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Household Annual Beneficiary Agricultural Outcome Survey

2013/14 Annual Evaluation of INVC

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SUBMITTED TO

INTEGRATING NUTRITION INTO VALUE CHAINS PROJECT

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Yours sincerely,

Lawrence D. Mapemba and Assa M. Maganga

ACRONYMS

CADECOM	Catholic Development Commission
CG7	
cm	centimeter
CSPro	Census and Survey Processing System
EPA	Extension Planning Area
EU	European Union
FtF	Feed the Future
FtFMS	Feed the Future Management System
FUM	Farmers Union of Malawi
GHI	Global Health Initiative
GVH	Group Village Headman
IC	Input Costs
INVC	Integrating Nutrition in Value Chains
Kg	Kilogram
M&E	Monitoring and Evaluation
NASFAM	National Association of Farmers in Malawi
NGO	Non-governmental Organizations
PPS	Probability Proportion to Size
QS	Quantity of Sales
STATA	Statistics and Data
TP	Total Production
UP	Unit of Production
USAID	United States Agency for International Development
USD	United States Dollar
VS	Value of Sales

EXECUTIVE SUMMARY

Groundnuts and soybeans enterprise value chain

A total of 1574 beneficiary farmers were interviewed during the survey, of which, 62 percent were female and 38 percent were male. A total of 430 farmers grew groundnuts only, 434 farmers grew soybeans only and 710 farmers grew both groundnuts and soybeans. The average land holding size among all the beneficiary farmers was observed to be at least 3 acres.

The results show that, of the 1574 beneficiary farmers, 1143 and 1139 beneficiary farmers applied at least one technology in soybeans and groundnuts fields, respectively. The total hectares that were applied to at least one of the promoted technologies were 668 hectares. This is the total number of hectares in the survey since farmers applied at least one INVC promoted technology to their farms.

Among the soybeans farmers and across the technologies, more female beneficiary farmers applied the technologies than their male counterparts except for agronomic practices, improved marketing and improved storage. It appears the project need to work hard on encouraging farmers to take up improved marketing technologies, as the numbers of farmers involved are very few. The low adoption of marketing technologies could be attributed to farmers' experiences on collective marketing in the past as well as lack of reliable market infrastructures. Among the groundnuts farmers and across the technologies and gender it was observed that, in general, lower proportions of farmers applied the technologies compared to soybeans farmers. Contrary to soybean farmers, more male beneficiary farmers applied the technologies compared to female beneficiary farmers. Groundnuts is becoming one of the cash crops hence males taking keen interest in the crop as well as the more government interferences in the soybean enterprises coupled with it being a new crop makes it unattractive to the male group of farmers.

The results for gross margins were all positive. The groundnuts gross margins were higher for male (USD 404.07) than female (USD 241.98) farmers. Jointly the groundnuts gross margin was USD 330.69. For groundnuts the gross margin for farmers under FUM was the highest while for soybeans the gross margin for farmers under NASFAM was the highest. The overall gross margin for groundnuts was USD 318.92. Total sales for groundnuts were USD 55,079.38 and the yield was 0.865 metric tons per hectare. Similarly, the soybeans gross margins were higher for male (USD 259.73) than female (USD 129.09) farmers. Jointly the soybeans gross margin was observed to be USD 156.56. The overall gross margin for soybean was USD 170.24. Total sales for soybeans were USD 33,483.34 and the yield was 0.669 metric tons per hectare.

Overall Results are shown in the table below:

Technologies	No. of Farmers	Percentage
Farmer who applied Improved technology	1574	100
Hectares Under Improved Cultivation	668	100

Gross Margins	$/Ha
Soy	$ 170.24
Groundnuts	$ 318.92

Conclusions

A. Conclusions

1. Plot management practices among beneficiary farmers

The project is promoting ridge preparation technology such as clearing the land of debris, ridge spacing of 75cm, wider ridge width, and tier/box ridges. In groundnuts, the results generally indicate that over 90 percent of the entire beneficiary farmers adopted at least one of these technologies with low proportions observed in Machinga and Mangochi districts. Nevertheless, female beneficiaries had adopted the technology more than male beneficiaries in four out of seven districts. In soybeans farmers it was observed that almost all farmers reported that they adopted the technology. There were no differences across gender among the beneficiaries.

The project promoted planting techniques that included plant spacing of 15cm, double row 30cm, and doubled-up legumes. Observed results for groundnuts beneficiary farmers indicate that over 80 percent of all the beneficiary farmers adopted the planting techniques. Specifically, at district levels male beneficiaries adopted the technology more than female beneficiaries, with the exception of Balaka district. In general, results for soybeans beneficiary farmers indicate that except for Ntcheu district, at least 90 percent of the beneficiary farmers reported to have used the techniques in their fields. However, the results indicate that some households still did not practice modern planting techniques.

On decision-making on plot management for groundnuts and soybeans, female beneficiary farmers made most decisions. As noted in demographic characteristics, most of the beneficiaries,

except for Mchinji district, were females hence the results prove that most of the decisions on plot management are made by beneficiaries themselves.

2. Crop management practices

Crop husbandry practices that are promoted by the project include early planting with the first rains, planting of pure hybrid varieties, crop rotation, proper storage of seed, filling of germination gaps, weeding, and treating diseases and pests if observed in crops. During the evaluation study beneficiary farmers were asked if they adopted any of the crop husbandry technologies.

In general, results show that slightly over half of the beneficiaries grew CG7 groundnut varieties. The districts that reported the least proportions of beneficiaries growing CG7 were Mangochi, Balaka and Machinga districts. For soybeans, almost 90 percent of the farmers among the seven districts adopted the improved varieties of Selinade and Makwacha. The highest adoption of the improved varieties (almost 100%) was observed in the southern districts while Mchinji recorded the lowest adoption of all districts. Across gender, more female beneficiary farmers planted the improved varieties than the male beneficiaries.

As regards to sources of seeds for groundnuts and soybeans, most farmers reported NASFAM as the main sources followed by own harvest and then fellow farmers. The results for groundnuts farmers indicate that over 30 percent of the beneficiaries obtained their seed from NASFAM. This was seconded by 20 percent who reported to acquire seed from their own harvest. The results for soybeans farmers show that most farmers got their seeds from NASFAM (67%).

On crop rotation, results indicate that 78 percent of respondents planted maize during the previous season in groundnuts plot. Other crops that were rotated with included soybeans, cowpeas, tobacco, cotton, cassava, sweet potatoes, irish potatoes and groundnuts. About 62 percent of beneficiary soybeans farmers reported that their plot was planted to maize in the previous season. This shows that most farmers follow the proper crop rotation by rotating cereals and legumes. However, the results showed that there were still farmers that were rotating a legume crop with another legume crop though the numbers of these farmers are small (about 5%).

