Final Report

2012

Strengthening Value Chains for Maize and Soybeans for Ugandan Women Farmers

FTF Niche Project No. 1071-20-505-1

IOWA STATE UNIVERSITY
Extension and Outreach

FARMER-TO-FARMER

Iowa State University

Submitted by,
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1. Work Plan Status

The Work Plan and project objectives to "Strengthen the value chain for maize and soybeans" through commercial agriculture for Kamuli district women farmers in Uganda were comprehensive from seed germination testing to post-harvest handling and cleaning. Volunteers worked with ten groups of women farmers and a total of 180 farmers. They partnered with an in-country non-profit organization, Volunteers Efforts for Development Concerns (VEDCO), whose staff helped address project objectives between volunteer work trips. Work of each volunteer group built upon work of the previous groups. All project objectives were addressed during two or more volunteer work trips, and with multiple methods throughout the year. This project design used a proven approach to teaching and technology transfer of multiple contacts and exposures to new concepts.

Work tasks for Quarter 4 were completed for each objective defined in the project work plan though the volunteer presence in Uganda and through the assistance of VEDCO staff. In January, 2013, three farmer volunteers and a program coordinator traveled to the Kamuli District of Uganda to meet and work with 10 farmer groups to determine the progress and overall success of the project. The scope of work for their trip included:

a. Continue training on use of soybean seed cleaners and propose suggestions for improvement. Assess labor savings and constraints to use.
b. Assess current grain marketing plans and offer potential adjustments.
c. Assess use of Farm Record Books for Crops for the second growing season.
d. Assess level of cooperation within the groups, challenges and propose solutions to help groups overcome roadblocks.
e. Document joint grain marketing transactions for the year.
f. Document Machinery Sharing Agreements for the farmers groups
g. Document articles of incorporation for Marketing Associations.
h. Provide training for Ugandan farm women about soil quality, productivity, and management

Table 1. Project Work Plan (shaded areas denote completed tasks)

Task	Quarter			
	1	**2**	**3**	**4**
Objective 1: *Improve maize post-harvest grain quality*				
Further assess maize post-harvest quality by threshing and cleaning method. Comparing bicycle-powered threshing with traditional threshing by beating maize with a stick.	X			
Supply bicycle-powered maize shellers to two new farmer groups/associations.		X		
Work with two new farmer groups to buy and jointly own bicycles dedicated to these grain shellers.			X	
Distribute tarpaulins for grain drying to 100 farmers.	X			
Analyze efficiency of farmers' use of the bicycle-powered maize shellers. Determine constraints to the shelling process and shelling speed. Develop and recommend improvements in shelling protocols.	X	X		
Work with Ugandan farmers to determine maize shellers needed by identifying optimum number of farm families served /or Kgs maize shelled with one maize sheller and a bicycle dedicated to its use.	X		X	
Assess and review maize storage protocols on Ugandan women's farms. Develop recommendation for improvement.	X			
Encourage adoption of the East African Grain Standards among members of the value chains for maize and soybeans in the Kamuli District.	X	X	X	X
Document price differences for various maize grades and share with collaborating farmer groups.			X	X
Objective 2: *Increase soybean production, etc.*				
Extend seed for improved soybean cultivation to 100 new collaborating Demonstrate documented production practices for soybeans to new farmer groups in the Kamuli district.	X			
Distribute soybean seed inoculum to 180 farmers for the first growing season in March 2012.	X			
Investigate mechanical shellers/shelling and/or seed cleaning techniques for soybeans.	X	X	X	X
Investigate improved drying methods for soybeans, as observed in Kamuli District for dry beans.				X
Purchase or construct prototype soybean sheller and/or seed cleaner and test in the Kamuli District.		X		
Demonstrate soil building techniques of biomass and compost additions.				X
Work with VEDCO to integrate soybeans into existing school feeding programs.		X		
Objective 3: *Seed quality and on-farm evaluation*				
Review Ugandan seed quality training materials for farmers.		X		
Train VEDCO staff and farmers to conduct on-farm seed germinations tests for maize and soybeans.	X			
Train farmers to use on-farm germination test results for planting decisions	X	X		
Objective 4: *Improve on-farm production and marketing records*				
Develop a 2nd generation' field record keeping book that will allow farms flexibility of tracking costs and sales for many crops.	X			
Distribute Farm Record books to 180 farmers			X	

Track use of the Farm Record books through two growing seasons in 2012				X
Document how farmers are using the information from their Farm Record book		X		X
Objective 5: ***Advance development of marketing groups for maize and soybeans***				
Co-develop, with Ugandan farmers, group/associations, written guidelines for joint marketing. Determine necessary conditions for jointly doing business, e.g. having an operable bank account, method of verifying accurate grain weights between sellers and buyers, etc.	X	X	X	X
Identify private sector partners/collaborators.		X		
Facilitate coordination of transportation for market crops within and among farmer groups/associations.				
Demonstrate to buyers the improved grain and oilseed quality from collaborating project farmer groups.		X		X
Provide each group with a scale to obtain accurate records of volume of grain received and sold (also provide 10 kg weight for scale calibration)		X		

2. Activities by Country

All project activities were conducted in the Kamuli District of Uganda.

3. Outreach

Iowa women Farmer-to-Farmer volunteers were featured in local newspapers and newsletter articles in 2012, sharing their volunteer experiences and the work they conducted while in Uganda. During two trips, volunteers posted blogs discussing their daily activities in Uganda.

Volunteers also gave 14 face-to-face presentations to community service groups, women in agriculture and beginning farmer conferences, church groups, school groups, US Senate Agriculture Committee, and to family and friends.

Other outreach included:

- an interview about the project with volunteer, April Hemmes, that appeared online at www.americasfarmers.com. She also wrote a blog during her work trip in August, 2012, that was carried on the same website.
- Volunteers Jenny Thomas, Paul Mugge and Connie Tjelmeland wrote a daily blog during their volunteer service that was posted on the Extension Value Added Agriculture website (http://www.extension.iastate.edu/valueaddedag/international-agriculture).
- An article, *PFI Members help Women Farmers in Uganda*, was published in the Practical Farmers of Iowa (PFI) spring, 2013 quarterly news magazine. The magazine is distributed to 2,100 members of this sustainable agriculture organization. Available online at: http://www.practicalfarmers.org/news/index.html
- Four volunteers also posted about their experiences on Facebook. They reached over 1,000 people through their outreach efforts (Table 2). Additional presentations are scheduled for later in 2013.

Table 4. Iowa /USAID 2012 Farmer-to-Farmer Volunteer Project Outreach Activities

Volunteer	Print Publication	Estimated Audience	Presentations	Estimated Audience	Social Media	Estimated Audience
April Hemmes			American Farm Bureau Women's Leadership Conference in Las Vegas Spoke at US Senate Ag Committee	500 30	Blogs: Americasfarmers.com Janicperson.com Thefieldposition.com Facebook	400
Cindy McCollough			Kiwanis, Webster City Private group, Webster City	28 10		
Lori Lang	Cedar Valley Times	2,000	2nd grade, Vinton-Shellsburg School	22	Facebook	
Paul Mugge			3 classrooms, Sutherland Schools	60		
Jenny Thomas **Paul Mugge** **Connie Tjelmenland**					Blog	200
Margaret Smith					Facebook	
Linda Naeve			Church group, Ames PEO group, Ames PEO group, Ames	14 22 28	Facebook	

4. Case Study

a. Challenge

Ugandan women farmers in the Kamuli district of Uganda face several challenges growing, harvesting, cleaning and marketing their grain and oilseed crops. These include:

- The farmers lose a significant amount of their crops due to improper post-harvest handling and storage
- Effective resources and equipment are yet available to the farmers to efficiently clean soybeans and field beans for home consumption or commercial sales. Manual winnowing of soybeans causes respiratory problems and allergic skin reactions due to the dust and particle fragments.
- Although the women farmers understand the basics of soybean production, they were unfamiliar with the importance of seed germination testing and strategies to improve soil quality.
- The farmers' limited business skills reduce their ability to access better markets and profitability. They need additional training and understanding of record keeping and have had minimal negotiating power with "middlemen" buyers to obtain a fair price for their crops.

b. Initiative

Farmer-to-farmer volunteers from Iowa, working in the Kamuli district of Uganda, focused on improving crop management and marketing skills with 180 Ugandan women farmers through five objectives:

- Improve maize grain quality, storage, and economic value in the marketplace
- Increase production of, and improve soil management, harvest, drying, and threshing techniques for soybeans
- Provide education about seed quality and encourage adoption of on-farm evaluation of open- pollinated maize and soybean seed before planting
- Improve on-farm production and marketing written record keeping
- Advance development of female-directed marketing groups/associations for marketing maize and soybeans.

Volunteers provided training on post-harvest grain handling techniques for maize and soybeans and demonstrated a hand-operated seed cleaner for soybeans and dry beans. Project coordinators developed a simple farm record book and taught farmers to track their production, input and marketing expenses to determine profitability for specific crops. Volunteers also provided training on field mapping and soil quality factors.

c. Results: As a result of the USAID Farmer to Farmer Project:

- 90% of participating farmers in the Kamuli District dried their grain crops on tarpaulins, rather than on the ground.
- 88% of project farmers kept written farm records in 2012. 96% of the farmers want to continue keeping written records, are willing to pay 1,000 UGX for a Record Book and requested more training in recordkeeping.

- 23% of project farmers collectively marketed grains in 2012 and received a 25% higher price than for grain sold individually. 83% of farmers are interested in collective grain marketing for 2013.
- All project farmers planted soybeans in 2012 compared to less than 5% in 2010. 92% plan to grow soybeans in 2013. Farmers sold 36% of their soybeans and kept the remainder for seed and family consumption.
- 96% of farmers reported increased household incomes due to participation in this project, enabling them to pay school and medical bills, lease additional land and purchase additional agro-inputs.

d. Knowledge generation and sharing

Iowa farmer volunteers, participating Ugandan farmers and VEDCO staff members worked to capture and disseminate the knowledge developed during this project through:

- their reports, newspaper interviews, presentations, and blog.
- the Farm Record Books for Crops that was revised with input and advice from our Ugandan collaborating farmers. This record book will be shared and its use taught to other Ugandan farmers participating in VEDCO project.
- one-on-one advice that FtF participants shared verbally with other Kamuli district farmers about post-harvest grain handling, soybean production, written farm recordkeeping, and collaborative grain marketing.

Indications of dissemination included the expansion of the number of farmers growing soybeans in the second cropping season of 2012. Project farmers sold, and/or shared seed from the improved soybean cultivar with neighboring farmers who then planted them in the second growing season.

