trials.
- The team leader improved his research management skills, especially in co-ordinating multi-institutional projects.
- Women on the research team, who formed the majority, benefited in skill development from the project.

7. Impact:

Development outcomes created by the project during the year were as follows:

- The project improved the data available to the participating districts, which they could use for planning at both the district and sub-county local government levels.

- Through collaboration and support to the research team, the technical staff of the participating district and sub-county local governments built their skills in survey management, participatory diagnostics and crop trial research.
- Participating farmers, most of whom were women, improved their knowledge of food insecurity vulnerabilities and adaptation strategies as well as for minor crop selection and management.

8. Recommendations:

As mentioned in the financial report, after the budget was agreed at the beginning of the project, the rates of allowances to project personnel were increased by Government and the prices of fuel kept going up significantly, in addition to the general rise on cost of supplies and labour. This has only partly been off-set by the rise in exchange rate between the CAD Dollar and the Uganda Shilling. However, to enable the project operate as fully planned, IDRC is requested to consider an increase in the budget for the next period and the remaining period.

9. References

- MAAIF (Ministry of Agriculture, Animal Industry and Fisheries), 2010: Agriculture Sector DSIP, 2010-2014.
- McKinney, P., 2009: Comprehensive food security & vulnerability analysis, Uganda. United Nations World Food Programme.
- MFEP (Ministry of Finance, and Economic Planning), 2009: National Development Plan, 2010-2014.
- NEMA (National Environment Management Authority), 2009: State of Environment Report for Uganda, 2008.
- UBOS (Uganda Bureau of Statistics), 2010: Statistical Abstract, 2010.

Appendix 1: TOPIC GUIDE FOR FOCUS GROUP DISCUSSIONS

The FGDs are to contribute to the overarching research questions guiding Objective 1, namely what are the key drivers, trends and impacts of food insecurity and what adaptation strategies and local innovations have farmers used to cope with food crises?

The topics for discussions will include:

1. What are the wealth indicators in the community?
2. What is the distribution of the community people between the rich, middle and poor groups?
3. Which groups are most prone to food insecurity?
4. What are the vulnerability indicators at the household and community levels?
5. What are the causes of food insecurity within the different groups?
6. What are the land/ water degradation problems?
7. What are the market access problems?
8. What are the service access problems?

Appendix 2: TOPIC GUIDE FOR APPRECIATIVE INQUIRIES

The AIs are to contribute to the research question of what can we learn from community experiences and past and ongoing initiatives to deal with the drivers of vulnerability and expand the multiple pathways to strengthen agri-food systems, and to reach the hard to reach? They are about identifying what works well and using it as a foundation for future development.

The areas of discussions will include:

1. What strategies has the community adopted to respond to food insecurity?
2. What local innovations have you improvised to cope with food insecurity?
3. How have you managed your seed sources?
4. How have you been able to sustain your soil productivity?
5. What have you been able to do in the face of changing climate?
6. What have you been able to do to improve your farming skills?
7. How have you taken advantage of the market?
8. What have been your assets for responding to food insecurity?

Appendix 3: KEY FEATURES, DRIVERS AND TRENDS OF FOOD VULNERABILITY IN TORORO, MUKONO AND NTUNGAMO DISTRICTS

Introduction

Food security refers to a situation where a household, community or a nation has sufficient food of the required types. There are three elements of food security, namely availability, distribution and utilization. Vulnerability in food security refers to a high degree of exposure to risks, shocks, stresses and susceptibility (prone) to food insecurity.

The common causes of vulnerability can be found in the demographic composition of a household, community or nation, low productivity of crops and livestock due to lack of innovations and poor natural resource management, effects of the market forces on food availability, policy, governance and institutional failures. Other factors include climate change and socio-cultural factors that affect food availability, distribution and utilisation.

Objective

To establish the key features, drivers and trends of food security vulnerability in the project sites as part of the mechanisms to address the problem of food insecurity in Uganda.

Features of vulnerability

The project examined main features of food security vulnerability in rural poor households, resulting in lack of sufficient food of the desired kinds. A baseline/diagnostic survey was carried out in three districts, namely Tororo representing the food insecure districts, Mukono for the food secure and Ntungamo for the districts with mid situations and covering 360 respondents.

Food insufficiency of desired types

The data revealed that only 17% of the respondents reported that they always had enough to eat and the kinds of food they wanted to eat all the time. The remaining households either did not have enough to eat or the kinds of food they wanted, (Table 1).

Table 1: The food eaten in households in the last 12 months

	Mukono	Tororo	Ntungamo	All
Respondents who always had enough to eat and the kinds of food they wanted	30%	17%	4%	17%

Among the remaining respondents, the food situation was as follows:

- 49% had enough to eat but not always the kinds of food they wanted.
- 31% sometimes didn't have enough to eat.
- 3% often didn't have enough to eat.

Vulnerable households could also be identified from their food behavior and the data revealed that in the last 12 months, 63.2% ate less food than they had desired to (Table 2).

Table 2: Food sufficiency in households HHs

	Mukono	Tororo	Ntungamo	All
Respondents who ever ate less than they felt they should because there wasn't enough money to buy food	35.2%	78.2%	77.1%	63.2%

Source: Survey data

Other reported behaviour among the respondents, indicative of vulnerability were as follows:

- 57.5% of the respondents ever cut the size of their meals or skipped meals because there wasn't enough money for food.
- 43.2% ever went hungry but didn't eat because they couldn't afford enough food.
- 48.2% experienced loss of weight because there wasn't enough food.
- 27.2% experienced situations where they did not eat for a whole day because there wasn't enough money for food.
- 41.7% ever cut the size of the children's meals because there wasn't enough money for food.
- 33.2% ever had the children skip meals because there wasn't enough money for food.
- 31.1% ever had children going hungry but they just couldn't afford more food.
- 17.1% ever had children not eating for a whole day because there wasn't enough money for food.

Vulnerability is also indicated by the non-consumption of food types with essential nutritive values. The data revealed that large proportions of households did not consume eggs (86.5%), beef (77.3%), fish (72.9%) or available vitamin A-rich fruits (72.2%) the previous day (Table 3).

Table 3: Households where the types of food were not eaten the previous day

	Mukono	Tororo	Ntungamo	All
Available grains	35.0%	.8%	52.9%	29.6%
Yellow or orange inside	53.8%	57.3%	44.9%	52.0%
Roots or tuber	19.2%	60.5%	47.5%	42.3%
Green vegetables	65.8%	35.9%	40.7%	47.6%
Available vitamin A-rich fruit	51.7%	84.6%	80.3%	72.2%
Beef	84.2%	72.3%	75.4%	77.3%

Eggs	82.5%	86.3%	90.7%	86.5%
Fresh or dried fish or shellfish	63.8%	66.4%	88.1%	72.9%
Food made from beans, peas or lentils	34.4%	75.2%	26.5%	45.2%
Milk products	55.8%	81.2%	50.4%	62.4%
Oil foods	49.6%	69.5%	70.3%	63.0%
Sugar or honey	19.7%	66.1%	85.6%	56.7%

Source: Survey data

Low quality of shelter for household

Vulnerability was also exhibited by the form of shelter the household used. The largest group of respondents had shelters with walls made of mud or cow dung (38.7%) (Table 4).