Beneficiary farmers were asked if they weeded as soon as weeds appear or at least 3 times in the past season. Recommended weeding practices among beneficiary farmers in groundnut fields were practiced by very few individuals. Overall, 16 percent of the farmers reported weeding as soon as weeds appeared and/or weeding at least three times in the past season. Similarly among the soybeans farmers, results show that only 11 percent of farmers followed the recommended weeding practices in their soybean farms. During interview discussions with farmers it was learnt

that farmers do weed the fields but most of them did not weed as soon as weeds appear while others reported weeding once or twice in the past season.

3. Harvesting and drying technologies among beneficiary farmers

Extension methods recommend that groundnuts should be harvested between 130-150 days after planting. Results of the survey show low proportions of farmers who knew the exact period for harvesting groundnuts. Similarly for soybeans, the results show that most farmers (over 75%) are not aware of the average days the crop takes in the field before harvesting.

On crop drying techniques practiced by beneficiary farmers, overall, among all the districts, only half of the farmers (50%) reported following the recommended drying methods. Most farmers reported that they do not dry their crop in the field due to theft. Usually farmers harvest raw groundnuts and dry it at home.

4. Crop sales

The results generally indicate that 61 percent of the beneficiaries sold their groundnuts. When the results were disaggregated by gender, 70 percent of farmers who reported selling groundnuts were male and 55 percent were female beneficiaries. The results show that few farmers access the market with their produce. Out of over 1000 farmers that reported growing groundnuts only 695 sold their groundnuts. Groundnuts as a crop has high gross margins hence they are a good income enhancement crop among farmers. Farmers are encouraged to grow enough for home consumption and sell the surplus for income. The story was somehow different for soybeans farmers, in general, the results show that over 80 percent of the farmers in Mchinji, Lilongwe and Dedza sold their soybeans followed by Ntcheu which reported 71 percent of farmers selling soybeans. Observations from the southern districts showed that, by the time of the survey, most farmers had not yet sold their soybeans. The most notable reasons that may contributed to less farmers able to sale their crops was reported to be late distribution of seeds by NASFAM to the beneficiary farmers, poor germination of the crops and disease and pests infestation that lacked assistance from extension services.

5. Post-harvest handling and processing

On post-harvest processing results show that over 65 percent of the groundnuts farmers cleaned and sorted their groundnuts. Very low numbers of farmers do grade, package or label their crop produce before they sell. Similar results were observed among soybeans farmers. In general the results showed that most farmers (over 80%) clean and sort their soybean crop produce before selling. Very few farmers grade, package and label their crop produce. Very few farmers process their produce into other products (i.e. 2% and 4% for groundnuts and soybeans, respectively).

On farmer training in grading and packaging the results indicated that there were very low proportions of groundnuts farmers (less than 20%) across the districts that got trained in grading and packaging. Similarly, among soybeans farmers only 17 percent reported that they received training on grading and packaging.

On awareness of the country's safety standards, especially, to control aflatoxins the results showed that very few beneficiary farmers knew about the country's safety standards on foods such as groundnuts and soybeans. This is a concern as reports have shown that the high levels of aflatoxins that have been found in the country's exported groundnuts have affected groundnuts exports to the EU. There is need to intensify awareness to local farmers on the country's food safety standards that meet international trade requirements since we are operating in a global economy. However, high proportions of beneficiary farmers (over 50% in some districts) reported being trained in the country's safety standards on foods. There were other districts that had low observations on those trained on food safety standards.

6. Storage conditions for groundnuts

Proper storage conditions ensure availability of safe foods and in required amounts with minimal storage losses. Results show that about 94 percent of households stored their groundnuts in a cool dry place. While about 78 percent and 76 percent, stored their nuts in a raised and well-ventilated place, respectively. At least 70 percent of the beneficiaries in the sample stored their groundnuts in 50kg bags. Over 78 percent of the beneficiary farmers stored their groundnuts in leak proof places. Very low proportions of households storing their groundnuts 1 meter away from the walls and in interlocking stacks were reported across all the seven districts.

On soybeans storage results show that most farmers store their produce in cool and dry places, well ventilated places, with leak proof roof and in 50 kg bags. The results show that there still few farmers (about 33%) that do not store their produce on raised surface. A lot more farmers across gender and districts (over 90%) did not store their produce 1 meter away from the walls and in interlocking stacks.

7. Source of information for various technologies and management practices

Beneficiary farmers were asked the sources of information for various technology and management practices they use. In general, at least 55 percent and 57 percent of the groundnuts and soybeans farmers, respectively, got their information from fellow farmers. While less than 20 percent got their information from radios, farmer groups, CADECOM, FUM, NASFAM and government agricultural extension workers. It appears lead farmers are doing more work in extension services than the mainstream government and NGO extension service.

8. Marketing technologies and practices

Farm produce can be sold in many different ways that farmers can take advantage of depending on the circumstances they are in. Beneficiary farmers were asked how they marketed their groundnuts. The results showed that not many farmers were using these modern ways of marketing or selling groundnuts. Less than 6 percent of the farmers were using any of the marketing technologies that the project is promoting. It appears that most farmers were not aware of these marketing technologies so there is need for intensified extension services that are geared towards establishing these marketing technologies. If these are technologies being promoted by the project then farmers need to be trained in all of them and provision need to be made for farmers to access these marketing techniques.

It is reported that selling groundnuts in shells reduces labor and at the same time reduces aflatoxin threat. In general, at least 35 percent of farmers across the seven districts sold their groundnuts in shells. Lilongwe reported the highest observation with over 65 percent of farmers selling their groundnuts in shells. This was followed by Mchinji district with at least 50% of farmers reporting selling their groundnuts in shells. The southern districts of Balaka, Machinga and Mangochi reported the lowest proportions (less than 10%) of farmers who sold their groundnuts in shells.

9. Gross margin analysis

In the study gross margin analysis was undertaken to determine the contribution of the crop to household income. When results were disaggregated by decision-making power, beneficiaries who reported male as decision-making person reported highest gross margins per hectare (US$404.07 for those that grew groundnuts and soybeans and US$406.00 for those that grew groundnuts only). Furthermore, when results were disaggregated by INVC partners, the highest gross margin was observed among beneficiaries under FUM (i.e. US$420.45).

Male beneficiaries recorded higher gross margins per hectare than their female counterparts because, as observed in the technology adoption/usage tables above, male beneficiaries adopted the technologies more than the female beneficiary farmers. Among the partners of INVC the results on gross margins showed that farmers under FUM had the best gross margins per hectare among the three beneficiaries. The low gross margins for farmers NASFAM and CADECOM could be because of poor seed germination percentage and distribution of seeds to beneficiaries very late in the agricultural season.

Similarly, Soybeans beneficiaries who reported that males had more decision making power on soybean farms realized the highest gross margin i.e. US$260 for those that grew both groundnuts and soy and US$176.43 for those that grew soybeans only. Among the INVC partners, NASFAM reported the highest gross margin of US$246.59.