Information on this Farmer to Farmer project was shared with the public through:

- websites and blogs
- print media-----newspapers, newsletters, and a national agricultural magazine
- oral and visual presentations by volunteers to Iowa farm, church, and service groups. Presentations included still photos and video
- one-on-one communication among Ugandan farmers
- group communication from VEDCO staff to additional non-project farmers
- conversations among Uganda farmers in the Kamuli district

Table 1a. Volunteer Assignment Data

Assignment (Trip) No.	Name	Sex	State of Residence	Occupation Category*	Race/Ethnicity	Prior FtF Assignments (Y/N)	Country	Niche Project	Assignment Start Date	Assignment End Date	Number of Volunteer Days Completed	Estimated Value of Volunteer Services Leveraged (U.S.$)	Estimated Value of Host Contribution (U.S.$)	Type of Volunteer Assistance**	Commodity Chain Activities***	Host(s)
1	Jennifer Steffen	F	IA	F	W	Y	Uganda	F2F	2-26-2012	3-10-2012	11	$2,500	$1,000	T R	P, M, D	VEDCO
1	Emily Babin	F	IA	F	W	N	Uganda	F2F	2-26-2012	3-10-2012	11	$2,500	$1,000	T R	P, M, D	VEDCO
1	Brenda Zylstra	F	IA	F	W	Y	Uganda	F2F	2-26-2012	3-10-2012	11	$2,500	$1,000	T R	P, M, D	VEDCO
2	Lori Lang	F	IA	F	W	Y	Uganda	F2F	7-27-2012	8-7-2012	12	$2,500	$1,000	T R	P, M	VEDCO
2	Cindy McCollough	F	IA	F	W	N	Uganda	F2F	7-27-2012	8-7-2012	12	$2,500	$1000	T R	P,M	VEDCO
2	April Hemme	F	IA	F	W	Y	Uganda	F2F	7-27-2012	8-7-2012	12	$2,500	$1,000	T R	P, M	VEDCO
2	Linda Naeve	F	IA	F, E	W	Y	Uganda	F2F	7-27-2012	8-7-2012	12	$2,500	$1,000	T R	P,M	VEDCO
3	Margaret Smith	F	IA	F, E	W	Y	Uganda	F2F	1-2-2013	1-14-2013	12	$2,500	$1,000	T R	P, M, D	VEDCO
3	Jennifer Thomas	F	IA	F	W	Y	Uganda	F2F	1-2-2013	1-14-2013	12	$2,500	$1,000	T R	P, M	VEDCO
3	Paul Mugge	M	IA	F	W	N	Uganda	F2F	1-2-2013	1-14-2013	12	$2,500	$1,000	T R	P,M	VEDCO
3	Connie Tjemeland	F	IA	F	W	N	Uganda	F2F	1-2-2013	1-14-2013	12	$2,500	$1,000	T R	P, M	VEDCO
	Total										129	$27,500	$11,000			

*F = farmer; E = extension educator;*T = teaching; R= gathering information; **P = production; M = marketing; D = distribution

Table 1b. Volunteer Assignment Activity Data

	Persons Directly Assisted			Persons Trained			Number of Volunteer Recommendations			
Assignment (Trip) No.	Male	Female	Total	Male	Female	Total	Economic	Organizational	Financial	Environmental
1	27	117	144	27	117	144	3	5	2	1
2	7	155	162	7	155	162	6	3	2	1
3	20	144	164	20	142	162	4	1	1	2
Total	54	416	470	54	414	468	13	9	5	4

Table 2. Host Data

					Potential Beneficiaries				
Host	Country	Country FtF Project	Institution type	Date of Baseline assessment	Members / owners	Employees	Clients and Suppliers	Family members of clients	Total
VEDCO	Uganda	Collaborative Marketing, etc.	NGO	June 2011	0	16	180	1,080	1,276

ANNEX: Volunteer Report for Final Field Assignment

Strengthening Value Chains for Maize and Soybeans for Ugandan Women Farmers

January 3 – 14, 2013

Submitted by:
Jenny Thomas, Humboldt, IA
Paul Mugge, Sutherland, IA
Connie Tjelmeland, McCallsburg, IA
Margaret Smith, Iowa State University

The Iowa/Uganda Farmer-to-Farmer project has been working with Ugandan women farmers for the past two years. One hundred and eighty farmers, in groups of 12 to 27 members each, have worked to improve their farm business management skills and incomes. With our teams' visits, the project came to a close. Our role was to tie up some loose ends as best we could. We also reviewed the practices and tools introduced by the project and asked the farmers to evaluate them.

Project Objectives

Objective 1: Improve maize grain quality, storage, and economic value in the marketplace

Examine maize shellers and bicycles for wear
Examine tarps for wear
Focus group questions
Does any group want to purchase another sheller?
Update documentation for groups who now have written machinery sharing agreements

These points are addressed in the final report for the entire project.

Objective 2: Increase production of, and improve soil management, harvest, drying, and threshing techniques for soybeans

In year one of the project, 2011, seed was provided to farmers of an improved soybean variety from a breeding program in Uganda. Only a very few of the farmers had ever grown soybeans, even though their diets provide minimal protein and fat. This new variety, Maksoy 1N, grew well in the district and farmers immediately began integrating soybeans into their family meals and selling excess for cash. Farmers continued to plant soybeans each season (there are two rainy seasons, therefore, two crop growing seasons per year in the Kamuli district). Soybeans on small-holder farms are harvested by pulling the plants or by cutting them at the ground surface, then taking them back to the farmstead. The plants are further dried on the ground or on tarpaulins (in our case, these were provided by the project), then threshed by hitting the plants with a stick. This threshing technique results in a lot of trash and chaff mixed in with the

Though previous volunteer teams had reported this threshing process as a gentle 'tapping' on the plants, this farmer wasn't doing any 'tapping'!

soybeans that must be removed before cooking or selling the soybeans. The great challenge to the women was cleaning their threshed beans.

Although the harvesting, drying, and threshing of the soybeans appear very inefficient by Western standards, those things didn't seem to be big concerns for the Kamuli district women farmers on the scale that they are working. The real issue, for them, is separating the beans from the chaff, dust, and dirt. Their current winnowing process involves throwing the chaff/bean mixture in the air a foot or so while blowing through it to remove the lighter chaff. The most serious issue with this process is the inhalation of dust – it makes the women sick. Therefore, the impetus of our effort was, and is, to keep the women away from the dust while cleaning their soybeans.

Seed cleaner

The previous team of volunteers developed and built a small, wooden, manually powered fanning mill to address this issue. St. Joseph's Vocational Technical Institute in Kamuli was charged with building a metal prototype, similar to the wooden cleaner, which our team could demonstrate to the various women's groups. The hope was that a suitably designed cleaner could then be manufactured and made available to the women at a price they could justify. Unfortunately, the cleaner built at St. Joseph's was deficient in many respects:

- The air inlets were seriously insufficient
- The impeller blades were angled incorrectly
- The fan shroud was too far away from the fan blades
- The agitation of the uncleaned product was inadequate
- Clean soybeans would bounce all over
- It is impossible to repair in the field
- It is probably too heavy
- It is possibly too expensive
- The workmanship is very poor

A volunteer, Paul Mugge, spent most of a day with St. Joseph's instructors and students trying to address the deficiencies that were amenable. Our effort were doomed from the beginning because the machine was welded together everywhere and could not easily be modified. In retrospect, our time would have been better spent modifying the original wooden cleaner. We did take the metal cleaner to one group of farmers, but it was immediately apparent that it was not up to the task. We decided that it was better to not bring anything than to demonstrate a piece of equipment that performed so poorly.

As a very simple and inexpensive alternative, we constructed a sieve from a metal pail that appeared to have a volume of about 5 gallons. We cut most of the bottom out and replaced it with small screen. A basket made of larger screen sat in the top of the pail. Ideally, the soybeans could pass through the larger screen and not through the smaller one, leaving relatively clean beans in the pail. Of course the two locally available screen sizes were "too big" and "too small" on both counts, so it was less than ideal. We did, however, demonstrate it to several groups, and most said they would prefer something really simple and inexpensive like the pail to a larger and more expensive cleaner even though quality and effectiveness were sacrificed. It depends a lot on scale, though, because the pail is not appropriate for a group selling a sizable quantity of beans.

Initially, we were very disappointed in seeing a significant need and not being able to address it in a meaningful way. Upon further reflection, we have changed our minds. This may have been a blessing in disguise. We think we have an opportunity now to do this right. Sadly, St. Joseph's does not currently have the expertise or equipment necessary, although perhaps there could be a chance for them to improve the quality of their work and instruction as an outgrowth of this. There is a need for qualified metal workers in Uganda and St. Joseph's could contribute if they are willing to upgrade the level of their instruction.

We know enough about the manufacturing capabilities available in Uganda to successfully design a seed cleaner which will improve the lives of women farmers in Kamuli and beyond. We know the design parameters, the materials available, labor and overhead costs, and have identified a capable manufacturer. We can work jointly with a group of ISU engineering students and the seed cleaning experts at ISU in a synergistic relationship in which everyone benefits. Drawings can be sent to Tonnet Manufacturing in Kampala to manufacture the equipment which Vedco can then make available at an affordable price. Admittedly, there are a number of "ifs" there, but it will be better in the long run for the farmers of Kamuli if we can pull this off. There will be challenges as to weight and cost and the size of the soybeans varies dramatically, but if done correctly, the cleaner could be used for crops other than soybeans also.

Soil Management survey

Volunteer Connie Tjelmeland interviewed the women about their knowledge of soil health and provided training for improving soil health. She presented the idea that soil is a complex ecosystem made up of many forms of life, minerals, air, and water. Soil in and of itself can be

healthy or unhealthy and that impacts the crops growing in it. To the question of what they look for in a healthy soil, they responded:

- dark soil color (not red) because it has more nutrients;
- soil that is heavy and holds water (not sandy) because it won't dry out so fast;
- soil that is 'soft' when dry and not sticky when wet (not too much clay) because it has more air in it and tills more easily;
- soil that has not been cropped for a while or virgin soil; and finally,
- soil that grows certain weeds that indicate health. (They also listed a number of weeds that indicate a poor soil.)

A glaring factor affecting yields is the overall poor quality of the soil. The women said that soil productivity has been declining over their years of farming. I emphasized that soil heaIth depends on protecting, maintaining, and increasing the soil's organic matter which is made up of living organisms, detritus, and humus. By examining several soils, the women learned that organic matter affects soil fertility, tilth, water holding capacity, and aeration. We discussed practices like leaving crop roots in the ground, mulching to preserve moisture and reduce erosion, planting cover crops, interplanting legumes, and adding manure and compost. All of these are practices which increase soil organisms and, therefore, soil health.

The farmers know about a number of these practices. We were not able to fully assess, though, how many of these are commonly used. The farmers are limited by time in their busy day to do improvements on all their fields. Many women lack the simple means of moving heavy loads of manure or compost very far. Although most everyone has free ranging, indigenous chickens, only a few women have larger livestock to supply manure for their crop fields. Just as in Iowa, land tenure affects farmers' commitment and ability to improving soil quality. On rented land, the women are reluctant to implement long term soil health measures, because they may not be farming those fields the next year.

In spite of these limitations, for crops grown on land that is owned and/or close to their homesteads such as bananas, coffee, tomatoes, and maize, they concentrated their efforts to improve the soil. Contour planting and use of terraces on slopes slowed soil movement and allowed better infiltration of rain. We saw only one farm with terraces. These were two-foot wide, one-foot deep trenches with the soil piled on the uphill side of the trench. Planting trees, like Eucalyptus, near fields was also used to reduce erosion.