Table 4: Respondents with material of the walls of the main family house

	Mukono	Tororo	Ntungamo	All
Mud/ cow dung	25.4%	52.3%	37.0%	38.7%
Grass/ sticks	.8%	6.9%	18.5%	8.7%
Iron sheets	4.2%	9.2%	4.2%	6.0%
Mud plastered with cement	5.9%	3.1%	21.0%	9.8%
Cement/ bricks	41.5%	14.6%	15.1%	23.4%
Roasted bricks	22.0%	9.2%	4.2%	11.7%
Other	--	4.6%	--	1.7%
Total	100.0%	100.0%	100.0%	100.0%

Source: Survey data

- 44.8 % of respondents had mud plain as the material of the floor of the family house.
- 21.8% had grass as the material of the roof of the family house.

Inadequate asset ownership

Asset ownership is another feature of vulnerability, in which the vulnerable households do not own essential productive and consumption assets. The data reveals that with the exception of radio (29.3%), bicycle (45.5%) and mobile phone (45.9%), high proportions of respondents did not own the common household and productive assets (Table 5).

Table 5: Respondents whose households did not own the asset types

	Mukono	Tororo	Ntungamo	All
Couch sofa	62.2%	76.9%	58.1%	65.7%
TV	75.6%	90.7%	86.3%	84.2%
Radio	21.7%	44.9%	21.7%	29.3%
Gas or electrical stove	92.4%	90.6%	93.2%	92.1%
Phone	45.8%	46.6%	45.4%	45.9%
Refrigerator	95.0%	93.2%	94.1%	94.1%
Sewing machine	90.8%	91.5%	89.9%	90.7%
Car	89.1%	91.5%	93.3%	91.3%
Bicycle	41.2%	44.1%	51.3%	45.5%
Motorcycle	78.0%	86.4%	89.9%	84.8%
Animal cart	90.8%	88.1%	89.0%	89.3%

Source: Survey data

- 33.7% of respondent's households use un-protected well as their main source of drinking water
- 95.5% of respondent's households use firewood as their main source of cooking fuel.
- 38.5% of respondent's households use uncovered pit latrine as their main toilet facility.

Drivers of vulnerability

Unfavourable demographic characteristics

The demographic structures revealed large household sizes hence the need to feed many mouths, causing a strain on the available food.

There were large proportions of dependants in households, mainly own children (53.6%) and other children who contributed little to food production but were significant food consumers (Table 6).

Significant proportions of single household heads (60.9 %), as well as divorced, widowed and separated persons, who often also had large households, could not grow enough food single-handedly to feed them properly.

Low educational levels, represented by household members with either no schooling (16.6%) or Primary education (56.0%), makes it difficult for the rural poor to adapt productivity innovations or secure high paying employment.

Table 6: Levels of schooling among respondents

	Mukono	Tororo	Ntungamo	All
No schooling	9.2%	25.2%	14.8%	16.6%
Primary	54.8%	56.2%	57.5%	56.0%

Secondary	34.7%	16.9%	25.1%	25.3%
College/ University	1.4%	1.4%	2.7%	1.9%
Total	100.0%	100.0 %	100.0%	100.0%

Source: Survey data

Lack of alternative cash sources

Many household members were unable to participate in cash income employment, due to limited opportunities and lack of qualifications/ skills (Table 7). This limited their capacity to buy food.

Table 7: Employment in cash work

	Mukono	Tororo	Ntungamo	All
Persons who received cash from informal /business activities	29.5%	16.9%	18.2%	21.5%
Persons who received payments from salaried employment	2.3%	6.4%	3.9%	4.2%

Source: Survey data

Even for the cash workers, the earnings were low, estimated at a mean of US\$86,100 per month and 920,845 per annum, which could not adequately feed their households.

Low participation in main crops of the region

There was limited participation of households in production of main food crops during the main seasons, shown by the non-involvement of some households in production of these crops (Table 8). This contributes to the low food production and availability for the households.

Table 8: Households that grew crops during last main season

	Mukono	Tororo	Ntungamo	All
Cassava	71.7%	75.8%	39.2%	62.2%
Sweet potatoes	63.3%	30.8%	51.7%	48.6%
Bananas	50.0%	9.2%	76.7%	45.3%
Maize dry	52.5%	38.3%	17.5%	36.1%
Common bean (local)	15.0%	5.8%	65.0%	28.6%
Millet	1.7%	42.5%	32.5%	25.6%
Beans (improved)	44.2%	4.2%	26.7%	25.0%
Groundnuts	10.8%	20.8%	34.2%	21.9%
Maize, green	12.5%	28.3%	8.3%	16.4%
Sorghum	0.8%	27.5%	2.5%	10.3%

Coffee/ cherries	20.0%	0.8%	2.5%	7.8%
------------------	-------	------	------	------

Source: Survey data

Insufficient land holdings

Land holdings by the farmers used for crop production were small and often could not meet the needs of the large households (Table 9).

Table 9: Average land holdings and acreages

	Mukono	Tororo	Ntungamo	All
No. of land holdings	4.4	2.8	3.8	3.7
No. of acres	3.9	2.8	4.4	3.7

Source: Survey data

Only 28.5% of the respondents owned their land and had title deeds for them, while 53.0% owned them but without deed and the rest either rented the land, used parents', relatives' or communal land. There were, therefore, uncertainties in ownership of fields, leading to frequent land conflicts, resulting in loss of land by the poor farmers.

Most of the respondents depended on rain-fed watering system as a method of farming (99.2%). In view of the changing weather patterns, this method of watering was regarded as highly unpredictable and risky and frequently would lead to crop failure, resulting in food insecurity.

The majority of the respondents reported preparing their land manually (90.2%), because they had no oxen and tractors nor could they afford the cost of hiring them. Also their land holdings were too small to warrant the use of these technologies. However, manual land preparation was often not efficient in turning out the soil and led to low productivity.

Most respondents used local varieties of crops (61.4%) as opposed to improved varieties (Table 10). Dependence on local varieties entrenches vulnerability in the poor farmers, as most of the local varieties are no longer resistant to drought, diseases and pests and take long to mature. The use of improved varieties would enable farmers to take advantage of positive characteristics built into them.

Table 10: Types of seed used by respondents

	Mukono	Tororo	Ntungamo	All
Local variety	45.2%	58.8%	82.7%	61.4%
Seedlings, cuttings/ splits	16.4%	19.7%	3.0%	13.1%
Hybrid	25.4%	19.4%	13.4%	19.8%
Others	8.8%	1.9%	0.9%	4.1%
Total	100.0%	100.0%	100.0%	100.0%

Source: Survey data

Limited use of productivity innovations

Majority of the respondents did not make use of fertilizers (62.3%) and among those who did, it was mostly manure (27.4%) and compost (4.9%) (Table 11). In view of the deteriorating soil conditions reported at the research sites, non-use of fertilizers leads to low productivity, thus increasing vulnerability of the farmers to food insecurity.