As noted before, male beneficiaries recorded higher gross margins per hectare than their female counterparts but unlike in the case of groundnuts, proportions of soybeans farmers across gender did not differ that much hence that cannot explain the difference. There could be something about the production system of male farmers that was not well captured.

Among the partners NASFAM distributed the recommended variety of seeds. During the survey some farmers under FUM who were asked the source of seeds and their varieties reported that they obtained the seeds from fellow farmers and did not know the variety. It could be that farmers under FUM and CADECOM planted poor varieties that affected their yields hence gross margins per hectare. It could be important for INVC to include local agro-dealers in their partnership so that local farmers have access to improved varieties of soybeans seeds (i.e. Selinade and Makwacha) and groundnuts seeds (i.e. CG 7).

CHAPTER 1

METHODOLOGY

1.1 Introduction

The following chapter gives the methodology that was used in the survey. The annual beneficiary agricultural outcome survey was quantitative. Qualitative data are available through various ongoing interventions monitoring efforts. Where necessary qualitative data were obtained in some areas where farmers had experienced a lot of problems with the distributed seed (i.e. poor germination) and in areas where farmers wanted to express their dissatisfaction with the project implementation process (i.e. late distribution of seeds).

1.2 Sample design and sample size determination

The sampling design proposed (for greatest power) was a systematic random sample from a complete list of INVC beneficiary households. A sample of 190 to 200 beneficiary households per district was determined to be representative enough. Using Probability Proportion to Size (PPS) the sample of 200 beneficiary households per district was allocated to the EPAs and GVHs where INVC partners are working. The list of all beneficiary households was obtained from the INVC Monitoring and Evaluation (M&E) Team. Using this list a random sample of beneficiary households, with replacements, was obtained for inclusion in the agricultural beneficiary outcome survey.

The sample size estimate of 190 to 200 beneficiary households was based on the anticipated 15% point change in yield among targeted beneficiaries as a result of FtF-INVC interventions. Therefore, a sample size of approximately 1,365 should provide sufficient power to detect an anticipated 15% point change, with 95% significance and 90% power (2-tailed, 95% Z_{Δ} and

90% $Z_{1-\Delta}$), and a 10% non-response rate, derived from the formula below

$$n = \frac{\left[Z_{\Delta}\sqrt{2PQ} - Z_{1-\Delta}\sqrt{P_1Q_1 + P_2Q_2}\right]^2}{(P_2 - P_1)^2}$$

Where:

Z_{Δ}= probability that an observed change of magnitude would not have occurred by chance (i.e., significance)

$Z_{1-\Delta}$= probability of certainty to detect a change of the desired magnitude (i.e., power)

P = proportion of the population displaying a key outcome of interest

$Q = 1 - P$

P_1 = population proportion at time 1 (i.e. baseline)

P_2 = population proportion at time 2 (i.e. final)

$Q_1 = 1 - P_1$

$Q_2 = 1 - P_2$

A sample of 1400 beneficiary households was finally determined to be in the survey. To take care of attrition due to either death or migration the sample was increased to 1600 beneficiary households.

1.3 Survey instruments

A semi-structured questionnaire was used to capture all quantitative data from representative beneficiary households (refer to Annex A1). The outcome indicator survey instrument captured key outcome data as stipulated in the purpose of the survey for reporting on annual agricultural outcome indicators, along with demographic and household socioeconomic characteristics, and other factors that may affect uptake of INVC interventions and exposure and utilization of program services. The household questionnaire was be standardized for all households included in the survey. The household questionnaire is attached in the Annex. In a few cases qualitative data was collected where farmers complained of seed germination and late distribution of seeds.

1.4 Data entry, cleaning and analysis

All collected questionnaires were entered in CSPro software. The data was then transferred into STATA for data cleaning and analysis. Tables were developed that were used to write a report.

1.5 Gross margin calculations

The study used gross margin analysis as the major analytical method. Since a direct beneficiary sample survey was used to collect gross margin data points, the sample survey estimates were extrapolated to total beneficiary estimated values before entry into FTFMS. Gross margins per hectare of groundnuts and soybeans were calculated. The gross margin is the difference between the total value of smallholder production of the agricultural product (soy bean and groundnut) and the cost of producing that item, divided by the total number of units in production (hectares of crops). Gross margin per hectare is a measure of net income for that farm. The INVC project focuses on three value chains—soybeans, groundnuts, and dairy. Gross margin data points was collected and reported on for groundnuts and soybeans. Input costs included were those significant cash costs that can be easily ascertained. Most likely cash input costs items were: purchased seed, fertilizer, pesticides, hired labor, hired enforcement, and hired machine. Capital investments and depreciation were not included in cash costs. Unpaid family labor, seed from a previous harvest and other in-kind inputs were not valued and were not included in costs.

The following were units of measure that were used in the analysis.

- Hectares planted (for soy bean and groundnuts)
- Dollars/hectare
- Total Production (metric tons for soy bean and groundnuts)
- Value of Sales (USD)
- Quantity of Sales (metric tons)
- Purchased input costs (USD)

The Malawi Kwacha currency units were converted to USD at the average market foreign exchange rate for the year 2014, which was the reporting year. Data was entered disaggregated to the lowest level (i.e., by commodity then by sex under each commodity. FTFMS calculated gross margins per ha automatically).

Method of calculation:

Gross margin is calculated from five data points, reported as totals across all direct beneficiaries:

1. Total Production by direct beneficiaries during reporting period **(TP)**
2. Total Value of Sales (USD) by direct beneficiaries during reporting period **(VS)**
3. Total Quantity (volume) of Sales by direct beneficiaries during reporting period **(QS)**
4. Total Recurrent Cash Input Costs of direct beneficiaries during reporting period **(IC)**
5. Total Units of Production: Hectares planted (for soybean and groundnuts) **(UP)**

The INVC study disaggregated values for the five gross margin data points, disaggregated first by commodity, then by the sex disaggregate categories: male, female, and joint, as applicable.

Commodity-sex layered disaggregated data are required because the most meaningful interpretation and use of gross margin information is at the specific commodity level, including the comparison of gross margins received by female and male farmers. FTFMS used the formula below to automatically calculate the average commodity-specific Gross Margin, and the average commodity-specific Gross Margin for each sex disaggregate:

$$\text{Gross margin per ha} = [(TP \times VS/QS) - IC] / UP$$

For example, for the total production data point, total production during the reporting year on plots managed by female, groundnuts-producing, direct beneficiaries; total production on plots managed by male, groundnuts-producing, direct beneficiaries; total production during the reporting year on plots managed jointly by female and male groundnuts-producing, direct beneficiaries were calculated. And so forth for total value and total quantity of sales; total cash recurrent input costs; and total hectares, for groundnuts. Similarly for soybeans the five data points were calculated.