The Kamuli district farmers have several means of replenishing nutrients in the soil. To build the two-foot-high mounds in which sweet potatoes are planted, they hoe very deeply and bring nutrients to the surface. Some women plant leguminous shrubs, such as the shrub-like legume,

Sesbania, around their fields. Using weeds to mulch around plants, or leaving crop residue in the fields provides organic material that can be worked in before the next crop is planted. Crop rotation and intercropping with legumes is used to reduce pest problems and fix nitrogen. Because of the number of crops grown and the complexity of their farming systems, crop rotations are not standard. Examples of intercropping patterns are maize intercropped (planted together in the same field) with soybeans, fields beans, or groundnuts (peanuts) and cassava planted with sweet potatoes, beans or groundnuts. Maize, tomatoes, and other vegetables are often intercropped around the perennials bananas, coffee, and cassava.

Some members in each of the groups made and used compost and applied manure to their crop fields. They understood the value of these soil amendments but said the labor involved in digging compost pits with hoes, turning the compost by hand and hauling compost and manure in baskets was not possible to do for all their crop fields.

It was evident to us that knowledge and acceptance of practices to build healthy soils is not a significant barrier for the Kamuli farmer groups. However, money to purchase livestock or labor-saving devices to extend the practices to more fields is, apparently, a big problem. Also, lack of land ownership or long term rental agreements discourages their general use.

Soy Consumption

Soybeans are a huge hit with the Kamuli women farmers. There remain some challenges with production, harvest, cleaning/processing and marketing, but they definitely plan to continue producing soybeans for both household consumption and for sale.
All of the women feel that their families are healthier and they report that their children love soybeans. Soybeans are prepared in several ways, including:

- pounded into flour, then cooked as a sauce (to eat with sweet potatoes or posho - a stiff, corn meal mush that is also a dietary staple)
- roasted (which provides a portable snack to send with the children to school)
- as a hot beverage - soy ‘coffee’
- processed into soy milk
- cooked with water to make porridge,
- mixed with other flours and made into pancakes.

Growing soybeans to make into these food supplements has enriched the diet with high quality soy protein, high energy vegetable oil, and an excellent source of vitamin E.

During the course of our two-year project, farmers have sold whole soybeans - like we do in the U.S. - or have had them milled and sold as full-fat flour. Money from the sale of soybeans has made positive differences in the farmers’ households. They report using funds for school fees for their children, to buy other household staples, and to buy livestock.

Constraints to soy culture and marketing

Doves and weaver birds have been a problem because they eat germinating seedlings. Fortunately, the vulnerable period is only about a week, so the farmer can, as they say, ‘be diligent’ during that short period keeping the birds away. A larger problem is monkeys. They eat

soybeans as the seeds in the pod begin to ripen. Farmers in the Namasagali subdistrict have experienced considerable yield loss to monkeys. The farmers try to scare them away, but they sneak into fields at night. The farmers have sometimes resorted to hiring someone to hunt and kill the monkeys.

We have not measured soybeans yields among our project farms, because we have been in the very early experimental stages of evaluating this crop. The irregularity of field shapes and sizes makes the determination of acreage difficult and soybeans are intercropped in many fields with maize, cassava, or plantain bananas. In one field demonstration conducted during our project, soybean variety Maksoy 1N yielded 15 bu/A. This seems low, but the women have only been growing soybeans for four seasons and there is much yet to learn. At this point, inoculation of the seed with *Rhizobium* bacteria has not been successful. In 2012, too much rain during one season and the delay of the rain in another caused poor yields.

Objective 3: Improve on-farm production and marketing written record keeping

Jenny Thomas participated in the Farmer-to-Farmer project to Uganda with the second group in May, 2011, when Field Record Books for Crops had just been introduced to the women groups and training had been implemented to help participating farmers use this template. There are two growing seasons per year, so twice as much record keeping as we have at home! Since then, our VEDCO partners and subsequent Iowa teams provided ongoing training, oversight and feedback to our collaborating farmers. Our (second) group reviewed each book entry and discussed how the record books were working for the groups. The farmers said the books helped them manage their farms better. A few of the comments they shared were:

- They now know what crops make money.
- They can keep track of when they planted and use this to estimate harvest dates and plan other field activities.
- They can keep track of how much crop was produced, used for food, or used for seed, and written records also help to plan for marketing together as a group.

The farmers repeated similar comments on this final trip. When asked whether they saw value in continuing the record books one group spokesperson simply replied “obviously”. Several groups suggested that we also include livestock pages in the next book. Over the course of the project, they have expanded the number of crops they are recording and have suggested improvements such as combining two seasons per book.

Early in the project, soybean fields were measured in a unit called an emigo. The emigo is a stick cut to approximately 10 feet in length. Fields are measured by turning the emigo end over end all around the field perimeter. The shape (map) of the field is drawn by hand and the measurements are recorded on the map and also on a production page in the record book.

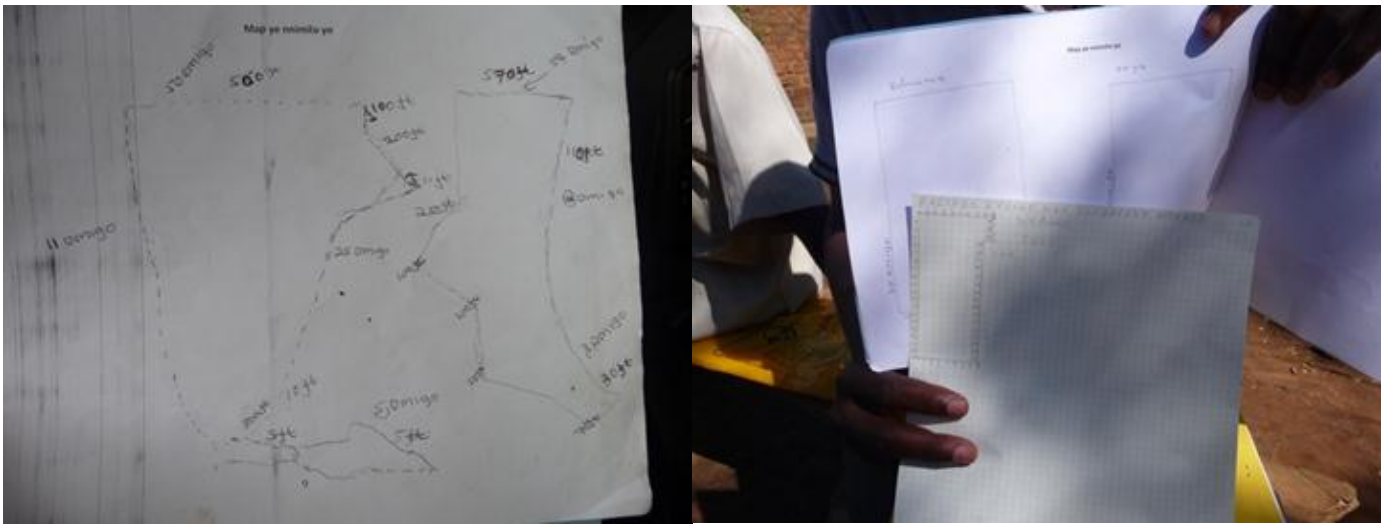
A later team photographed each page of the first books to help understand how the books were being used, to evaluate the completeness of records, and to identify problems with using the template pages. They found that the record books were widely and readily accepted.

Before this final trip, diagrams were developed from the photographed soybean field maps by using the women's hand drawn maps and measurements and converting them to scale on graph paper. Area calculations were attempted so that yields per acre could eventually be determined. The scaled diagrams were brought along and distributed to the participants when we met with the groups.

There were difficulties with calculating field areas based on the measurements collected. They were more often than not, irregularly shaped fields. Also, the measurements weren't always made all around the perimeter of the field. For instance sometimes only two ends or two sides were measured. Things didn't always add up! It appears that graphic math skills among many of the women are at a beginner level or perhaps had gotten "rusty" over the years.

This exercise turned out to be a useful guide to better understand the range of book keeping abilities of individual participants within the groups. Seventy-two percent of participants were successfully using the record books, that is, tracking at least one crop for an entire season. At the other end of the spectrum were participants who brought their book to the meeting, but the name was not printed on the front, and nothing was recorded inside.

We learned that our collaborating women farmers have education levels ranging from no schooling to seven years of primary school. In perspective, their graphic skills are probably right on par for this level of formal schooling.



Here are two really great farm field maps. Based on the irregular field configurations, you can see the challenge the women have in getting accurate field measurements and in drawing maps, especially when viewing the area from the ground. A lot of improvement has been made over the two years of the project. More crops and more fields are being added. More measurements are being recorded accurately. Graph paper pages for field map pages should be helpful by enabling spatial visualization and planning of fields.

Once in Kamuli, with the help of Michael Nabugere, a VEDCO volunteer, we used the scaled drawings to explain to the women the concept of using graph paper to draw maps, and enable them to check to see if their measurements made sense. Maps were scaled one emigo (10 feet) per square to allow use of simple addition of squares.

The next step was to teach farmers to count the squares to determine acreage. For example, 44 squares equals about one-tenth of an acre. Once they know how to determine area, they can start comparing yield information from farm to farm and year to year to improve their production practices. However, determining field areas, yields per land unit, and adding livestock record keeping will likely require additional outside support.

The numbers collected during our training sessions with the farmers groups support that at least 129 out of 180 women in the project have used the Farm Record Books for Crops or 72% participation. Before the project, my understanding is that none had access to record books. Farmers reported that they are now providing neighbors with book pages by having the books photocopied locally.

VEDCO will take over the printing and distribution of the Farm Record Books for 2013 Crops. Farmers will have to pay for the books, which will be a good indicator of how valuable they view record keeping for their farm businesses. In general, participants appeared willing and able to pay the cost of replacement record book pages for the next season. There were group discussions about printing pages locally.
The cost of a semi-permanent cover/record book binder sounded prohibitive for most of the participants. Our team applied remaining project funds to purchase ringed binders that will protect several years of record book pages. The objective of this purchase is to enable multi-year analysis of farm production and marketing outcomes by protecting paper pages.
Other areas of need are determining why some members aren't using the books and seeing if we can brainstorm with the groups to generate solutions to bring participation up over 90%. Perhaps a mentoring program, involving an older child with the project, working with local educators, or some other idea will surface to include current non-participants.

We were pleased to learn that VEDCO is planning to use the record books with farmer groups in other areas of Uganda.

Objective 4: Advance development of female-directed marketing groups/associations for marketing maize and soybeans

Joint marketing in 2012
Group marketing of maize and soybeans was implemented by about half the groups this year. Because the first growing season (February through July) had low and irregular rainfall, crop yields were poor. Maize and soybeans that were produced on many farms were used mostly for family consumption and saved for seed for the second growing season. Farmers who did have some grain to sell often sold small amounts individually. Soybeans grown during the second growing season have recently been harvested, threshed and need to be cleaned before marketing can begin.

The range of quantities sold and the range of price for the groups who did group marketing in 2012 were:

	Maize	Soybeans
Weight sold (Kg)	1500 Kg/group – 8000 Kg/group	700 Kg/group – 4000 Kg/group
Price (Ush/Kg)	550 Ush/Kg – 1500 Ush/Kg	1200 Ush/Kg – 1500 Ush/Kg

Scales and calibrating weight

Early in the project, the women farmers had identified issues with their current marketing options. A lot of the grain, maize in particular, was sold to a middle man, who arrived on a bicycle, weighed the bags of grain with his scale and set the price he was willing to pay. The women were suspicious that the buyer was paying them for less weight than they provided, was giving them a lower price than what the grain was worth on the farm, and was pocketing any quality premiums.