Table 11: Farmers who used fertilizers

	Mukono	Tororo	Ntungamo	All
Manure	17.8%		46.6%	27.4%
Compost	2.2%		10.1%	4.9%
Others	5.6%	50.0%	2.0%	5.4%
None	74.3%	50.0%	41.2%	62.3%
Total	100.0%	100.0%	100.0%	100.0%

Source: Survey data

Low emphasis on indigenous minor crops

While many respondents have participated in growing important indigenous minor crops, significant proportions did not. These minor crops are essential for consumption and supplementary income. The data revealed that the most commonly planted indigenous minor crops were sweet potatoes (76.9%), common beans (70.0%) and maize (69.7%) (Table 12). While some of the crops may not be applicable in certain areas, where they apply, non cultivation jeopardises the food situation of the households concerned. It should be noted that cassava and banana were not regarded as minor but major crops in many of the research sites.

Table 12: Farmers who have ever planted important indigenous minor crops

	Yes	No
Sweet potatoes	76.9%	23.1%
Common bean (local)	70.0%	30.0%
Maize dry	69.7%	30.3%
Indigenous vegetable	57.5%	42.5%
Groundnuts	56.7%	43.3%
Millet	45.3%	54.7%
Sorghum	39.7%	60.3%
Soybeans	30.0%	70.0%
Yams	27.8%	72.2%

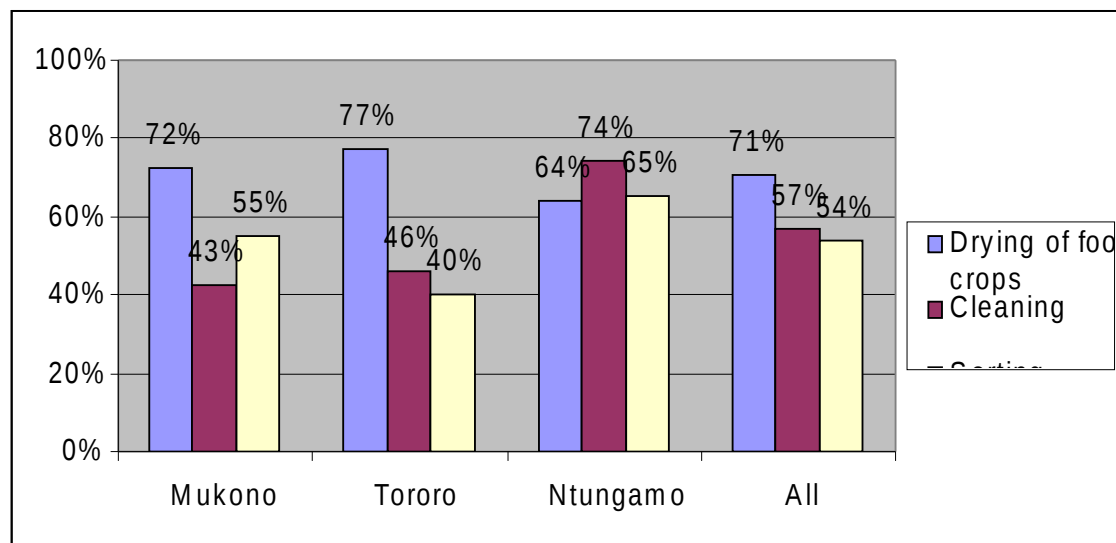
Source: Survey data

The main reasons why some farmers did not grow important minor crops were because either they did not know about them (42.4%), had problems of affording

seeds (19.2%) or did not have enough land (16.4%). In the process they failed to take advantage of food crops which were important for the diet and incomes of poor rural farmers.

There was inadequate practice of essential post-harvest handling techniques. The data revealed that the majority of farmers practiced drying of food crops (70.9%), cleaning (56.7%) and sorting (53.6%) (Chart 1). Many of the other techniques were not practiced, leading to low quality as well as high post-harvest losses for the commodities produced.

Chart 1: Farmers who practiced important post-harvest handling techniques



Source: Survey data

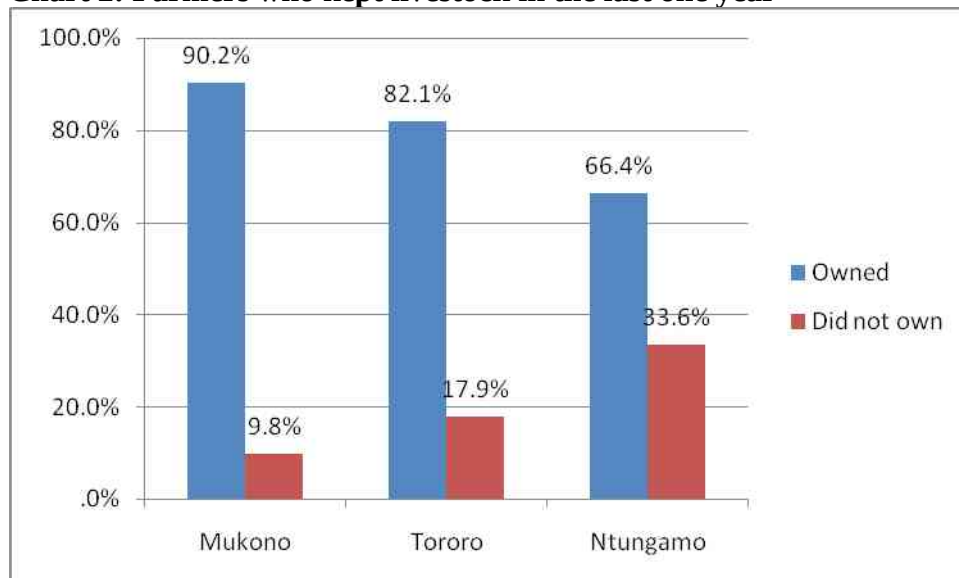
Other practices that were in use to a lesser extent were as follows:

- 47.5% practiced winnowing of grain and pulses.
- 47.4% practiced pre-sorting.
- 44.3% practiced packaging of food commodities.
- 35.6% practiced sizing.
- 19.9% practiced curing of cereals.
- 15.3% practiced curing of tubers.
- 12.0% practiced drying of fruit and vegetables.

Limited livestock assets

Some of the respondents did not keep livestock at home, especially in Ntungamo District (33.6%) (Chart 2). This meant that they lacked essential asset which they could sell to cope with situations of food shortage and were, therefore, prone to food insecurity.

Chart 2: Farmers who kept livestock in the last one year



Source: Survey data

The livestock commonly owned by the farmers were indigenous chicken (51.1%), goats (51.1%) and local cows (28.8%). Other animals owned were pigs (27.5%), cross cows (14.7%) and cross calves (10.8%), among others. The animals most commonly owned are of low value, thus unable to provide significant incomes to feed the households when sold in time of need.

Furthermore, the number of livestock transactions among the farmers were limited during the year, which could have kept the resulting earnings low, thus reducing the incomes of the respondents. Most respondents sold goats (n=45), followed by local chicken (n=39), both of which were low value livestock (Table 13).