CHAPTER 2

DEMOGRAPHIC AND GENERAL INFORMATION

2.1 Introduction

This section presents socioeconomic and demographic characteristics of the sampled beneficiary households. It discusses gender aspects of household heads, average land holding sizes per household, proportion of beneficiaries that grew other crops apart from groundnuts and soya beans and proportions of individuals that grew both targeted crops. The analysis is disaggregated by district, gender and type of land tenure where possible.

2.2 Gender of beneficiaries by district and overall (%)

Table 2.1 presents results for gender of the beneficiaries by district. In general 62 percent of the beneficiaries were female. Since females are concerned with household food availability, females manage most food crops while men concentrate on cash crops like tobacco. However, Mchinji district is the only study area that had more male beneficiaries (57%) than females. The other cause of the differences in gender of beneficiary households may be as a result of targeting. The project targets lactating mothers and pregnant women.

Table 2. 1: Gender of beneficiary by district and overall

District	Gender of beneficiaries		n
	Male	Female	
Mchinji	57	43	257
Lilongwe	39	61	251
Dedza	29	71	240
Ntcheu	37	63	207
Balaka	42	58	202
Machinga	21	79	199
Mangochi	39	61	218
Total	38	62	1,574

2.3 Average land holding size of beneficiaries (Acres)

Table 2.2 presents results of land holding sizes of beneficiaries per household. The land holding sizes are presented in acres by gender and type of tenure. Noteworthy, male beneficiaries that cultivated their own land reported to have more land holding sizes than female beneficiaries. Male beneficiaries had 0.45 acres more land than female beneficiaries. On average a beneficiary household cultivated 2.7 acres of their own land. In all case, male beneficiaries had more land compared to female beneficiaries. These results suggest that female beneficiaries in the sample were more land constrained than their male counterparts. A possible explanation might be that

most male beneficiaries were married households' heads who combined land belonging to the male and female spouse. On the other hand, female beneficiaries were either a spouse in a household who reported their land only or a female-headed household.

Table 2. 2: Average land-holding sizes of beneficiaries (acres)

Land holding form	Gender of beneficiaries				Pooled	
	Male		Female			
	Mean	n	Mean	n	Mean	n
Own cultivated (Include dimba)	2.97	595	2.52	964	2.70	1559
Sharecropped in	0.024	5	0.008	4	0.01	9
Borrowed	0.04	30	0.03	42	0.03	72
Rented out (for money)	0.11	41	0.06	44	0.08	85
Sharecropped out	0.02	4	0.002	4	0.01	8
Lent out (for free)	0.07	23	0.03	26	0.04	49
Rented in	0.37	160	0.30	240	0.33	400
Fallowed	0.30	120	0.23	182	0.26	302

2.4 Proportion of beneficiaries who grew other crops

Table 2.3 summarizes results of proportion of beneficiaries who grew other crops apart from soybeans and groundnuts. Results are disaggregated by gender and type of crop the household grew. Almost every household in the sample, regardless of gender, grew maize as evidenced by 100 percent male beneficiaries and 99 percent female beneficiaries who reported growing maize besides groundnuts and soybeans. Most beneficiaries grew other food crops besides groundnuts and soybeans with the highest proportions of beneficiaries observed growing sweet potatoes, common beans and cowpeas. A few other beneficiaries grew cash crops like tobacco and cotton (22% and 17%, respectively). More male beneficiaries (30%) grew tobacco than female beneficiaries (17%). In general, among the beneficiaries that grew other crops besides groundnuts and soybeans cash crops ranked higher among male beneficiaries compared to female beneficiaries. This may suggest that female beneficiaries are more oriented towards diversifying for nutrition purposes.

Table 2. 3: Proportion of beneficiaries who grew other crops

Crop	Gender of beneficiaries					
	Male		Female		Pooled	
	%	n	%	n	%	n
Maize	100	601	99	963	99	1564
Rice	8	48	11	107	10	155
Common beans	37	222	37	360	37	582
Cowpeas (khobwe)	35	210	38	370	37	580
Sorghum (mapila)	19	114	29	282	25	396
Tobacco	30	180	17	165	22	345
Cotton	18	108	17	165	17	273
Cassava	18	108	17	165	17	273
Sweet potatoes	48	288	44	428	46	716
Irish potatoes	12	72	12	117	12	189

2.5 Proportion of beneficiaries who reported grew either groundnuts or soy or both (%)

Table 2.4 presents results of the proportion of beneficiaries who reported to have grown either groundnuts or soybeans or both. Overall, among the beneficiaries most of them grew both groundnuts and soybeans (45%) followed by those who grew soybeans only (28%) and then those who grew groundnuts only (27%). Results generally present mixed results across the districts and across the targeted legumes but notice that beneficiary farmers in all of the southern districts grew either soybeans only or both groundnuts and soybeans. Most beneficiary farmers in Mangochi grew soybeans since NASFAM distributed more soybeans than groundnuts in the district. The other reason was that farmers in the district reported that groundnuts are not the most suitable for the climate in Mangochi compared with soybeans. Very few beneficiary farmers in Ntcheu district grew both groundnuts and soybeans. Most beneficiaries grew groundnuts only followed by soybeans only. Interview with farmers revealed that NASFAM was distributing groundnuts only is some parts of the district and soybeans only is other parts. Widely mixed results were observed in the Central Region districts of Mchinji, Lilongwe and Dedza where Farmers' Union of Malawi (FUM) had beneficiaries. FUM was not distributing seeds but conducting capacity building with legume farmers. Hence the farmers had to choose between growing both crops and one crop only. So in Mchinji and Lilongwe districts most beneficiary farmers grew both soybeans and groundnuts followed by groundnuts only and a few grew soybeans only. In Dedza most farmers grew groundnuts only (48%) followed by both crops (37%) and then soybeans only (15%).

The farmers were asked the number of plots of groundnuts that they have for both groundnuts and soybeans. Refer to Table A2.1 and B2.1 in annex 2 that shows that the average number of plots each farmer reported were more than one groundnuts and soybeans.

Table 2. 4: Proportion of beneficiaries who reported growing either groundnuts or soy or both

District	Legume type (% of beneficiaries)																	
	Groundnut Only						Soybeans Only						Grew Both					
	Male		Female		Pooled		Male		Female		Pooled		Male		Female		Pooled	
	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Mchinji	27	39	29	32	28	71	8	12	13	14	10	26	65	95	59	65	62	160
Lilongwe	48	48	39	60	43	108	8	8	14	21	12	29	43	43	47	71	45	114
Dedza	33	23	54	92	48	115	23	16	12	21	15	37	43	30	34	58	37	88
Ntcheu	57	44	52	68	54	112	30	23	34	44	32	67	13	10	14	18	14	28
Balaka	11	9	8	10	9	19	29	24	42	49	36	73	61	51	50	59	54	110
Machinga	0	0	3	4	2	4	45	19	33	52	36	71	55	23	64	101	62	124
Mangochi	1	1	0	0	0	1	63	53	58	78	60	131	36	30	42	56	39	86
Total	27	164	27	266	27	430	26	155	29	279	28	434	47	282	44	428	45	710

CHAPTER 3

GROUNDNUTS ENTERPRISE VALUE CHAIN

3.0 Introduction

This chapter presents results and discussion of farmer activities in groundnuts production. It discusses technology adoption by farmers in various farm activities including plot management, crop management, crop and husbandry practices, post-harvest technologies and marketing.