As a result, there was anecdotal evidence provided from one of our ISU participants who understood the local language and overheard the farmers talking among themselves. She reported to us that some women were adding weight to their bags in the form of dirt, rocks, and other debris, leading to a downward spiral of quality, lower grain prices and a lower weight that the middle man was willing to acknowledge and reward for on-farm purchases.

As the women have worked toward improving grain quality with bicycle shelling and drying grain on tarps and the project provided each group with a 100 kg hanging scale to weigh and fairly compensate group participants for their joint sales. On this trip, time was allotted to explain that a standard 10 kg weight had been purchased and will be available through VEDCO to calibrate their scale periodically. As calibration was explained and demonstrated we conversed with the women as to how the scale was being used. We were pleased to hear about the market power this simple apparatus has provided!

All groups saw value added to grain sales on the farm as a result of the project. Now that they have their own project supplied scale, their grain is sold according to the group's scale, not the scale provided by the middleman. As we worked our way through the groups we came to realize the women asserted their way through resistance from the middleman to negotiate the same price per bag for a higher weight, and some groups commented that they were able to command the price of high quality maize as well, based on a now established history of selling consistently good quality.

Project conclusions and recommendations

Over the short period of the project, soybeans have shown signs of being an important cash crop for the women farmers. They use the money to buy extra food, pay school fees, and build a savings. Soybeans also are valued as a delicious source of much needed protein and fat in the family's diet.

Although the winnowing process has yet to be resolved, the stage is set for progress in the future. During this visit we learned more about manufacturing capabilities for grain cleaners, available materials and costs, design parameters and a possible manufacturer. All this makes it easier to design a cleaner appropriate for the Kamuli farmers.

The use of their own, calibrated scales has given the women the confidence to work out more favorable marketing agreements. This, coupled with the knowledge that their grain is of higher quality than in the past due to the use of tarpaulins and corn shellers, significantly improves the women's negotiating skills.

Barriers to healthier soils seems to be lack of long term land tenure arrangements and money to purchase the means and material (animals to produce manure, and labor saving tools) to extend soil building measures to more fields.

Recommendations for future work

- Document cropping patterns and soil improvement practices
- Collect soil samples for testing
- Survey land tenure – ownership or rental or other arrangements
- Work with Iowa State University grain cleaner experts and engineering students to develop a seed cleaner
- Evaluate current methods of assessing production level and production efficiency within and among the groups. Continue to work on accurately assessing yields in bushels per acre, or determine an easier standard or method to assess crop production level and production efficiency.
- Determine why some members aren't participating in using the record books provided, and brainstorm how the level of participation might be increased.
- Develop a better sense of how men's farming and marketing decisions impact the decisions women make in their farm business practices
- Integrate a livestock (chickens in particular) component into the research

Each of the ten groups that Farmer to Farmer has been working with the past two years has claimed its own identity with wonderful and inspirational names. It is only now, at the end of our project, that we have fully understood the English translations of their Lusoga group names.

Ten women's farmer groups in Namasagali and Butansi subdistricts, Kamuli District, Uganda

Lusoga Group Name	English Translation
Tibikoma	It never ends.
Kyebajjatobona (Bakusekamajja)	Some are working, others are just looking. From a proverb, "If some work and some look on, then when it is time to eat, some will eat and others will still just look on."
Twekembe	Let's get together for something good.
Kamu kamu	One by one.
Babigumira (Kabaganda)	(We) can persevere in any situation.
Butsani HIV/AIDS	Butansi subdistrict HIV/AIDS.
Kasombeleza	Collecting individuals into something big.
Baligema kumumwa	Express awe by touching ones mouth.
Agiliawamu	We are together.
Akuwa olukaba	Potato vine. From a proverb, "If you give me a (sweet) potato vine, it is better than giving me a (sweet) potato."

Although the project is ending, these women will continue to meet and work together to improve the livelihood of their families and communities. We are encouraged by their entrepreneurial spirit and determination. It is our hope that future funding will allow Iowa State University to continue to work with the non-profit VEDCO and that the VEDCO staff will take what the project has learned and continue to apply it in Kamuli and elsewhere in Uganda.

IOWA STATE UNIVERSITY
University Extension

VEDCO/USAID FARMER TO FARMER

PROJECT NAME: INCREASING THE COMPETITIVNESS OF UGANDAN WOMEN FARMERS IN THE MARKET PLACE.

APRIL 2013
Compiled by the Monitoring and Evaluation Department & Project Staff

I. EXECUTIVE SUMMARY

VEDCO in partnership with IOWA state University Global extension department reached an agreement to implement a 1 years project (Jan 2011- Dec 2011) but it was extended to April 2013 in the communities of Butansi and Namasagali Sub counties, Kamuli District. The project is Agric Trade based and is intended to promote sustainable livelihoods of small landholder women farmers by strengthening their capacity for market oriented farming and establishing associations of such farmers to share knowledge, experience and market bases. The Niche project intends to outreach more 100 farmers organized in 10 farmer groups in addition to the 80 farmers in the first phase of implementation which are also hoped to later form viable marketing associations to be able to achieve the project objectives.

At the inception of the project it was pertinent to establish the current status of households, farmer groups and communities and their farming practices to enable the project efforts be evaluated after implementation. This would also work as a decision making report as far as implementation of the project is concerned. In regard to establishing the above, an evaluation survey was conducted in the communities of Butansi and Namasagali sub counties.

All 138 farmers, ((119)86.2% females and (19)13.8% males directly outreached by the program were sampled for the study thus 17 (17.2%) males, 82 (82.8%) females came from Butansi and 2 (5.1%) males, 37 (94.9%) females from Namasagali sub counties. The data was analyzed using SPSS software and presented as frequencies and percentages in tables, graphs and charts.

Thus the farmers (both new and old) adopted most of the recommended practices through their farmer groups. They have also strengthened their farmer groups through the support inform of inputs, trainings they have received from the project to enable them benefit from their agriculture. Farmer groups which were formed and well managed, have efficiently handled their post harvesting, marketing and record keeping. The project has achieved its major focus of greatly contributing to improved livelihoods of farmers in the intervention areas through increasing the competitiveness of women farmers in the market place.

INTRODUCTION

Background

VEDCO in partnership with Iowa State University College of Agriculture implemented a one-year project in the two communities of Butansi and Namasagali sub-counties in Kamuli district. The increasing the competitiveness of Ugandan Women Farmers in the market place commenced in Jan 2011 and was extended to April 2013.

The project was intended to promote sustainable livelihoods of small landholder women farmers by strengthening their capacity for market oriented farming and establishing associations of such farmers to share knowledge, experience and market bases. The second phase was focusing on mainly providing education about seed quality and encouraging adoption of on- farm evaluation of open pollinated maize and soya bean seed before planting, improve on farm production and marketing record keeping and lastly advance development of female- directed marketing groups for marketing maize and soybeans. This was to be done through training them in seed germination testing and evaluation, training sessions on the use of the new 2012 Farm Record book for crops and investigating options for market associations through providing them with inputs and linking them to buyers.

Project Outreach

The project was intended to outreach 180 farmers organized in 18 groups in the communities of Butansi and Namasagali. The project was implemented in five parishes of Namasagali, Bwiiza in Namasagali Sub County while in Butansi Sub County; the project was in Naluwoli, Bugeywa and Butansi parishes.

Project Major Objectives

The project was focused on four major objectives of operation which included;

- Improve maize grain quality by implementing better post-harvest handling strategies
- Increase soybean production among women farmers in the Kamuli District
- Improve on-farm production and marketing and record keeping.
- Develop pilot joint maize marketing effort among farm women's groups.

Before the start of the second year of the project, there was a baseline survey on the new farmers on the project which was conducted to establish the current status and practices of individual farmers and their groups. This formed a basis for monitoring the progress of the project in the set targets as well as reviews the planning to ensure positive outcomes.

Objectives of the Evaluation

The general objective of the evaluation was to establish their household status (project impact) and level of adoption of the practices which the project has been promoting to the various farmer groups.

Specific objectives of the evaluation are;

- To know the socio-demographic characteristics of the farmers
- To establish the farming practices of the farmers.
- To know the farmer's marketing behaviors and how they have accessed market information.
- To know the farmers' Post Harvest Handling practices adopted.
- To establish farmers' level of keeping written farm records.
- To know whether the project has caused any impact in their households.

SURVEY METHODOLOGY

Data collection tools

The evaluation data was collected using structured questionnaires comprising of questions on socio – demographic information; current farming practices, marketing behavior, market Information access, post- harvest handling practices, written record keeping of farm activities, access to extension services and project impact. The household interviews were conducted by 8 research assistants who were trained and facilitated. Each interview would take an average of 25 minutes. The survey tool was then pre-tested by the research assistants to find out whether the tool was achieving the intended purpose so that accuracy and efficiency are achieved during the actual data collection.

Data management, analysis and Presentation

After data collection, the questionnaires were checked for completeness to ensure accuracy of the data collected. The data was coded and entered into computer software- SPSS. After entry, the data was analyzed still using Statistical Package for Social Scientists (SPSS) to generate simple frequency tables, percentages, charts, descriptive statistics and cross tabulations were used to present the data findings as shown in subsequent pages.

THE FINDINGS OF THE STUDY

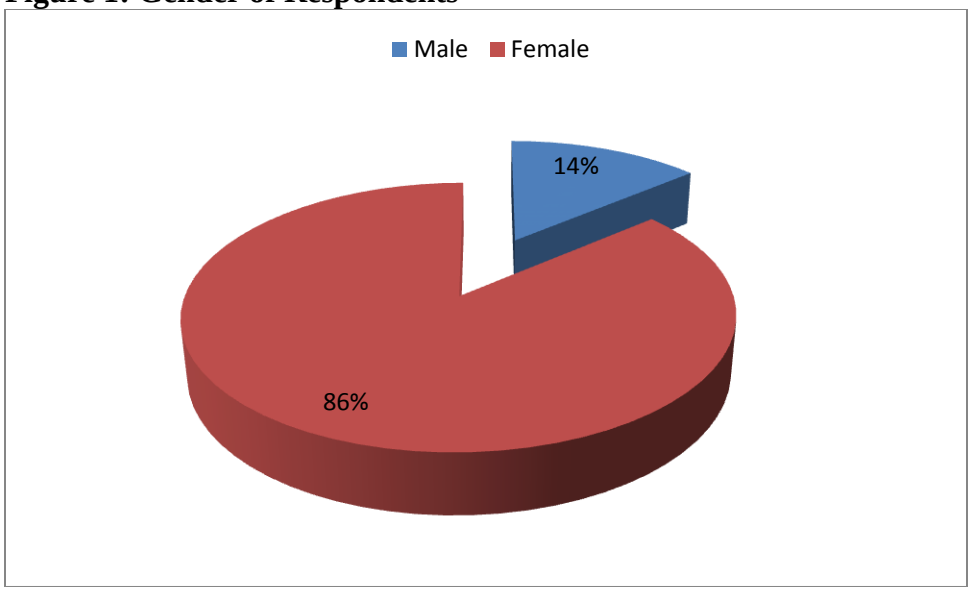
Social demographic characteristic of the Respondents.