Table 13: Farmers' operations with common livestock in the last one year

	Local cow		Goat		Local Chicken	
	N	Mean	N	Mean	N	Mean
Current value per unit (Shs)	88	398,693	165	56,615	158	13,303
Number purchased	28	3	39	2	43	2
Unit Price at purchase (Shs)	27	249,130	39	32,821	45	12,273
Number Sold	25	2	37	3	29	5
Average unit price when sold (Shs)	25	312,000	45	57,756	39	14,526

Source: Survey data

Farmers also faced challenges in feeding their livestock as most respondents fed their local cows on napier grass (54.9%), goats on roadside grass (41.8%) and local chicken on maize bran (27.9%). Lack of suitable feeds has adverse effects on productivity of

livestock, affecting the products for direct consumption by the households as well as the incomes accruing from them. (Table 14).

Table 14: Respondents who used the different feeds for their common livestock

	Local cow	Goat	Local chicken
Napier grass	54.9%	31.8%	13.2%
Roadside grass	25.4%	41.8%	13.2%
Maize bran	1.4%	0.9%	27.9%
Other crop residue	4.2%	3.6%	31.6%
Other sources	14.0%	21.7%	14.1%
Total	100.0%	100.0%	100.0%

Source: Survey data

The number of households that produced cow milk at home was low, especially in Tororo District (16.1%). Except for Mukono District, the majority of the households did not produce any cow milk during the last one year (67.2%) while only a few sold fresh milk (28.2%) (Table 15). Given the importance of milk for its nutritive values as well as a source of income, low production puts a household in a vulnerable situation.

Table 15: Production and sale of cow milk in the last one year

	Mukono	Tororo	Ntungamo	All
Households which produced cow milk	54.5%	16.1%	36.7%	32.8%
Households which sold fresh milk	37.2%	7.1%	18.6%	28.2%

Source: Survey data

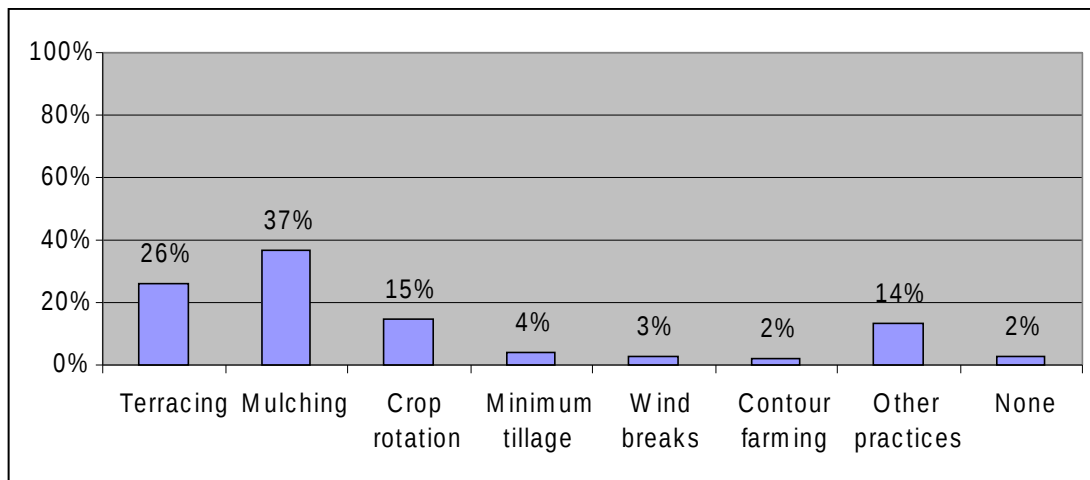
Average number of animals producing milk was 8 among 68 households that reported producing cow milk and the average milk production per month was 177 litres. The distance to the point of largest buyer was on average 4 km.

Limited application of water and environmental conservation practices

There was a fair amount of awareness among the farmers of the threats to their water and environment for production. However, the data revealed that the measures adapted by respondents to deal with the problems were mostly to apply mulching (36.7%), terracing (25.7%) and crop rotation (14.8%), among others (Chart 3).

Limited adoption of water and environmental conservation practices was therefore, a threat to productivity, natural resource and ultimately food security.

Chart 3: Respondents who practiced water, and environmental conservation methods

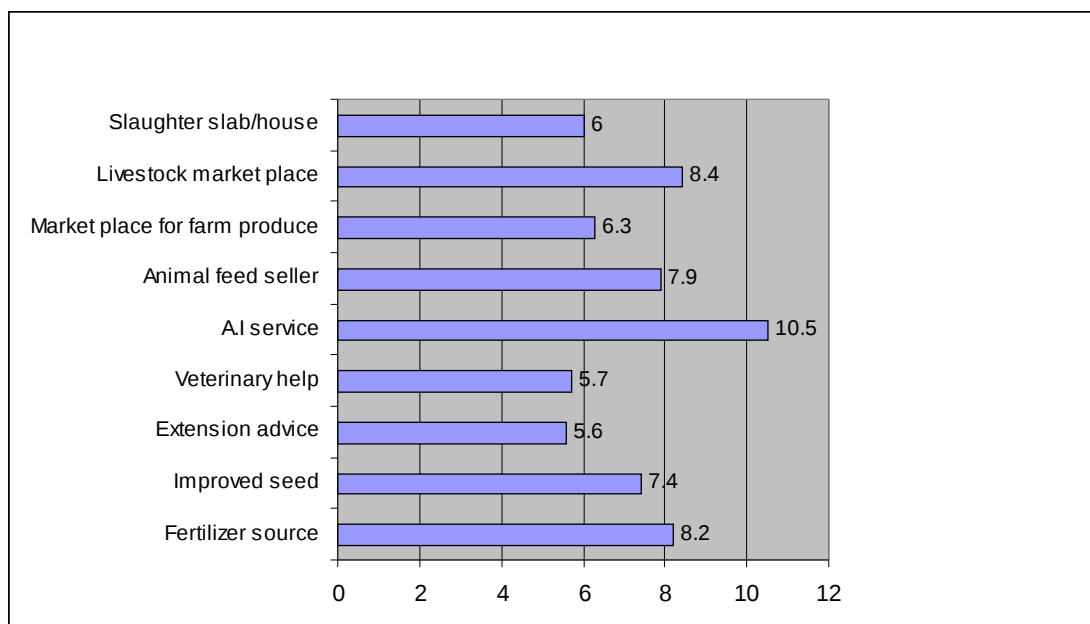


Source: Survey data

Distant service and market centres

Long distances that farmers often have to cover in order to access farming services, supply and market centres have often hindered them from taking full advantage of them. The data reveals that the nearest distances to essential inputs namely improved seed, fertilizer, extension advice and market for farm produce were all beyond 5 kilometres from the respondents’ homesteads, which is the walking distance (Chart 4).

Chart 4: Distances from homesteads to service and market centres



Source: Survey data

Appendix 4: ADAPTIVE STRATEGIES, LOCAL INNOVATIONS AND THE PATHWAYS USED BY THE RURAL POOR AND WOMEN TO COPE WITH FOOD INSECURITY IN THE PROJECT SITES

Introduction

The purpose of this output was to use the results of the baseline and participatory diagnostics analysis to develop alternative innovations for agricultural production, natural resource management and food security.

The farming systems in the project areas were analysed to identify the innovations that communities had been using for agricultural production, natural resource management and food security. The innovative strategies were examined for their contribution to sustainable agriculture, food security and natural resource management.

Comparative analysis of the agricultural productivity, food security and natural resource management in the different areas where the innovations have been put in place was undertaken.