3.1 Plot management practices among beneficiary farmers

Plot management included cropping system, application of manure and inorganic fertilizers on the plot, ridging and planting distances and mulching. Ideally plot management activities mean land husbandry practices that enhance water infiltration into the soil, soil moisture retention and soil fertility.

3.1.1 Ridge spacing technology adoption

Table 3.1 summarizes proportion of farmers who reported ridge preparation technologies used on their land by gender and by district. The ridge preparation technology that were advocated included clearing the land of debris, ridge spacing of 75cm, wider ridge width, and tier/box ridges. Results generally indicate that over 90 percent of all the beneficiary farmers adopted at least one of these technologies with low proportions observed in Machinga and Mangochi districts. Nevertheless, female beneficiaries had adopted the technology more than male beneficiaries in four out of seven districts. Despite the good results farmers still need to be commended and encouraged to keep up with the technologies by adopting all of them.

Table 3. 1: Proportion of farmers who adopted ridge preparation technologies

District	Adopters by gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	99	96	100	134	100	230
Lilongwe	100	131	100	91	100	222
Dedza	100	150	100	53	100	203
Ntcheu	99	85	98	52	99	137
Balaka	100	69	100	60	100	129
Machinga	96	101	100	23	97	124
Mangochi	93	52	100	31	95	83
Total	99	684	100	444	99	1128

3.1.2 Planting spacing technology adoption

Table 3.2 gives a summary of results of farmers that employed modern planting techniques. The modern planting techniques that were advocated were plant spacing of 15cm, double row 30cm, and doubled-up legumes. In general, over 80 percent of all the beneficiary farmers adopted at least one planting technique. Specifically, at district levels male beneficiaries adopted the technology more than females, with the exception of Balaka district. There is need for extension services to encourage female beneficiaries and other remaining farmers to adopt the modern planting technologies.

Table 3. 2: Proportion of farmers who adopted planting techniques

District	Adopters by gender of beneficiaries					
	Male		Female		Pooled	
	%	n	%	n	%	n
Mchinji	94	126	92	89	93	215
Lilongwe	91	83	89	117	90	200
Dedza	87	46	83	125	84	171
Ntcheu	93	49	83	71	86	120
Balaka	77	46	77	53	77	99
Machinga	78	18	71	75	73	93
Mangochi	74	23	61	34	66	57
Total	88	391	81	564	84	955

3.1.3 Plot management decision maker

Table 3.3 provides a summary of proportions of farmers that reported who makes decision on plot management by district. Results generally indicate that females have more decision making power on the farm than males. This could be true as reported earlier that most females are concerned with food production at household level while most male farmers take control over cash crops. However, in Mchinji district it was observed that more males make decision on plot management than females. As noted in demographic characteristics, most of the beneficiaries, except for Mchinji, were females hence the results prove that most of the decisions on plot management are made by beneficiaries themselves.

Table 3. 3: Proportion of farmers reporting who makes decision on plot management by district

District	Decision power					
	Male		Female		Joint	
	%	n	%	n	%	n
Mchinji	39	52	32	31	29	67
Lilongwe	25	23	43	56	33	73

Dedza	18	10	42	63	40	81
Ntcheu	27	14	45	39	28	39
Balaka	33	20	48	33	20	26
Machinga	17	4	61	64	23	29
Mangochi	32	10	54	30	14	12
Total	27	133	46	316	27	327

3.2 Adoption of crop husbandry practices by beneficiary farmers

Crop husbandry practices that are promoted by the project include early planting with the first rains, planting of pure hybrid varieties, crop rotation, proper storage of seed, filling of germination gaps, weeding, and treating diseases and pests if observed in crops. During the evaluation study beneficiary farmers were asked if they adopted any of the crop husbandry technologies and it was found that all farmers adopted at least one of the promoted crop husbandry practices. One of the problems farmers faced was poor germination of the seeds. Farmers were asked if they observed gaps in the germination, over 60 percent of the farmers across the seven districts reported observing the gaps and about 43 percent of them managed to fill the gaps (Table A2.2 and A2.3 in the Annex 2).

3.2.1 Adoption of CG7 among beneficiary farmers

Summarized in Table 3.4 are results showing proportion of beneficiaries who planted CG7 groundnut varieties. In general, results show that slightly more male beneficiaries grew CG7 groundnut varieties than female beneficiaries. Disaggregating by districts, Ntcheu district had more than 90 percent of the beneficiaries growing CG7 groundnut varieties. This was seconded by Dedza district where 68 percent of the beneficiaries grew CG7, followed by Mchinji district (65%) and then Lilongwe district that reported 57 percent of beneficiaries grew CG7. The districts that reported the least proportions of beneficiaries were Mangochi, Balaka and Machinga districts. There is still need for extension services to promote CG7 among beneficiary farmers and also make it readily accessible to the farmers.

Table 3. 4: Proportion of beneficiaries who planted CG7

District	Gender of beneficiaries					
	Male		Female		Pooled	
	%	n	%	n	%	n
Mchinji	69	92	60	58	65	150
Lilongwe	55	50	59	77	57	127
Dedza	66	35	69	104	68	139
Ntcheu	89	47	93	80	91	126
Balaka	45	27	35	24	40	51
Machinga	26	6	32	34	31	40

Mangochi	52	16	45	25	47	41
Total	61	273	58	402	59	674

3.2.2 Source of seeds among beneficiary farmers

Another question of interest during the evaluation was beneficiary farmers' sources of groundnuts seeds. Farmers are generally encouraged to minimize recycling seeds so as to benefit from genetic potential of pure hybrids. Figure 3.1 indicates the sources of groundnuts seed by gender of beneficiaries. The results indicate that over 30 percent of the beneficiaries obtained their seed from NASFAM. This was seconded by 20 percent who reported to acquire seed from their own harvest. Less than 20 percent of the beneficiaries obtained their seed from the local market. Less than 5 percent of the beneficiaries reported to have obtained their seeds from either government, local agro-dealers or were given by fellow farmers. These results agree with the project's reality on the ground. NASFAM was, however, reported to have distributed the seeds late and most farmers (over 50%) reported to have planted late (Table A2.4 in Annex 2)