The study was carried out in the two sub counties of Butansi and Namasagali, Kamuli District. Out of the 138 respondents, 99 were from Butansi and the rest (39) were from Namasagali Sub County.

Gender of respondent

The pie-chart below shows the percentage distribution of respondents by gender from the two sub counties of Namasagali and Butansi where the survey was conducted.

Figure 1: Gender of Respondents



From the pie chart above, the majority of the respondents were female, 119 (86%) whereas 19 (13.8%) of respondents were males.

The study went ahead to establish the percentage of the age distribution of households in both sub counties. According to the findings, it was established that majority of the households were between 50-59(23.9%), and very few households surveyed were between 80-89, (1.4%) as shown in the details below.

Table 1: Age Distribution of Respondents

Age Distribution	Frequency	Percent
20-29	23	16.7
30-39	31	22.5
40-49	30	21.7
50-59	33	23.9
60-69	14	10.1
70-79	5	3.6
80-89	2	1.4
Total	***138***	***100***

Type of Farmer Group

The project evaluation survey went ahead to obtain information concerning the type of farmer group each project beneficiary belonged to. The findings from the survey revealed that majority of the farmers belonged to mixed groups 100(72.5%) and those who belonged to women groups were 38 (27.5%). These are indicated in the frequency table below;

Table 2: Type of Farmer Group

Type	Frequency	Percent	
Women	*38*	*27.5*	
Mixed	*100*	*72.5*	
Total	*N=138*	*100*	

Respondents Education level

The findings from respondents' education level revealed that 85 of respondents had attained primary education (61.6%), 27 attained secondary education (19.6%), 2 had attained tertiary education (1.4%), and 24(17.4%) had not gone to school at al. The frequency below illustrates the details.

Table 3: Respondents education level

Education level	Frequency	Percentage
Primary	85	61.6
Secondary	27	19.6
Tertiary	2	1.4
None	24	17.4
Total	***138***	***100***

Respondents Relationship to Household Head

The survey elicited information on the relationship of the different households to their household heads. The findings revealed that 86 (62.3%) respondents were spouses, 1 respondent was son/daughter, self were 49 (35.5%) and the rest had no relation at all, 2(1.4%). The details are shown in the frequency table below.

Table 4: Relation to Household Head

Relationship to HHd head	Frequency	Percent
Spouse	86	62.3
Son/Daughter	1	0.7
Self	49	35.5
Others	2	1.4
Total	***138***	***100***

Household agricultural implements

All the 138 surveyed households had at least a hoe. Over 80 households were in a possession of the mobile phones. This conclusively indicated that these 80 households would easily access market information directly via SMS in case of any. The table below shows summary of agricultural implement possessions by the households.

Table 5: Household Agricultural Implements

Agriculture Implements	N	Mean
Number of Hoes	557	4.04
Number of Pangas	135	0.98
Number of Rakes	14	0.1
Number of Spades	53	0.38
Number of Axes	108	0.79
Number of Slashers	98	0.71
Number of Sickles	23	0.17
Number of Wheelbarrows	15	0.11
Number of ox-plough	8	0.06
Number of mobile phones	102	0.74

Bicycle ownership

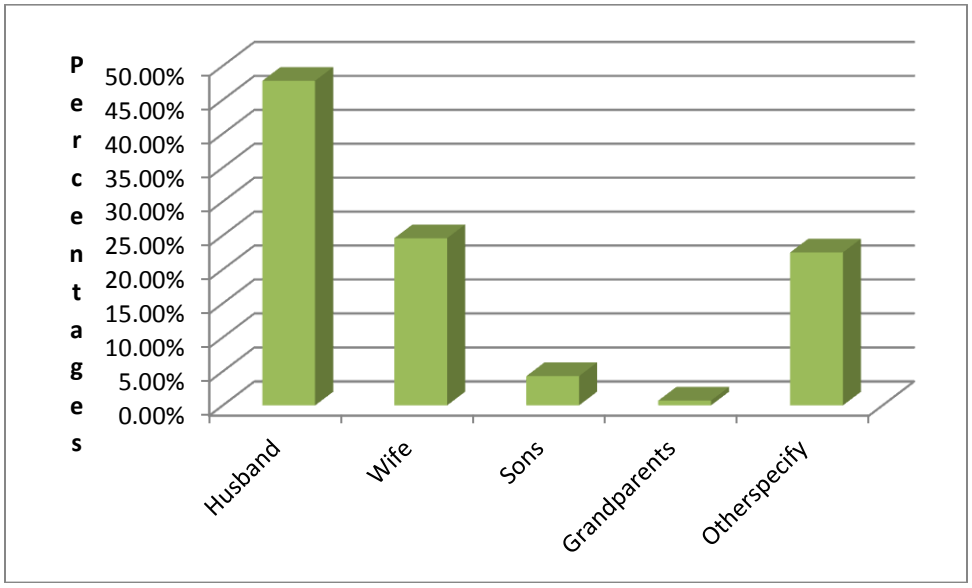
The survey went to find out whether the household owned a bicycle. 116 households (84.1%) owned a bicycle and only 22 households (15.9%) do not own a bicycle. Of the 116 HHs which owned a bicycle, 50.7 percent (70) owned bicycle individually whereas 34.8 percent (48) respondents revealed that the bicycle is jointly owned by the household. The rest of the respondents did not own a bicycle at all (14.5%). Those who do not own bicycles mainly access them mainly on request; others pay fees and even trade labor.

Table 6: Bicycle Ownership

Ownership	Frequency	Percentage
Owned by individual	70	50.7
Jointly owned	48	34.8
Non Applicable	20	14.5
Total	**138**	**100**

The majority of the bicycles (66)47.8% are owned by husbands, followed by 34 (24.6%) owned by women, sons owned 6(4.3%), 1(0.7%) by grandparents and the rest of the family members owned 31 (22.5%) respectively.

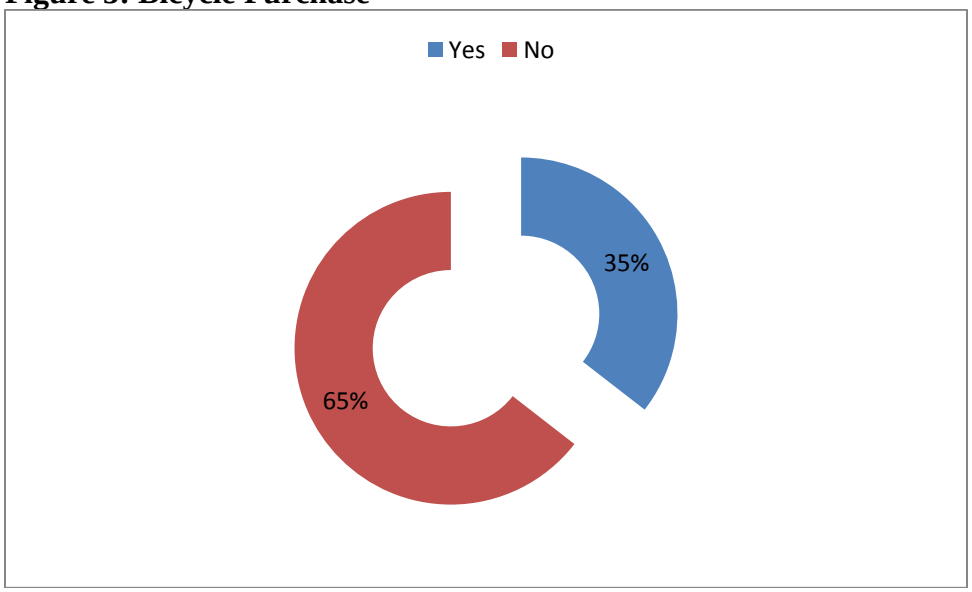
Figure 2: Individual Ownership of Bicycle



Bicycle Purchase by Group

Majority of the households, 89 (64.5%) surveyed responded that their respective groups have not purchased a bicycle dedicated to the maize Sheller with cost share funds from the project, only 49 (35.5%) households belonging to different farmer groups had bought bicycles dedicated to the maize Sheller as shown in the figure below.

Figure 3: Bicycle Purchase



A majority of the farmers who have not purchased the bicycles dedicated to the maize shellers had collected a maximum of Shs. 100,000 from their respective members towards the purchase of the bicycles, and those groups with less than Shs. 100,000 hope to complete their savings needed within a period of one month.

Land ownership, Usage and production

The evaluation survey collected information on land ownership, acreages used in farming and if the land used for production is borrowed, hired or rented for production, changes in the land farmed/hired ever since farmers started growing soy bean.

On average, a household has 4.899 acres of land available for farming and other activities, and on average 2.35 acres are only used for agricultural purposes in most of the households. Majority of the households do not borrow or hire land, 70 (50.7%), only 68 (49.2%) households do borrow their land to other households and on average of 1 acre is borrowed/hired/rented per season by most of the households surveyed.

82(59.4%) farmers who participated in the exercise confessed that their amounts of land had changed greatly on average by 1.41 acres ever since they began growing soybean and only 56 (40.6%) farmers who were mainly the new farmers on the project said that the amounts of their land had not changed greatly but they hoped they will change this season.

Those who have tried to borrow/hire their land to other households said that there was no significant changes in the amounts of their land since majority have been farming on their own lands. The few who tried to borrow 25(18.1%), the e amounts of their land changed on the average of 1.82 acres.

Farming Practices

The survey included questions to establish whether farmers were involved in cultivation of either maize or soya bean both seasons by looking at the different sources of planting materials, size of plots planted, production in Kilograms, whether sold or not and the source of labor as shown in the discussions below.

Source of Maize Planting Materials

The majority of the farmers 88 (63.8%) who planted maize in the first season used the seed they had saved from the previous season which indicated that farmers heeded to the advice of the extension workers during the trainings on seed which were conducted, 20 (14.5%) bought seed from the suppliers, 17(12.3%) got their seed from VEDCO, 7 (5.1%) farmers got the seed from NAADS, 1 (0.7%) farmer got seed PLAN and the rest 5 (3.6%) could not specify the sources for their seed they planted last season. The table below shows details of farmer seed source.

Table 7: Source of Maize Planting Materials

Source	Frequency	Percent
VEDCO	17	12.3
NAADS	7	5.1
PLAN	1	0.7
Buying from Suppliers	20	14.5
Saving Seed	88	63.8
Others	5	3.6
TOTAL	138	100

For soybean in the first season, the many farmers,105 (76.1%), got their seed from VEDCO, 22 (15.9%) farmers used seed saved from the previous season, 2 (1.4%) farmers bought from suppliers, 1 farmer got the seed from NAADS and 8 (5.8%) farmers received seed from other sources they could not specify.