The best practices would be identified, which should be scaled-up, modified or sustained. The willingness and perceptions of the farmers to adopt the innovations would then be assessed.

Strengthening cash income sources

The importance of cash for food security has been recognised by the rural poor. This includes to hire additional labour when there is need, purchase improved seed, fertilizer and farming tools and also for direct purchase of food in situations of food insufficiency. Some households have, therefore, responded to this by their members taking up paid employment. In the most food secure District of Mukono under the study, some 29.5% of the respondents reported that their households had persons on paid employment, while at the least food secure District of Tororo, they were only 16.9%. The main areas of employment were farm labour and trading farm produce (Table 1).

There is need for a policy for Government to partner with the private sector to create conditions for job creation in rural as well as urban areas. Rural farmers should respond to such a policy by creating capacity within their households by getting education and skills and adapting work culture.

Table 1: Respondents' sources of paid employment

	Mukono	Tororo	Ntungamo	All
Farm Labourer	.7%	.0%	2.2%	1.0%
Trading farm produce	.6%	.6%	.6%	.6%
Casual wage earner	.2%	.7%	.3%	.4%
Brewing business	.3%	.3%	.1%	.3%
Teacher	.1%	.1%	.3%	.2%
Transportation	.4%	.1%		.2%

Source: Survey data

Participation in growing main the crops of the area

Each of the research sites has its main crops which are important for food and /or income. Most respondents are reported to have ensured that they participated in growing the main crops for their areas during the main season as a strategy to ensure food security and income generation. The data also revealed the following main crops for the different research sites as given in Table 2.

Opinion leaders have argued for by-laws compelling all community households to grow the main crops of the area as a food security measure. However, such measures are yet to be realised in this free economy and its implementation would be a challenge. What remains is for sensitisation to be carried out to that effect.

Table 2: Main crops for the research sites

	Mukono	Tororo	Ntungamo
Cassava	71.7%	75.8%	
Sweet potatoes	63.3%		
Bananas			76.7%
Common bean (local)			65.0%
Millet		42.5%	

Source: Survey data

Improving access to land

The study revealed that land holdings by the farmers used for crop production were small and often not viable and could not meet the needs of the large households. Furthermore, the ownership of the fields they cultivated was unclear as most of them had no land titles, leading to frequent land conflicts, resulting in loss of land by the poor farmers.

Some farmers have responded to this by renting-in additional land from large land owners for a number of seasons to grow food for their households.

At the moment Uganda has no land policy but only pieces of land laws. There is need for a land policy to be put in place which would strengthen security of tenureship while at the same time allowing for free market on land. At the local levels, by-laws should be put in place for to guide land transactions.

Improving land preparation

The survey revealed that most of the respondents prepared their land manually (90.2%), because they had no oxen and tractors nor could they afford the cost of hiring them. Also their land holdings were too small to warrant the use of these technologies.

However, in order to address the demanding tasks of land preparation as well as weeding, some farmers have formed groups within which they acquire oxen and ploughs and also pool their labour and collectively carry out hard tasks for members on rotational basis.

There is need for a strategy to promote collective approach to farming, through building and strengthening farmer groups through improved organisation, access to resources and skills.

Improving access to seeds

Most respondents used local varieties of crops (61.4%) as opposed to improved varieties and as a result they suffered the full impact of drought, diseases and pests, leading to poor crop yields. Although their numbers were still quite few, adapters of improved varieties gained some advantages such high yields, as quick maturing, resistance to drought, diseases and pests.

Other strategies farmers used in addressing the issue of seed supply were:

- Not selling all harvest in a particular season, to make sure that one has seed for the next season.
- Selecting good seeds from the harvest and storing them separately as seed for the next season.
- Buy seeds from the market, when own seeds could not be kept for one reason or another and also to bring in better seed types.
- Get from government e.g NAADS, to ensure that got improved seeds.

Improving soil conditions

During the survey, soil condition was reported to be deteriorating in a number of different ways, resulting in low productivity of crops. However, the survey revealed that the majority of the respondents did not make use of fertilizers (62.3%).

However, as a strategy to address deteriorating soil conditions, some of the farmers applied manure (27.4%) and compost (4.9%) to their gardens. During the FGDs, some of the suggestions farmers reported to deal with soil fertility were to avoid the following:

- Over-growing of a particular crop on the same piece of land season after season, a practice resulting from land shortage.
- Poor farming methods
- Over-grazing of animals on a piece of land
- De-forestation, or generally removing vegetation cover and exposing land to soil erosion.
- Clearing swamps for cultivation,
- Growing of eucalyptus which drains a lot of soil water.

Promoting important indigenous minor crops

Indigenous minor crops are essential for consumption and supplementary income. Non cultivation of minor crops jeopardises the food situation of the households concerned.

The main reasons why some farmers did not grow important minor crops were because either they did not know about them (42.4%), had problems of affording seeds (19.2%) or did not have enough land (16.4%). In the process they failed to take

advantage of food crops which were important for the diet and incomes of poor rural farmers.

The survey data revealed that the most commonly planted indigenous minor crops were sweet potatoes (76.9%), common beans (70.0%) and maize (69.7%). However, during FGDs, farmers have prioritised the minor crops for the research sites as given in Table 3.

Table 3: Priority minor crops for the research sites

Mukono	Tororo	Ntungamo
Groundnuts	Cowpeas	Groundnuts
Yams	Sorghum	Sweet potatoes

Source: Survey data

There should be a strategy for poor farmers to utilise their marginal land, resources and labour to ensure that they cultivate some indigenous minor crops.

Adapting important post-harvest handling techniques

Many of the farmers' commodities are susceptible to quality deterioration and post-harvest losses. There are important post-harvest handling techniques recommended to address these problems. The data revealed that the majority of farmers applied the following practices: drying of food crops (70.9%), cleaning (56.7%) and sorting (53.6%). Other practices which were also used to a lesser extent included winnowing of grain and pulses, pre-sorting, packaging of food commodities, sizing, curing of cereals or tubers and drying of fruit and vegetables

Promoting livestock ownership

Apart from being food items in themselves as meat or milk, livestock is an essential asset which poor farmers could sell to cope with situations of food shortage. In the food secure District of Mukono, 90.2% kept, while it was 82.1% in Tororo and 66.4% in Ntungamo.

The livestock commonly owned by the respondents were indigenous chicken (51.1%), goats (51.1%) and local cows (28.8%). Other animals owned were pigs (27.5%), cross cows (14.7%) and cross calves (10.8%), among others. However, the animals most commonly owned are of low value, thus unable to provide significant incomes to feed the households when sold in time of need. Furthermore, the number of livestock transactions among the farmers were limited during the year, resulting in low earnings. Most respondents sold goats (n=45), followed by local chicken (n=39), both of which were low-value livestock. Farmers also faced challenges in feeding their livestock, so most respondents fed their livestock crop residues.

The strategy should, therefore, be to promote livestock ownership, with focus on the low cost but improved breeds for high value. Feeding should be examined, with focus on the use of crop residues.

Improving water and environment conservation

The survey revealed that farmers were aware of the threats to their water and environment for production. The strategies some of the farmers adapted were to apply mulching, terracing and crop rotation, among others.