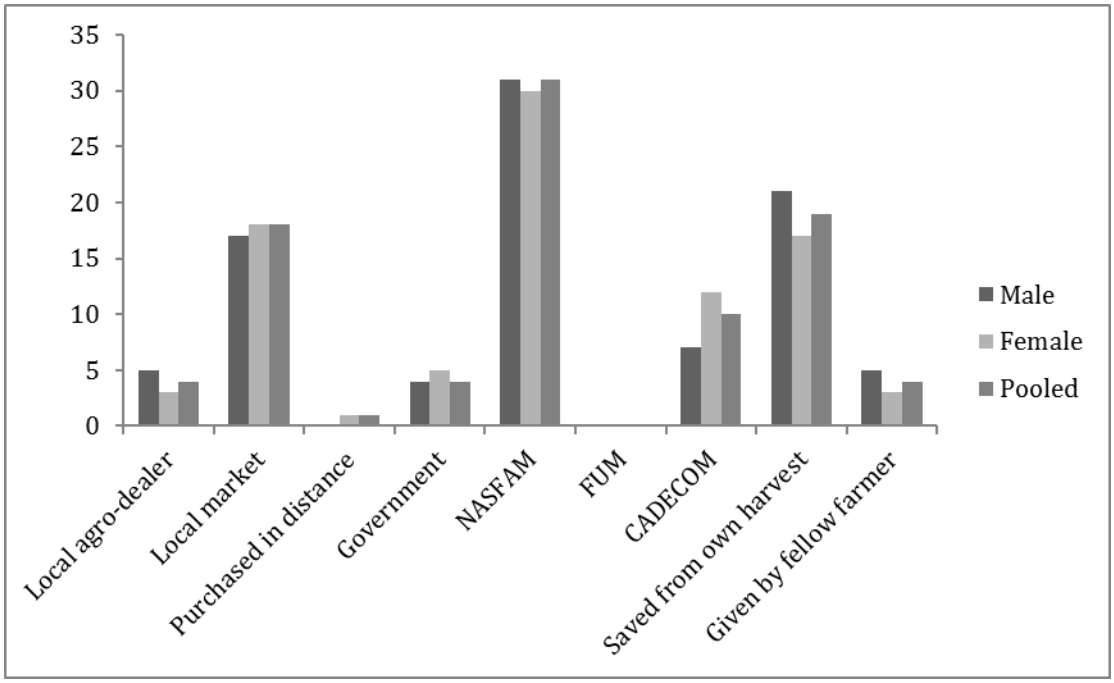

Figure 3. 1: Source of groundnuts seed by gender of beneficiaries

3.2.3 Crop rotation practices among beneficiary farmers

One of the technologies that helps in reducing pests and diseases and at the same time allow crops to take advantage of residual nutrients in the soil is crop rotation. Rotation of legumes and cereals allows cereals take advantage of nitrogen that is fixed by legumes in the soil. The introduction of a cereal after legumes reduces the population of legume pests and occurrence of legume diseases. Figure 3.2 presents proportion of beneficiary farmers that reported adopting crop rotation technology. Results indicate that 78 percent of respondents planted maize during

the previous season. However, the other crops that were previously grown namely soybeans, cotton and groundnuts had proportions less than five percent in all gender categories. This shows that most farmers follow the proper crop rotation by rotating cereals and legumes.

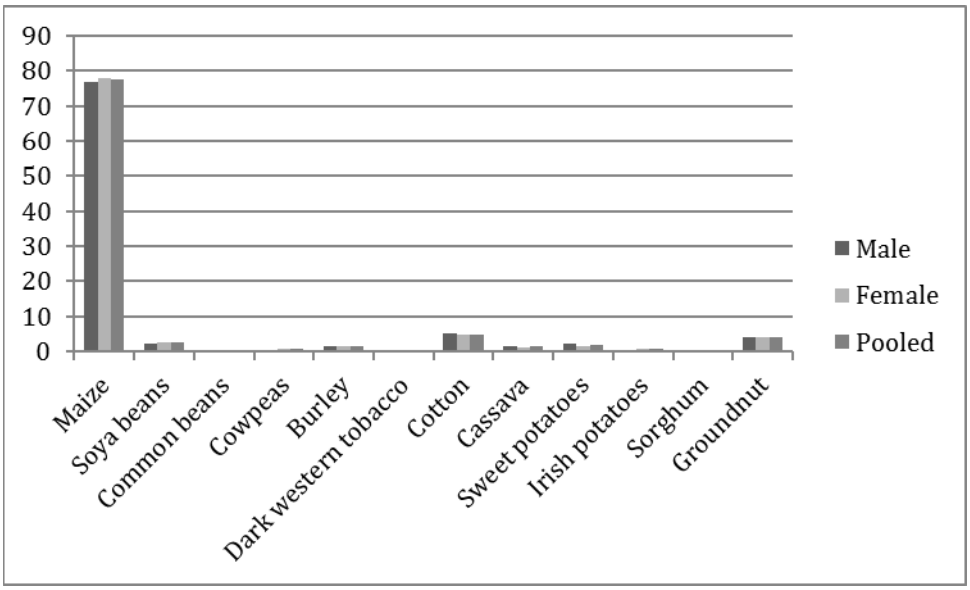

Figure 3. 2: Proportion of farmers reporting on crop rotation technologies

3.2.4 Weeding practices among beneficiary farmers

Yield losses in the field is partly contributed by growth of weeds that compete with crops for soil nutrients. The project promotes weeding as soon as weeds appear and weeding a minimum of 3 times. Beneficiary farmers were asked if they weeded as soon as weeds appeared or at least 3 times in the past season. The results summarized in Table 3.5 show proportions of farmers reporting weeding practices by gender and district. Recommended weeding practices among beneficiary farmers in groundnut fields were practiced by very few individuals. During interview discussions with farmers it was learnt that farmers do weed the fields but most of them did not weed as soon as weeds appeared while others reported weeding once or twice in the past season. Overall, 16 percent of the farmers reported weeding as soon as weeds appeared and/or weeding at least three times in the past season. Extension services should aim at intensifying training farmers on the importance of recommended weeding practices so as to enhance their crop production.

Farmers also complained of observing significant pests and diseases in the groundnuts fields. Tables A2.6 and A2.7 give summaries of the proportion of farmers that reported observing significant diseases and pests, respectively.

Table 3. 5: Proportion of farmers that weeded their fields.

District	Gender of respondent				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	23	31	23	22	23	53
Lilongwe	15	14	14	18	14	32
Dedza	8	4	18	27	15	31
Ntcheu	24	13	15	13	19	26
Balaka	12	7	14	10	13	17
Machinga	4	1	8	8	7	9
Mangochi	16	5	9	5	11	10
Total	17	75	15	103	16	178

3.3 Groundnuts harvesting and drying technologies among beneficiary farmers

Extension methods recommend that groundnuts should be harvested between 130-150 days after planting. If harvested late the farmers encounter crop product loss because some pods remain in the ground when digging. Furthermore, proper harvesting of groundnuts should follow recommended harvesting practices such as random maturity sampling to detect if the crop is ready for harvesting and proper drying in the field.