Table 8: Source of Soybean Planting Materials

Source	Frequency	Percent
VEDCO	105	76.1
NAADS	1	0.7
Buying from Suppliers	2	1.4
Saving Seed	22	15.9
Others	8	5.8
TOTAL	***138***	***100***

Agricultural Production among Households

During the evaluation survey, there was a need to establish the average acreage of land farmers had under production for both crops in the first season. Thus on average, 1.38 acres and 0.61 acres of maize and soybean, respectively, were planted in the first season. On average, farmers also managed to produce 645.04 Kgs and 72.69 Kgs of maize and soybean, respectively, in the first season. The results are elaborated in the table below.

Table 9: Agricultural Production and Acreage in the First Season

Crops	*Mean acreage*	*Mean yield (Kgs)*
Maize	1.38	645.04
Soybean	0.61	72.69

In the first season, many maize farmers, 104 (75.4%) surveyed, sold their produce and only 34 (24.6%) did not sell their produce in the first season.

For soybean, majority of the farmers 70 (50.7%) did not sell their soybeans, whereas only 68 (49.3%) managed to sell their produce to the different buyers.

The survey also went ahead to find out the main sources of labor for both crops. It was revealed that the main source of labor for maize and soybean was mainly the family (52.9% and 53.6%), respectively, and very few farmers used hired labor because of the high costs involved.

In the second season, the main source of maize seed was still from seed saved from the previous season as shown in the table below.

Table 10: Source of Maize Planting Materials in Second Season

Source	Frequency	Percent
VEDCO	3	2.2
SELF HELP AFRICA	14	10.1
Buying from suppliers	5	5.8
Saved seed	92	66.7
Others	20	14.5
TOTAL	***138***	***100***

For soybean in the second planting season, the main source of planting materials was still the seed saved from the previous season as shown below.

Table 11: Source of Soybean Planting Materials in Second Season

Source	Frequency	Percent
VEDCO	29	21
Buying from suppliers	1	0.7
Saved seed	67	48.6
Others	41	29.7
TOTAL	***138***	***100***

On the side of acreages planted and productions realized in the second planting season for both crops, on average, 1.23 acres and 0.5 acres of maize and soy bean respectively were planted, the realizing 423.17Kgs and 63.22Kgs of maize and soy bean respectively as summarized below.

Table 12: Agricultural Production and Acreage in the Second Season

Crops	*Mean acreage*	*Mean yield (Kgs)*
Maize	1.23	423.17
Soybean	0.50	63.22

It was also discovered that in the second season, 69 (50%) and 36 (26.2%) did sell their maize and soybean, respectively, while 69 (50%) and 102 (73.9%) did not sell their maize and soybean, respectively, citing different reasons like lack of market to offer good prices, low yields as a result of the bad weather, and other farmers kept the soybeans mainly for household consumption.

The main source of labor for both crops was still the family that is (47.1% and 39.1%), respectively, for maize and soybean in the second season. Some households could use both hired and family in case they could afford the costs involved.

Intercropping

One hundred two (102) farmers reported to have intercropped soybean with different types of crops whereas 36 (26.1%) farmer s had not practiced intercropping. The most common crops which were intercropped with soy bean included; maize, ground nuts, beans, cassava and cassava.

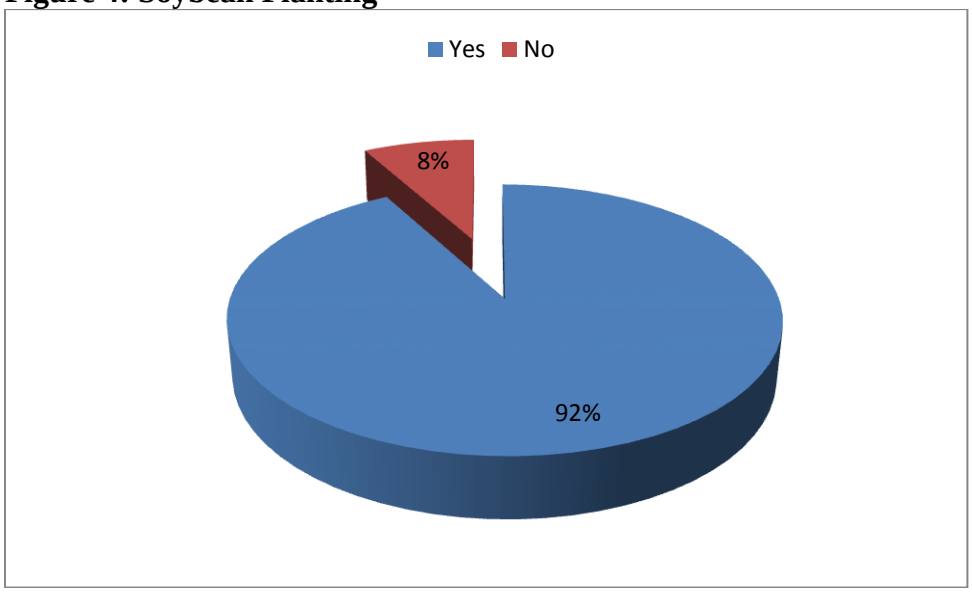
Soybean Consumption

Much of the soybean harvested by the different families in the different areas of operation is being consumed by mainly children as porridge, adults and other family members as snacks and to prepare source to escort meals. It was also discovered that on average, family members often consume the soybean twice a day, though some families go beyond the two times depending on the need.

Soybean planting in 2013

Majority of the farmers who participated in the survey, 127 (92%) were planning to plant soybean in 2013 and they prepared their fields for the first planting season. Only 11 (8%) farmers of the surveyed were not planning to plant soybean in 2013 as shown in the figure below.

Figure 4: Soybean Planting



On average, they plan to plant 0.66 acres of land for soybean this year using mainly the seed saved from the previous season. It was also discovered that many farmers performed germination tests on different crops in the first and second growing seasons of 2012 which included; maize, beans and soybeans.

Agricultural Trade, Planning and Marketing

This section mainly looks at collective/group production planning, individual marketing of maize and soybean in the first and second season, participation in collective marketing in both seasons, costs incurred, bulking and selling, quality of both maize and soybean and where they sold their produce both individually and collectively.

Individual Marketing.

On average, maize farmers who participated in individual marketing planted 1.34 acres realizing production of 620.62 Kgs on average in the first season. On average, they managed to sell 431.01Kgs at an estimated cost per kilogram of Shs.366 realizing estimated earnings of Shs. 20,3170.

For soybean farmers who participated in individual marketing, on average they managed to plant 0.49 acres realizing a production of 65.33Kgs on average in the first season. They also managed to sell on average 24.87Kgs at an estimated cost of Shs.518 realizing estimated earnings of Shs.29,837.

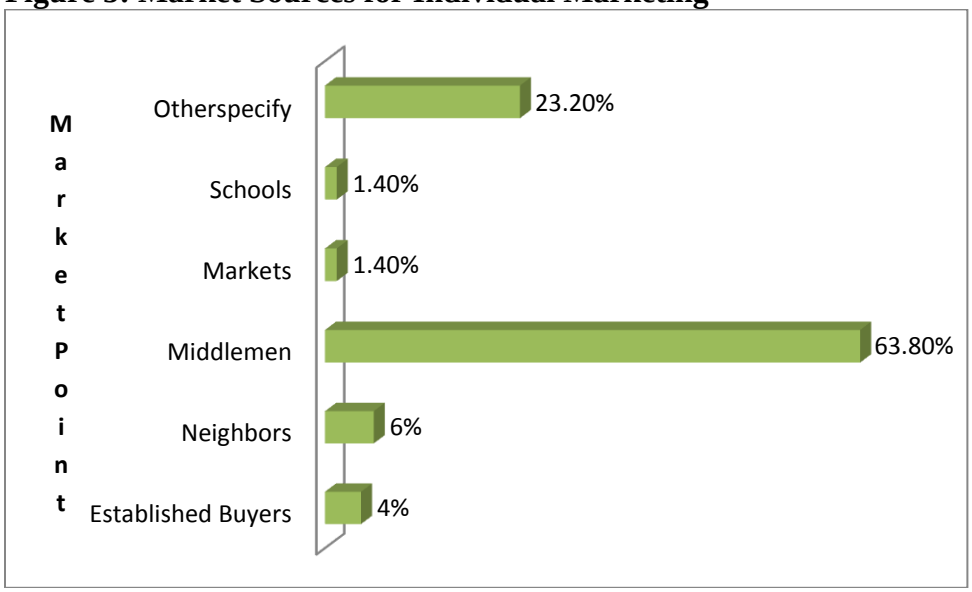
Table 13: Individual Acreage, Production and Sales

Crops	Mean Acreage	Average production	Average Kgs sold	Average cost/kg	Average earnings
Maize	1.34	620.62	431.10	366	203170
Soybean	0.49	65.33	24.87	518	29837

Market Sources for Individual Marketing

The survey also discovered that majority of the farmers, 88(63.8%) still sell their produce individually to middlemen, 32 (23.2%) to other buyers in the community, 8 (5.8%) sold to their neighbors, 6(4.3%) to established buyers and 4 (2.8%) sold to both schools and established markets as shown in the figure below.

Figure 5: Market Sources for Individual Marketing



Collective Production Planning and Marketing

A good number of farmers surveyed 83(60.1%) participated in collective production planning in their respective groups whereas only 55 (39.9%) did not participate in collective production planning in both seasons in 2012 especially among the new projects on the project.

In the first growing season, many farmers 106 (76.8%) did not participate in collective marketing citing reasons like poor yields as a result of the bad weather, pests and diseases and some new groups on the project had not started with practice of collective marketing with their members. It was only 32 (23.2%) farmers who managed to participate in collective marketing.

In the second growing season, 105 (76.1%) farmers did not participate in collective marketing citing reasons like low produce, need to cater for household expenses, whereas only 33 (23.9%) participated in the marketing process as a group which shows 1% increment from last season.

Collective Acreage, Production and Sales

The mean acreages for both maize and soy beans planted first season collectively were 0.63 acres and 0.32 acres respectively. Average quantities produced were 360.7Kgs and 30.7Kgs, respectively, average quantities sold within the group for both maize and soybean - 103.12Kgs and 10.7Kgs, respectively. The average price of maize and soybean sold within the group was at Shs125 and Shs 134, respectively.

Table 14: Collective Acreages, Production and Sales

Crops	Mean Acreage	Average production	Average Kgs sold	Average cost/kg
Maize	0.63	360.7	103.12	125
Soybean	0.32	30.7	10.7	134

Farmers who participated in collective marketing sold their produce to mainly(17) middlemen, (10) established buyers like Agridec Premier Seed Uganda Limited through VEDCO which bought soybean from the farmers at relatively higher price compared to schools (1), neighbors(3), markets (1) and the rest (106) sold to other buyers on the market.