A water and environment strategy should, therefore, deepen the application of these measures among the rural farmers. In addition, other conservation measures should also be progressively introduced, where applicable. These include:

- Minimum tillage
- Wind breaks
- Contour farming
- Grass strips
- Afforestation
- Agro-forestry
- Tied ridges
- Fanya juu

Promoting ownership of productive assets

Many farmers were involved in accumulation of assets, which they used for productive as well as consumptive purposes. Productive assets, as listed in Table 4, enabled them to increase their productivity. These as well as the consumptive assets, e.g chairs, could also be sold to purchase food during periods of food shortages to the household.

It is suggested that farmers should be encouraged to spend on asset accumulation as a means of increasing productivity as well as security for periods of low food production.

Table 4: Respondents whose households owned the asset types

	Mukono	Tororo	Ntungamo	All
Radio	78.3%	55.1%	78.3%	70.7%
Phone	54.2%	53.4%	54.6%	54.1%
Bicycle	58.8%	55.9%	48.7%	54.5%
Motorcycle	22.0%	13.6%	10.1%	15.2%
Animal cart	9.2%	11.9%	11.0%	10.7%

Source: Survey data

Promoting membership of groups

Some farmers were reported to be members of the different groups, notably common interest groups (27.7%), women groups (19.6%), community welfare groups (14.5%)

and church groups (10.5%), among others. These groups have helped them to learn from fellow farmers, access extension services and get social capital, among other functions and thus improved their productivity and contributed to their food security.

There should, therefore, be a strategy to mobilise farmers to form or join membership of groups well focused towards the issues of productivity, natural resource management and food security.

Appendix 5: INTERVENTIONS TO STRENGTHEN AGRI-FOOD SYSTEMS IN THE PROJECT SITES

As part of the process of developing interventions to strengthen agri-food systems in the project sites, Appreciative Inquiry techniques were used to collect community accounts of past experiences, innovations and opportunities. This revealed the resources and assets establishing their capabilities that could be turned into opportunities for improving their livelihoods. This report summarises the innovations from their experiences.

1. Community mechanisms for improved food security

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Planting crops that can grow in whatever conditions e.g. sweet potatoes, pumpkins, local yams. • Buying food from shops • Cultivating in wetlands • Selling animals/livestock • Selling part of household land • Seeking handouts from relatives • Storing food in polythene sacks in houses, e.g dry cassava, beans, millet, maize • Planting fruit trees which are ripe during food shortage seasons. • Planting a variety of crops every season • Growing crops at different times whenever it rains. • Inter-cropping • Growing long crops that cannot be eaten by animals e.g pawpaw • Ensuring that not only crops for selling are planted but also specifically for food. 	<ul style="list-style-type: none"> • Offering labour in return for money or food • Mobilization by the local leaders to grow enough food for domestic consumption and for sale • Growing crops with a shorter grow our period • Growing crops with a very long shelf life e.g peas, sorghum • Taking loans to grow sufficient crops • Selling domestic animals • Keeping food reserves in exchange for f 	<ul style="list-style-type: none"> • Intercropping in order to reduce the risks of relying on one crop • Hiring/renting land for cultivation and farming crops. • Growing a variety of crops in order to reduce the risks of relying on one crop • Getting loans from banks and investing in farming, trading and any other income generating activities. • Look after crops very well to ensure high production e.g. through pruning their banana regularly. • Engaging in activities other than farming for example trading in non food and non food items. • Asking/begging for land from those who have and using it for crop farming. • Keeping food in stores, e.g beans • Planting crops that yield within short time intervals • Planting disease and

Mukono District	Tororo District	Ntungamo District
•		drought resistant crops • Engaging in Fish farming to generate incomes as well as a source of protein

2. Coping mechanisms for acquiring and managing seed

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Keeping seeds from harvests for planting next season • Buying from either market or other farmers • Obtaining improved seed from NAADS • Note: Some farmers did not buy improved seeds for planting because: <ul style="list-style-type: none"> o The high price of improved seeds o Caring for plants from improved seeds costly o Improved seeds can only be used for one or two seasons o Lack of improved seed shops in some areas 	<ul style="list-style-type: none"> • Selecting good seeds from harvests • Buying seeds from the market • Getting from Government e.g NAADS • Drying and keeping it safely or mixing with goats' droppings or Lantana Camara for preservation • Continuous drying of seeds after every two weeks till planting season • For potatoes and cassava, planting near homesteads or in shade where one can monitor • For cassava, removing the tubers and maintaining the stocks standing 	<ul style="list-style-type: none"> • Buying seeds from the shops. • Keeping seeds to plant in the next season

3. Mechanisms for improved soil management

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Use of cow dung • Digging contours • Terraces 	<ul style="list-style-type: none"> • Digging contours • Applying local manure like cow dung 	<ul style="list-style-type: none"> • Adding cow dung to their soils to improve

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Picking plastic bags from the soil • Planting trees e.g ovacado, Abbizia, Mutuba • Digging channels to re-direct water which would have washed away soils • Planting trees with small leavesthat shed off and mulch the soil • Digging ditches in different parts of garden to trap soil and water • Note: The community of Bukooza had estimated that about 10% of their households adopted improved soil management methods 	<ul style="list-style-type: none"> • Crop rotation/ Intercropping like banana/beans, maize/beans, potatoes/beans • Resting the land (fallowing) • Mulching • Fanya juu- fanya chini (dig gullies) to act as water reservoir • Terracing • Planting elephant grass 	<p>its fertility</p> <ul style="list-style-type: none"> • Mulching using bio degradable materials which helped to alleviate soil erosion, acted as a source of manure and kept the water table appropriate for crops growth.

4. Mechanisms to cope with the changing climate

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Afforestation, in response to the high deforestation which may exacerbate climate change • Planting climatic adapted crops like yams. • Planting fruit trees e.g ovacado, Abbizia. • Continuous attending of sensitization and training 	<ul style="list-style-type: none"> • Afforastation by about 60% of the population • Planting food/cash crops whenever it rains • Relying on weather forecast on radio • Continuous planting whenever it rains and planting in “HOPE” for rains • Planting trees • Growing different crops at ago 	<ul style="list-style-type: none"> • Making trenches and channeling water to gardens during prolonged droughts. • Almost 50% of the respondents planted trees as a way of controlling adverse effects of climatic changes. • Growing drought resistant crops. • Engaging in a growing a multiplicity of crops and other activities to increase the number of income sources and

Mukono District	Tororo District	Ntungamo District
		<p>reduce the risks.</p> <ul style="list-style-type: none"> • Changing with the seasons No longer following the traditional planting seasons but plant any time as long as rain is sustainable.