3.3.1 Knowledge of groundnuts harvest time by beneficiaries

The results summarized in Table 3.6 present proportions of farmers reporting on knowledge of harvest time and average days to harvest after planting. The analysis has been disaggregated by gender and district. In general, 25 percent of male beneficiaries and 19 percent of female beneficiaries reported that they had knowledge of harvest time and average days to harvest after planting. When males and females are combined, 22 percent of the sample indicated that they had knowledge of harvest time. However, some districts reported low proportions of farmers' knowledge on harvesting period. For example, Dedza and Ntcheu districts indicated the lowest overall proportions of 16 percent each. However, in each case male beneficiaries reported higher knowledge levels of days to harvest groundnuts. Overall the results show low proportions of farmers who knew the exact period for harvesting groundnuts. Hence, extension advice should also include training farmers on time to maturity.

Table 3. 6: Proportions of beneficiaries that reported on knowledge of harvest time

District	Gender of respondent					
	Male		Female		Pooled	
	%	n	%	n	%	n
Mchinji	31	42	28	27	29	67
Lilongwe	25	23	23	30	24	53
Dedza	26	14	12	18	16	32
Ntcheu	20	11	14	12	16	22
Balaka	23	14	13	9	18	23
Machinga	17	4	21	22	20	26
Mangochi	19	6	27	15	24	21
Total	25	114	19	133	22	243

3.3.2 Drying techniques practiced by beneficiary farmers

Summarized in Table 3.7 are results showing proportions of farmers reporting drying techniques of groundnuts. The analysis has been disaggregated by gender and drying technology. The first method used was leaving the harvested groundnuts on the row for 3 to 4 days to wilt, pluck and then further dry. In this method, among all districts, 18 percent of male beneficiaries and 26 percent female beneficiaries reported that they adopted it. The overall adoption of this method was 23 percent that included both male and female beneficiary farmers. Seven percent of male beneficiaries and 4 percent of female beneficiaries adopted the second method, the Mandela Cock, with an overall 6 percent adoption among the beneficiary farmers. This is a relatively new method and most of the beneficiaries did not have knowledge on how it works. The third method is to leave the groundnuts on the row to dry for 4 to 6 weeks before plucking it. Overall, 50 percent of the beneficiaries reported that they practiced this technology. This appeared to be the most popular technology. Overall, among all the districts, only half of the farmers (50%) reported following the recommended drying methods. Most farmers reported that they do not dry their crop in the field due to theft. So they harvest raw groundnuts and dry it at home.

Table 3. 7: Groundnut drying technologies

Drying technology	Gender of beneficiaries					
	Male		Female		Pooled	
	%	n	%	n	%	n
Leave the harvested groundnuts on the row for 3 to 4 days to wilt, pluck and then further dry	18	80	26	180	23	262
Mandela Cock	7	31	4	28	6	68
Leave it for 4 to 6 weeks before plucking to dry	58	258	46	319	50	570

3.4 Marketing of groundnuts among beneficiary farmers

To enhance household rural income the government of Malawi is promoting commercialization of agriculture. One way for farmers to engage in commercialization is by being involved in marketing of crop produce. Table 3.8 gives a summary of results showing proportion of farmers who sold their groundnuts by gender and district. The results generally indicate that 61 percent of the beneficiaries sold their groundnuts. When the results were disaggregated by gender, 70 percent of farmers who reported selling groundnuts were male and 55 percent were female beneficiaries. Lilongwe district reported the highest proportion of farmers that sold the crop followed by Mchinji. These two districts lie along the Lilongwe – Kasungu plain that is the largest production region for groundnuts. Balaka district, which lies in a rain shadow area reported, the lowest proportion of beneficiaries (18%), who sold groundnuts. The results show that few farmers access the market with their produce. Out of over 1000 farmers that reported growing groundnuts (Table 2.4) only 695 sold their groundnuts. Groundnuts as a crop has high gross margins hence they are a good income enhancement crop among farmers. Farmers are encouraged to grow enough for home consumption and sell the surplus for income. The results also show that very few farmers process groundnuts before sell (refer to Table A2.8 in Annex 2).

Table 3. 8: Proportion of farmers who sold their groundnuts by gender by district and overall

District	Gender of respondent					
	Male		Female		Pooled	
	%	n	%	n	%	n
Mchinji	87	117	74	72	81	189
Lilongwe	95	86	88	115	91	201
Dedza	77	41	62	93	66	134
Ntcheu	41	22	28	24	33	46
Balaka	20	12	16	11	18	23

Machinga	57	13	38	40	41	53
Mangochi	68	21	54	30	59	51
Total	70	312	55	385	61	697

3.5 Post-harvest processing of groundnuts among beneficiary farmers

To obtain good prices farmers have to process their produce into other products or clean and grade their produce. Some cleaning, sorting, grading and even proper packaging of the crop produce can mean a big difference in pricing. Buyers are normally put away by mixing poorly grown small and big pods of groundnuts in the same bag thereby negotiating for a low price. The presence of debris in the produce has to be discouraged among farmers. Most farmers are not involved in grading and packaging of their produce, an activity that needs to be emphasized by agribusiness extension.

3.5.1 Farmers that applied various post-harvest technologies

Post-harvest handling adds value to the crop produce. Table 3.9 summarizes results of proportion of farmers who applied post-harvest technologies to their groundnuts before they were sold. In general, 79 percent of the beneficiaries reported that they cleaned their groundnuts, 68 percent sorted, and 34 percent graded their groundnuts before selling. However, low proportions of beneficiaries packaged and labeled their groundnuts, 9 percent and 0.6 percent, respectively. When the analysis is disaggregated by gender, noticeable differences are observed in cleaning of groundnuts where most female beneficiaries (82% female versus 74% male beneficiaries) practiced cleaning. Packaging is a good value addition to produce that most farmers do not engage in. There are many vendors and supermarkets that are selling packaged groundnuts at higher prices than farm gate that farmers could have taken advantage of. Most value chains for crops have shown that players at higher levels of the chain are benefiting more than farmers at the bottom of the chain due to lack of proper post-harvest handling. Extension training should encourage farmers to engage in valuable post-harvest processing of their groundnuts to take advantage of good prices.

Table 3. 9: Proportion of households that reported post-harvest technologies to groundnuts.

Post-harvest technologies	Gender of beneficiaries					
	Male		Female		Pooled	
	%	n	%	n	%	n
Cleaning	74	329	82	569	79	898
Sorting	68	303	67	465	68	768
Grading	33	147	34	236	34	383
Packaging	12	53	6	42	9	95
Labeling	0.64	3	0.52	4	0.57	7

3.5.2 Beneficiaries training in grading and packaging

Farmer training in various technologies or skills that will enhance their capabilities in fetching high prices for farm produce is essential. Figure 3.3 summarizes proportions households that received training in grading and packaging. The analysis is disaggregated by gender and district. Results, generally, indicate that there are very low proportions of farmers (less than 20%) across the districts that got trained in grading and packaging. No wonder the results in Table 3.9 showed few farmers doing grading and packaging of groundnuts. As stated above extension services should intensify training farmers in post-harvest processing.