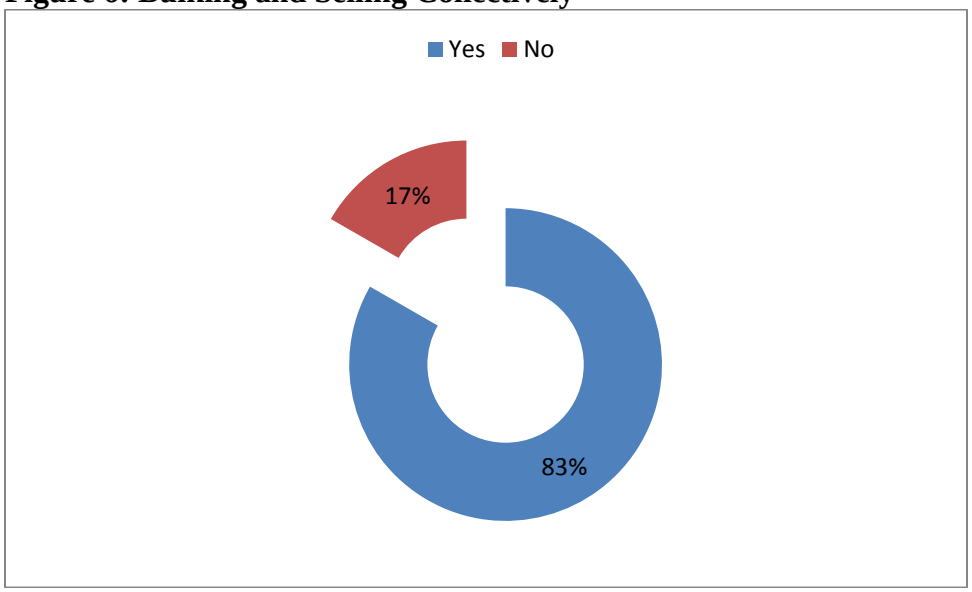
The farmers who participated in joint marketing of their maize and soybeans, majority of the farmers 100(72.5%) did not incur any costs, those who incurred costs were 38 (27.5%) as a result of joint marketing of the produce, the cost was shs151,100 on mainly payment for bags, truck rental and hired labor.

The survey also sought to find out if farmers made more money from joint marketing than individual marketing and what they used the money for. Thus, many farmers responded that they used the money to prepare their fields, cater for household expenditures and purchase agricultural inputs for the next planting season.

Bulking and Selling Collectively

Majority of the farmers 115 (83.3%) interviewed wanted to bulk and sell collectively and only 23 (16.7%) did not want to bulk and sell collectively. Those who wanted to bulk and sell collectively cited different benefits associated with the practice which included; majorly high prices paid for the produce sold, high bargaining power between them and the buyers.

Figure 6: Bulking and Selling Collectively



Rank of Maize and Soybean Quality

The rank of maize quality was generally good 91 (65.9%) as revealed by the majority of the farmers, thanks to the trainings on seed quality they have received from the project, 32 (23.2%) farmers, the quality was fair and only 15 (10.9%), the quality was poor as shown in the table below.

Table 15: Rank of Maize Quality

Rank	Frequency	Percent
Good	91	65.9
Fair	32	23.2
Poor	15	10.9
Total	***138***	***100***

The main reasons cited for the above ranks for maize quality were mainly the trainings on seed quality they have received from the project, the good post-harvest handling practices they have adopted from the project.

Rank of Soybean Quality

The rank of soybean quality was also largely good 84 (60.9%) as revealed by most of the farmers who had planted the crop, poor quality 20 (18.1%),fair quality were 20(14.5%) and the rest 9(6.5%) were not bothered about the quality of soy bean.

Table16: Rank of Soybean Quality

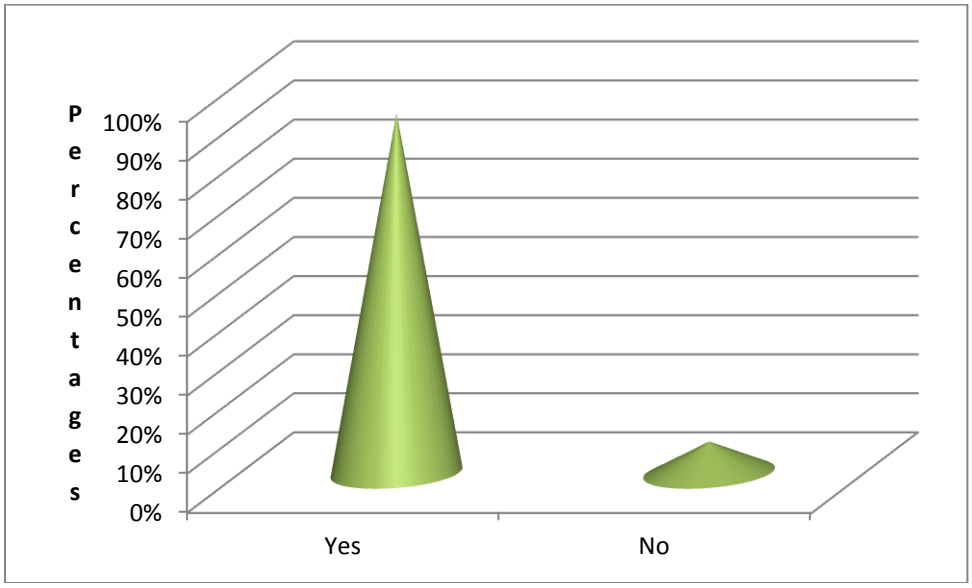
Rank	Frequency	Percent
Good	84	60.9
Fair	20	14.5
Poor	25	18.1
Not applicable	9	6.5%
Total	***138***	***100***

This good quality was also attributed to the several trainings on seed quality, post-harvest handling practices to be employed, clean and high quality seed they were receiving from the project.

Written Record Keeping of Farm Produce and Sales

Majority of the households 127(92%) interviewed revealed that they did keep written records of the farm produce and sales before in the first growing season, only 8 farmers (8%) responded that they were yet to keep written records on their farm produce and sales especially the new project beneficiaries.

Figure 7: Record Keeping of Farm Produce and Sales



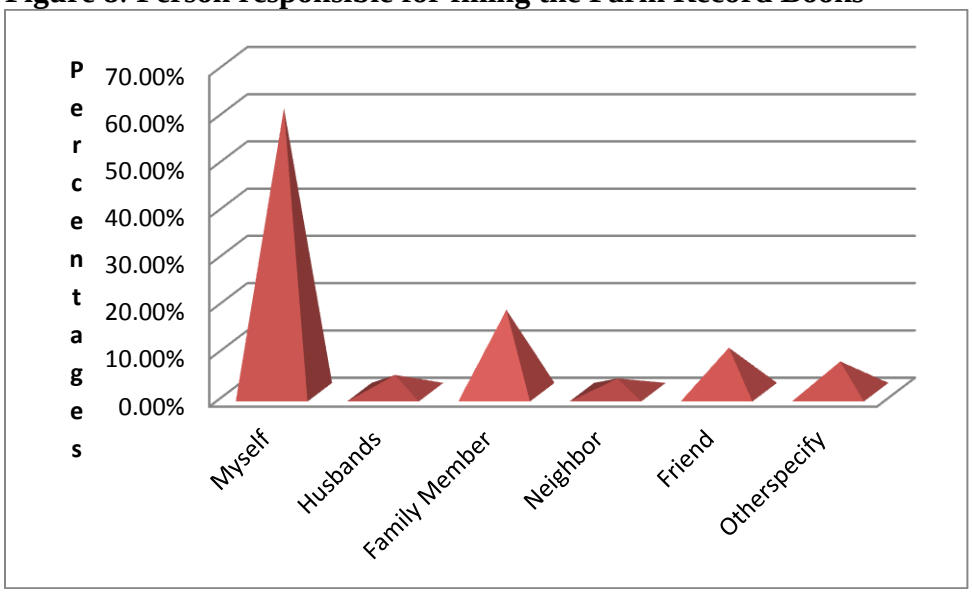
In the second growing season in 2012, 122 (88.4%) kept written records on their produce and sales and only 16 (11.6%) did not keep records of their farm produce and sales citing reasons like they missed trainings on how to fill the books but they promised to consult their fellow group members for assistance.

The most common crops which were kept in the Farm record books in the second growing season included; soy bean, maize and beans. The other crops which were also recorded in the Farm books in the second season included; ground nuts, sweet potatoes, millet, sim- sim, bananas and vegetables.

3.4.1: Person responsible for filling the Farm Record Books.

Most of the Farm record books were filled by farmers themselves (60.1%), family members (17.4%), friends (9.4%), other people like cousins, nephews (6.5%), husbands (3.6%) and neighbors (2.9%) as shown in the figure below.

Figure 8: **Person responsible for filling the Farm Record Books**



Majority of the farmers 132 (95.7%) who participated in the survey did not make copies of the record book or pages and shared them with any friend/neighbors who were not on the Farmer to Farmer project, only 6 (4.3%) farmers managed to share with their friend and neighbors not benefitting from the project.

Many farmers used the information from their record books to determine the level of yields realized from the garden, size of plot to be planted, determine costs, sales and profits earned, planting dates, track the period for harvesting, determine the measurements of the their plots and use the information to improve on the quality of the seeds planted.

One hundred thirty two (132) 95.7% farmers want to continue using the record book in their agricultural activities and only (06) 4.3% farmers were not willing to continue using the farm record books.

Farmers who want to continue using the farm record books were also willing to pay for the book in case there was need, thus, on average; they are willing to pay Shs. 1000 for each copy of the Farm record book.

They also said that the farm record book could be made more useful to them by including more pages for other crops, be made for two growing seasons; include provisions for calculating profits and losses and inputs invested in the garden.

Farmers requested for additional support and refresher trainings on mainly on how to fill the books, drawing sketch maps of their plots because it is still a big challenge.

ACCESS TO MARKET INFORMATION

One hundred nineteen farmers (86.2%) accessed market information on the prevailing market prices last year, whereas 19 (13.8%) farmers were not able to access market information last year as revealed by the results from the survey.

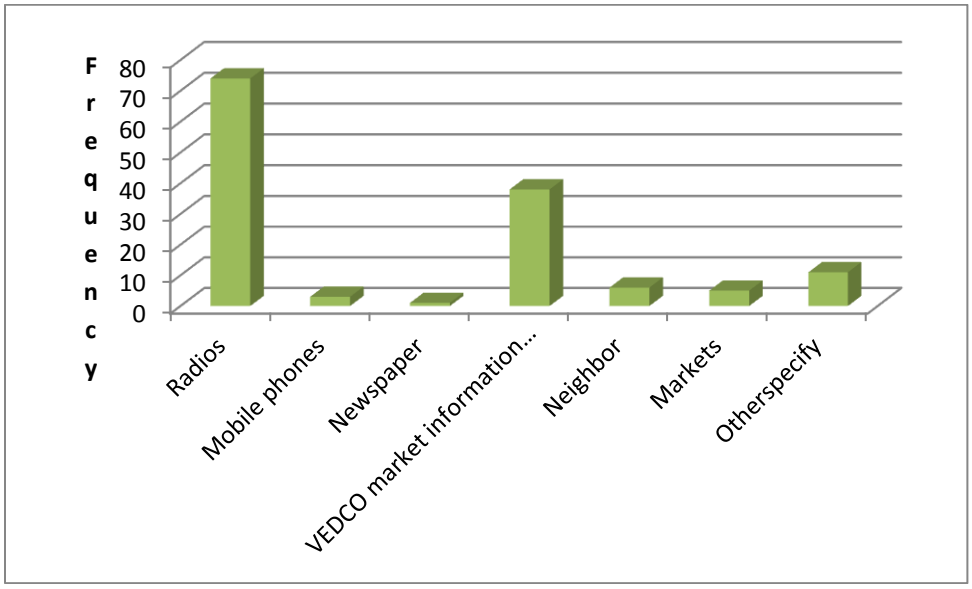
Many farmers accessed market information mainly on daily (28.3%) and weekly (27.5%) basis. The rest of the farmers accessed the market information twice a month (11.6%), monthly (8%), when VEDCO staff visits (10.1%), in more than a month (2.2%) and others (12.3%) as shown in the table below.