5. Mechanisms for improving farming skills

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • It was estimated that 20% of the community households had attended training provided by Kyagalanyi Coffee Ltd, NAADS and Sasakawa • Copying from others. 	<ul style="list-style-type: none"> • Employing indigenous knowledge learnt over time and through experience • Listening to media like radios and reading newspapers • Copying from others • Attending agricultural meetings at the local level • Learning from neighbours • Attending meetings 	<ul style="list-style-type: none"> • Attending NAADS meetings. Over 20% of the people in the community attend training (Kyagalanyi Coffee Ltd, NAADS) • Using mainly indigenous knowledge and copy or learn new skills from friends/colleagues. • Note: Otherwise there was nothing much because NAADS reaches out to a few people whereas extension workers are not committed to doing their work- instead, they charge money to do their work

6. Mechanisms for improved market access

Mukono District	Tororo District	Ntungamo District
<ul style="list-style-type: none"> • Some farmers have started producing coffee due to the proximity of a coffee factory • Selling farm produce (usually grains and legumes) 	<ul style="list-style-type: none"> • Marketing food and cash crops like cassava, millet • Selling chicken, 	<ul style="list-style-type: none"> • Selling to buyers who came to their homes saved them from incurring transport costs to far

Mukono District	Tororo District	Ntungamo District
<p>to the schools, despite the very low prices offered by schools</p> <ul style="list-style-type: none"> • Selling from home to avoid transport and market charges • Taking their produce to deficit areas like the landing sites where little crop production is practiced 	<p>pigs, goats</p>	<p>away market places.</p> <ul style="list-style-type: none"> • Selling their produce as a group saved them from exploitation and enabled them to arrange transport for produce to markets with better prices

Appendix 6: COMMUNITY-BASED PARTICIPATORY MONITORING AND EVALUATION PLAN

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
Key features, drivers and trends of food vulnerability in the project sites documented by September 2010.	List and description of features, drivers and trends of vulnerability	Report on features, drivers and trends	Once during project life	Representative, Local M&E Committee	Group meetings
Adaptive strategies, local innovations and pathways used by the rural poor and women to cope with food insecurity in the project sites identified and documented by September, 2010.	List and description of adaptive strategies, local innovations and pathways	Report on adaptive strategies, local innovations and pathways	Once during project life	Representative, Local M&E Committee	Group meetings
Interventions to strengthen agri-food systems in the project sites designed by June, 2010.	List and description of designed interventions	Activity report Baseline report and recommendations	Once during project life	Representative, Local M&E Committee	Group meetings
Practical community-based participatory monitoring and evaluation tools	A community-Based Monitoring and Evaluation plan	Plan document	Once during project life	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
developed by June, 2010.					
A review synthesis of local innovations and research technologies for orphan crops and management technologies published by June 20 10	Summary of synthesis of local innovations and research technologies	Synthesis report	Once during project life	Representative, Local M&E Committee	Group meetings
Effective approaches to dissemination and scaling up and out identified by the end of the project	List and description of approaches to dissemination and scaling up and out	Report on dissemination and scaling up and out approaches	Once during project life	Representative, Local M&E Committee	Group meetings
Processes and outcomes of participatory varietal selection and farmer experimentation documented by December 2012	Number and description of participatory varietal selection and farmer experiments	Report on processes and outcomes	Once during project life	Representative, Local M&E Committee	Group meetings
Adoption potential of selected best-fit orphan crops and local innovations determined	Number of farmers adopting best fit orphan crops Acreage of orphan crops	Adoption reports	Every year	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
	Yields per season per acre				
Market opportunities identification and value chain analysis for selected orphan crops completed	List and descriptions of market opportunities Summary of value chain for orphan crops	Market identification reports Value chain analysis reports	Once during project life	Representative, Local M&E Committee	Group meetings
A range of technology innovations for improving productivity of orphan crops and for agricultural diversification tested	List of technologies tested Results of technology tests	Trial garden reports	Every season	Representative, Local M&E Committee	Group meetings
Analytical synthesis of specific policies and governance mechanisms supportive of agri-food systems and sustainable natural resources management published.	List and descriptions of policies and governance mechanisms.	Papers on analytical synthesis	Once during project life	Representative, Local M&E Committee	Group meetings
Processes and outcomes of policy dialogue advocacy and civic education sessions documented	Descriptions of processes and outcomes of policy dialogue advocacy and civic education	Policy dialogue session reports	Every quarter	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
A number of policy briefs, policy memo and awareness materials produced and disseminated to a variety of stakeholders by end of project.	Number of policy briefs, memos and awareness materials produced Number of dissemination events on policy briefs, memos and awareness.	Policy materials produced Dissemination reports	Every quarter	Representative, Local M&E Committee	Group meetings
A range of policy options and policy narratives supportive of agri-food security systems identified,	Number and description of policy options and policy narratives	Policy review reports	Every year	Representative, Local M&E Committee	Group meetings
Analytical synthesis of specific policies and governance mechanisms supportive of agri-food systems and sustainable natural resources management published.	Number and descriptions of policies and governance mechanisms	Papers on analytical synthesis	Once during project life	Representative, Local M&E Committee	Group meetings
A framework for comparative studies and analytical syntheses, knowledge management, sharing and learning developed.	Description of framework for knowledge management, sharing and learning	Framework document	Every year	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
A number of analytical synthesis and comparative analysis of different agricultural innovations and technologies on agri-food systems published	Number and descriptions of synthesis of agricultural innovations and technologies	Papers on analytical synthesis	Every year	Representative, Local M&E Committee	Group meetings
An analytical synthesis of some of strategic food security initiatives and agricultural development programmes in the region.	Description of synthesis of initiatives and programmes	Synthesis document	End of project	Representative, Local M&E Committee	Group meetings
Outcomes					
The rural poor, women and the vulnerable increase their ability to expand their best-fit adaptation strategies to improve food security.	Number of strategies adopted Number of rural poor farmers adopting strategies	Adoption reports	Every year	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
Local innovation capacity and systems that work for the poor and women are strengthened	Number of local innovations strengthened Number of farmers practicing local innovations	Brainstorming through FGDs	Every quarter	Representative, Local M&E Committee	Group meetings
A wide range of options for improving the productivity of selected orphan crops are tested under specific field conditions.	Number of productivity options tested Results of the testing of options	Trial options reports	Every season	Representative, Local M&E Committee	Group meetings
A selected number of best-fit profitable and scalable orphan crops and local innovations promoted.	Number of orphan crops selected and promoted Number of local innovations promoted	Promotion orphan crops reports Promotion of innovations reports	Every season	Representative, Local M&E Committee	Group meetings
Increased diversity of orphan crops and enterprises as integral components of food security systems at the household and community levels.	Change in number of different orphan crops grown by farmers	Brainstorming through FGDs	Every season	Representative, Local M&E Committee	Group meetings
Increased income	Change in incomes	Wealth ranking	Every year	Representative, Local	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
opportunities for women and the poor from orphan crops.	reported by women and poor farmers			M&E Committee	
Viable policies and institutional arrangements supportive of community driven agri-food systems promoted.	Number of effective supportive policies and institutional arrangements promoted Number of promotion events	Policy promotion reports	End of project	Representative, Local M&E Committee	Group meetings
Capacities of local stakeholders to advocate for responsive policies enhanced	Change in representation of local stakeholders at policy fora Change in knowledge of local stakeholders on policies on agri-food systems	Brainstorming Membership of local fora	End of project	Representative, Local M&E Committee	Group meetings
Large national and regional food security initiatives and programmes use lessons documented by the regional learning networks	Description of lessons documented List of large national and regional food security initiatives and programmes	Document on lessons Programme documents of large regional initiatives	End of project	Representative, Local M&E Committee	Group meetings

Outputs/ Outcomes	Indicators	Data sources/ methodology	Frequency of data collection	Person responsible	Reporting
Outputs					
A critical mass of young generation of scientists and professional trained in agri-food systems approaches.	Number of scientists who obtained PHD. No of professional trained in agri-food systems approaches.	Certificates Course syllabus	End of project	Representative, Local M&E Committee	Group meetings

Appendix 7: PROCESSES AND OUTCOMES OF PARTICIPATORY VARIETAL SELECTION AND FARMER EXPERIMENTATION

On- farm trials have been conducted in response to the needs identified through the baseline survey as well as the participatory diagnostics studies as a major production constraint identified by farmers for the selected crops. These included lack of access to suitable seeds, limited use of productivity innovations and inadequate land and environment conservation practices, among others. Availing of seed was the first agreed necessary intervention to improve productivity of the minor crops in the districts.