Table 17: Access to Market Information

Duration	Frequency	Percent
Daily	39	28.3
Weekly	38	27.5
Twice a month	16	11.6
Monthly	11	8
In more than 1 month	14	2.2
When VEDCO staff visits	14	10.1
Other specify	17	12.3
Total	***138***	***100***

Respondents also revealed that they accessed the market through different ways that is, 74 farmers mainly accessed the information from their radios at home, 38 farmers from VEDCO market information bulletins, 6 farmers their neighbors, 5 farmers from the different markets, 3 farmers using their mobile phones, 1 farmer from the newspapers and the rest from others, 11 farmers received from specified sources like NAADS and Africa 2000 Network as shown in the figure below.

Figure 9: Modes of Accessing Market Information



POST HARVEST HANDLING TECHNOLOGIES

A big number of farmers interviewed had received many training on post- harvest handling practices for both maize and soy bean. These ranged from drying, sorting and grading as revealed by the farmers during the survey.

Post-Harvest Handling Practices Used for Maize and Soybean

Majority of the farmers 124(89.9%) interviewed dried their produce and grains on tarpaulins, 11 (8%) farmers on bare ground, 2 (1.4%) farmers on iron sheets and 1 (0.7%) on cemented floors as shown in the table below..

Table 18: Post Harvest Handling Practices used on Maize and Soybean

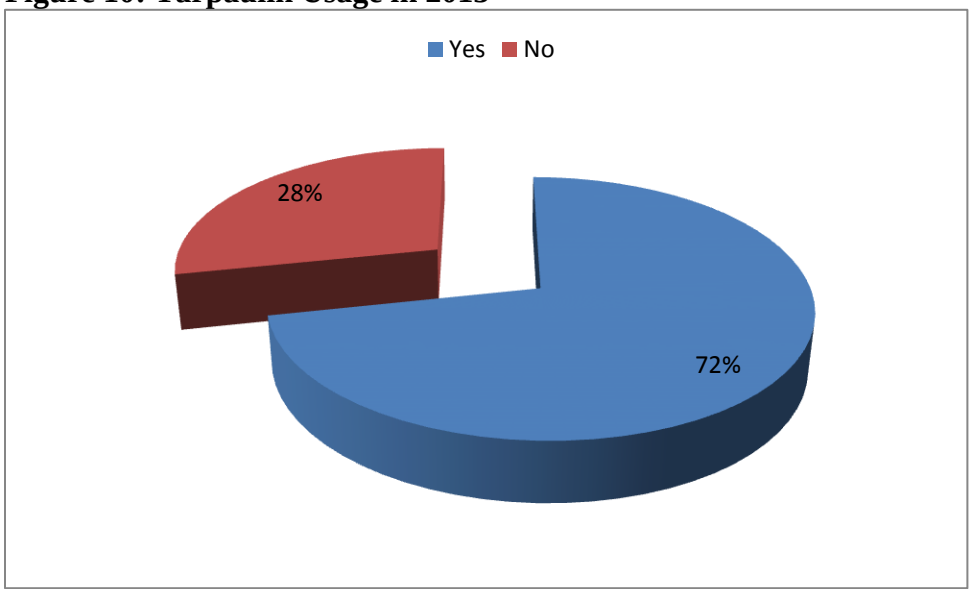
Practice	Frequency	Percent
Tarpaulins	124	89.9
Bare ground	11	8
Cemented floor	1	0.7
Iron sheet	2	1.4
Total	***138***	***100***

The survey also wanted to look at what crops were mainly dried on tarpaulins in the different growing seasons and these included; soybean, maize, beans, ground nuts, coffee, sim-sim, millet and grain amaranth.

Fifty four (54) farmers confessed to have used the tarpaulins for other purposes while 84 farmers used the tarpaulins only for drying their grain and produce. Other purposes they used the tarpaulins included; during burials, shelter and as mats for sitting on.

Majority of the farmers 99 (71.7%) were planning to use another tarpaulin in 2013, and 39 (28.3%) farmers were not planning to use another tarpaulin in 2013, since the tarpaulins from the project where still in good condition and others could not afford the price.

Figure 10: Tarpaulin Usage in 2013



The survey also sought about which groups had purchased dedicated bicycles for the shellers, and it was discovered that only 45 (32.6%) farmers responded that their farmer groups had purchased dedicated bicycles for the shellers which greatly smoothened access to the shellers more easily whereas a good number of farmers, 93 (67.4%) said their respective groups had not purchased bicycles dedicated to the shellers.

Maize Quantities Shelled by the different Technologies

On average, 60.1Kgs of maize were shelled by using a maize Sheller, 251.8Kgs were shelled by beating using mainly sticks, 140.4Kgs were shelled by hands and 122.8Kgs were shelled using a motorized Sheller.

The main challenges they faced in sharing the maize sheller within their groups included; break down of the sheller, congestion during the time of shelling, weak bicycles which easily broke down, being labor intensive, some groups lacked dedicated bicycles for the sheller and the maize was so much time consuming compared to other technologies.

Majority of the farmers, 130 (94.2%) were planning to use the bicycle-powered sheller this growing season and in the future. Only 8 farmers (5.8%) were not planning to use the bicycle-powered sheller this year and in the future citing reasons like; their groups had not purchased dedicated bicycles, they are also time consuming compared to the motorized shellers.

Maize Threshing

The survey also found out how different farmers usually threshed their maize because proper maize threshing improves on its quality on the market.

In most of the households, adult males (39.9%) were responsible for threshing the maize showing that males were becoming involved in agriculture followed by adult females (31.9%), children comprised (18.1%), hired labor (6.5%), mill owners (0.7%) and others like relatives accounted for (2.9%) as shown below

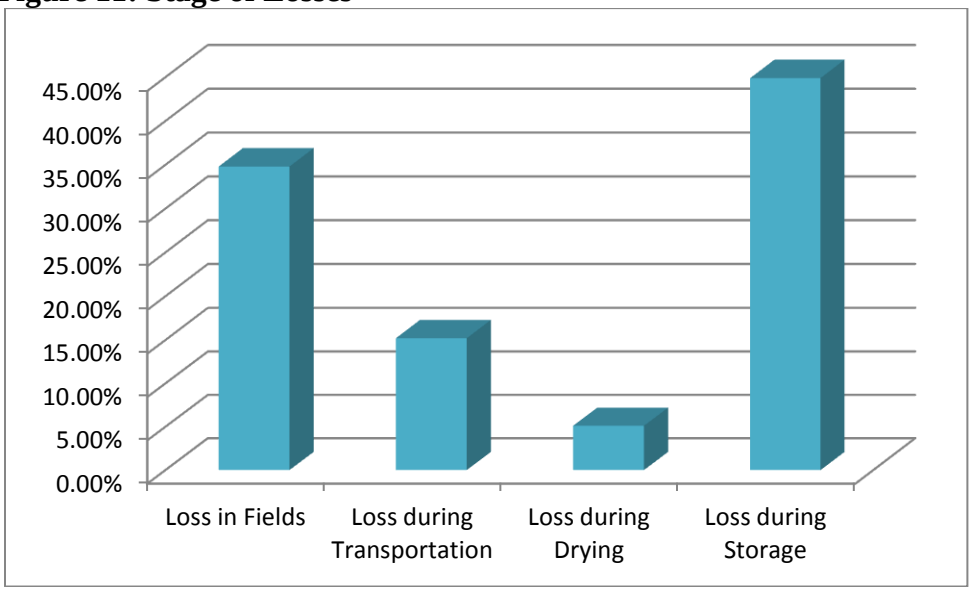
Table 19: People Responsible for Maize Threshing.

Person Responsible	Frequency	Percent
Adult Males	55	39.9
Adult Males	44	31.9
Children	25	18.1
Hired labor	9	6.5
Mill Owners	1	0.7
Others	4	2.9
Total	***138***	***100***

Stage of Post- Harvest Handling Losses

In 2012, many farmers, 62(44.9%) incurred more losses after harvesting during storage, 48 (34.8%) farmers in the fields, 21 (15.2%) during the time of transportation and 1 (5.1%) farmer during drying as shown in the figure below.

Figure 11: Stage of Losses



The major causes of losses as elicited by farmers included; pests attack like rats, weavils, termites, then prolonged drought conditions, destruction by animals and thieves, heavy rainfall experienced during the season, late planting of seeds, long distances to both the markets and storage points, poor state of storage facilities and increased negligence by laborers during the time of harvesting.

A huge percentage of maize (80%) was also lost/ spoiled by farmers in the first season of 2012 as revealed by the farmers during the survey, but as a result of the Farmer to Farmer project, the amount of spoilage of maize has tremendously lowered,thanks to the different intervetions like trainings, technical support, input support of quality and clean maize from the project.

Farmers also suggested appropriate technologies that can reduce the above losses which included; provision of fertilizers, provision of tarpaulins, intensify on the trainings on Post - harvest handling, spraying during the time of planting to control pests like weevils and use of traps to control rats.

ACCESS TO EXTENSION SERVICES

Majority of the farmers revealed that they accessed the extension services from their group leaders mainly weekly basis (39.1%), followed by those who access them twice a month (32.6%), (11.6%) on monthly basis, (15.9%) never accessed and on quarterly basis (0.7%) as shown in the table below**.**

Table 20: ACCESS TO EXTENSION SERVICES

Time Frame	Frequency	Percent
Weekly	54	39.1
Twice a month	45	32.6
Never	22	15.9
Monthly	16	11.6
Quarterly	1	0.7
Total	***138***	***100***

PROJECT IMPACT

This section included the changes in incomes farmers have realized as a result of the project, rank the importance of tarpaulins, bicycle shellers and group marketing, changes in maize quality and changes experienced in the household as a result of the project.

Thus, farmers reported an increase in incomes from maize in 2012 as a result of the knowledge and skills they had attained from the project mainly through the different trainings focusing on maize agronomy, post-harvest handling, collective marketing and record keeping.

On average, farmers ranked tarpaulins the highest (2.24) of importance to them during project implementation, followed by group marketing (1.96) of their produce and bicycle sheller (1.72) implying not many farmers have benefited from the technology as yet compared to the practices above.

Many farmers also confessed that there were changes in the maize they consume at home as a result of the Farmer to Farmer project and these changes included: improved nutrition especially among children inform of porridge, high price from the sales of quality maize on the market.

Project Impact in the Household

Majority of the farmers, 133 (96.4%) who participated in the survey elicited that the project has brought about a number of changes in their households, only 5 (3.6%) responded that there has not been great impact caused by the project in their households.

These changes which they have experienced by using the incomes they have earned from the sales of soybean and maize include: ability to pay school fees and scholastic materials for their children, pay medical bills, cater for household expenditures, purchase agro-inputs and livestock, and hire additional land for increased cultivation.