The approach used under the trials was as follows:

- Participatory processes, involving farmers, district extension workers, and researchers.
- Farmers provided land and labour and managed the trials while the project paid for land preparation and provided seed, technical backstopping and chemicals for pest control.
- Farmers made observations/evaluation of the performance of varieties under their management conditions.
- Extension staff mobilised farmers, provided technical advice and monitored farmer's progress.
- 15 trials were established in each district, that is, 5 in each sub-county.

Selection of host farmers was carried out as follows:

- i) Farmers to host trials were identified with the help of Sub-county Extension Officers
- ii) Criteria for selection of host farmers included: having enough land to host trials; willingness to host and manage the trial; willingness to allow access to field by other farmers to learn from the trial, proximity to an access road where other farmers would learn from the trial; host farmer being part of a farmer group and high involvement of
- iii) Host farmers were given financial contribution for land preparation.
- iv) Planting was done jointly by farmer group members, extension workers and researchers.

Mukono District

Groundnuts and yams were selected in Mukono District and trials conducted on them as follows:

- A total of 7 groundnut trials were established.
- They were planted during the 4th week September to 1st week of October, 2010 in the 3 sub-counties as follows: Nabale 2, Nagoje 2, Ntenjeru 3.
- Four varieties: SERENUT 1, 3, 4 and Red beauty were planted.
- Plot sizes were: 10x10m leaving 1m between plots/varieties.
- Spacing was 15x45cm.

- A total of 8 yam trials were established.
- Planting was during 1-2nd week of October, 2010.
- Yam plot size was 20x20 or 20x15m or 15x15m depending on available land.
- Only 1 local popular variety of yam was planted at spacing of 1.5X1.5m.
- 2 Yam varieties were planted at MUZARDI for seed multiplication.
- Improved variety was obtained from Namulonge.

Monitoring and spraying were carried out by researchers in 2nd week of November, 2010. First spraying against groundnut pests was also done during the monitoring visit. Assessment was done on plant stand, pests and diseases, plant vigour by researchers. Issues arising from monitoring visits were:

- In most fields groundnuts were at flowering stage.
- Most of the trials were well managed and performing well.
- Groundnuts in Ntenjer0 had been affected by drought during the 1st monitoring visit.
- In Ntenjero there were severe symptoms of leaf curl in groundnuts.
- Variety Serenut1 had low germination percentage across locations.
- Other farmers had expressed need for yams.

Next steps planned under the trials in Mukono were as follows:

- Second monitoring visit.
- 2nd spray against groundnut pests.
- Data collection on yield and other attributes.
- Post harvest attributes and Taste evaluation for groundnuts.
- Multiplication of improved yam varieties.
- Planning for next season's activities.

Tororo District

Work in Tororo District started with a reconnaissance survey by NARO/ACODE in March 2010. Five food insecure sub-counties were visited in order to select 3 for the Project activities. Results from the baseline survey conducted in the District indicated that sorghum and cowpea were major food security crops but were among the neglected/orphan crops. Unavailability of seed of improved varieties of the two crops was identified as a production constraint. On-farm testing of improved varieties was agreed as an immediate intervention.

Mella, Osukuru and Kisoko sub-counties were selected in consultative meetings including District Production Officers and on-farm trials were established in the three sub-counties. The selection of the sub-county was based on the following criteria.

- Having an active sub-county extension worker who would regularly supervisor and monitor the trials and farmers' activities.
- Bearing evidence of high food deficit with poor natural resource base, with potential for improved production.

- Evidence of growing of sorghum and cowpea as a food security crop.

Improved varieties of sorghum and of cowpea respectively were sourced from NaSARRI to be tested alongside local/farmer varieties. Two varieties of Cowpeas (SECOW 1 T and SECOW 2 W) and two of sorghum (SEKEDO and Epuripur) were selected for their good performance and high yields.

- Farmer selection, using criteria given above, was done in August 2010.
- Planting of trials was done in the first week of September 2010.
- Each plot was 10 x 10 m and the spacing used for both cowpea and sorghum was 60 x 30 cm. A path of 1 meter was used to separate plots of different varieties.
- The field lay out depended on the plot field/garden.
- Some gardens accommodated the two crops side by side while others allowed the two crops to be planting in one strip.

Field Monitoring was first conducted on from 29th September to 2nd October 2010. The purpose was to make on-spot check on the trials and do first chemical spraying to control foliar pests of both cowpeas and sorghum. The team also shared useful information concerning chemicals and chemical use.

The second monitoring trip was made on from 30th October to 3rd November 2010. The purpose of the trip was a follow up of the first trip – to observe crop performance and to do second chemical spraying to control foliar and flower pests of both cowpeas and sorghum.

The observations made during the monitoring visits were as follows:

- Most of the trials were well managed and were performing well.
- A few trials were not well managed leading to stunting of the crops.
- Improved variety Epuripur had poor germination across all sites.
- Shoot fly was observed on sorghum varieties.
- There were few instances of over harvesting of cowpea leaves.
- Hailstorms in Mella affected the crops at some stage.

Ntungamo District

Trials were carried out in Itojo, Nyabihoko and Rugarama Sub-counties.

The ground nut varieties planted were as follows:

- Serenut 4 (Tan)
- Serenut 3 (Red)
- Red Beauty
- Serenut 1
- Local

Nine fields were established. The plot sizes varied from farmer to farmer and was not uniform as most of the land had been planted with other crops like millet, beans and maize.

Performance monitoring revealed the following:

- Germination was not uniform for all varieties, with germination for Serenut 1 being low, followed by Serenut 3. The germination of the local variety was high and very vigorous compared to the rest.
- The groundnuts were doing well except that there was a problem of leaf defoliators which was observed on most of the varieties. The trials weeded late were affected mostly.
- A few plants were affected by early blight disease, Rosset virus, and brown leaf spot (*cercospora*).

The physiological state of the crops was that of flowering except for some varieties on a few field were not such as Serenut 1 and Serenut 4.

Sweet potato varieties planted were Naspot 1, Naspot 11, Naspot 8 and local.

They were affected by drought, especially fields located on a slope and loam stony soils. Gap-filling had to be done.

Concerning pests and diseases, there was a problem of leaf defoliators but it was not severe. No disease was observed.

Both sweet potatoes and ground nuts were sprayed to control leaf defoliators using Pyrinex. The quantity applied was; 70 mls /15ltrs of water.