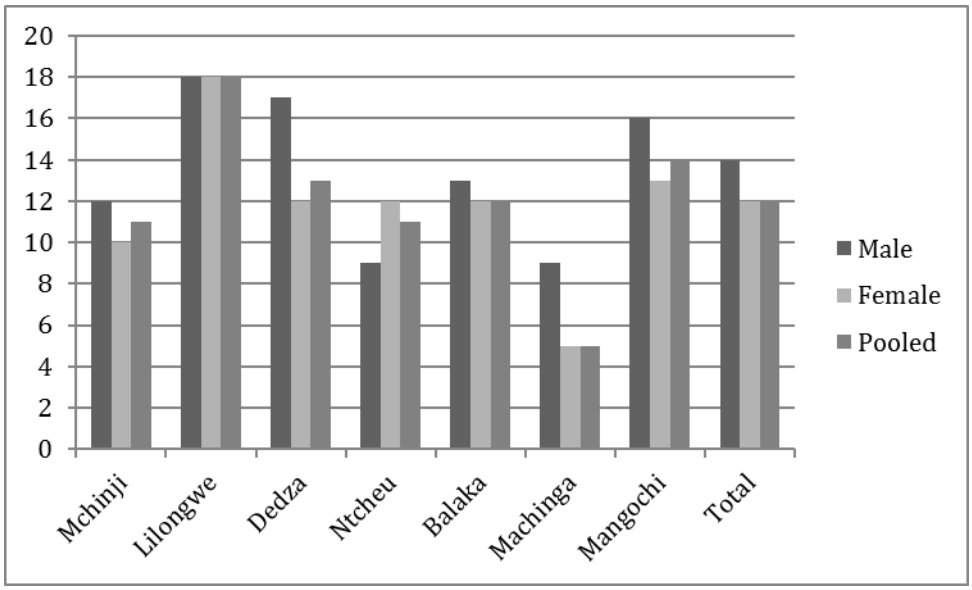

Figure 3. 3: Proportion of farmers who received training on packaging and training.

3.5.3 Beneficiary training in processing of groundnuts

Beneficiary farmers were also asked if they received training in processing of groundnuts. Figure 3.4 shows a summary of proportions of farmers who reported receiving training in processing of groundnuts into various products by gender and by district. Results indicate that the highest proportions of farmers who received the trainings were reported in Lilongwe district followed by Mchinji district and then Dedza district. Similarly, as discussed above extension services should intensify post-harvest processing among legume farmers so as to let the farmers take advantage of higher prices.

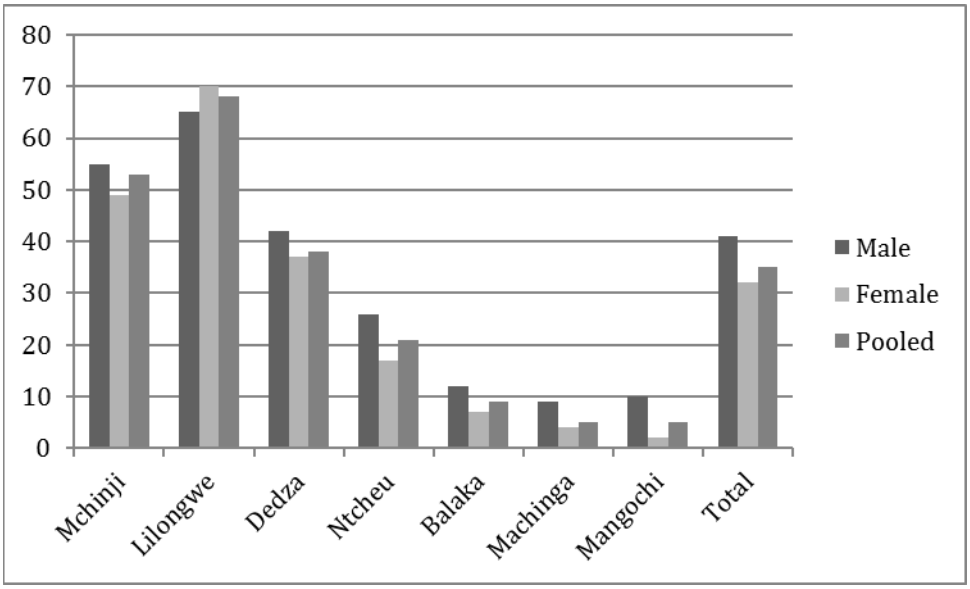

Figure 3. 4: Proportions of farmers who reported receiving training on processing of groundnuts into various products by gender and district

3.5.4 Awareness of the country's safety standards for groundnut products

Control of aflatoxins in groundnuts and other food products should start from the farm level up to storage facilities, transportation and marketing facilities. In Table 3.10 is a summary of results of proportion of beneficiary farmers who reported that they have knowledge of country's safety standards. In general, the results show that very few beneficiary farmers know about the country's safety standards on foods such as groundnuts. This is a concern as reports have shown that the high levels of aflatoxins that have been found in the country's exported groundnuts have affected groundnuts exports to the EU. There are reported cases where the whole consignment was returned. There is need to intensify awareness to local farmers on the food safety standards that meet international trade requirements since we are operating in a global economy.

Table 3. 10: Knowledge of safety standards in the country

District	Gender of respondent				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	13	17	13	13	13	30
Lilongwe	19	17	11	14	14	31
Dedza	17	9	13	20	14	29
Ntcheu	19	10	10	9	14	19
Balaka	15	9	7	5	11	14
Machinga	4	1	7	7	6	8
Mangochi	23	7	11	6	15	13
Total	16	70	11	74	13	144

3.5.5 Training on safety or quality standards for groundnut products

The study wanted to determine if legume farmers are trained on safety standards. Figure 3.5 gives a summary of results of beneficiaries who received training on safety standards. Except for Lilongwe, in all districts the highest proportion of those trained on safety standards were male beneficiaries. Across the districts, results varied by gender. The highest proportions, on average, were reported in Lilongwe district. In Lilongwe, 70 percent of female beneficiaries received while 68 percent male beneficiaries received training. The second highest district that received training on safety standards is Mchinji district where 55 percent of male beneficiaries received training while 49 percent received training on safety standards. The lowest district that received training was Mangochi district where 10 percent of male beneficiaries received training while 2 percent of female beneficiaries received training. In general, safety standard training was dominated by male beneficiaries as evidenced by a 9 percent difference between male and female beneficiaries. The results still show that there is a big room for improvement in terms of training of farmers in country's food safety standards that are to be met.

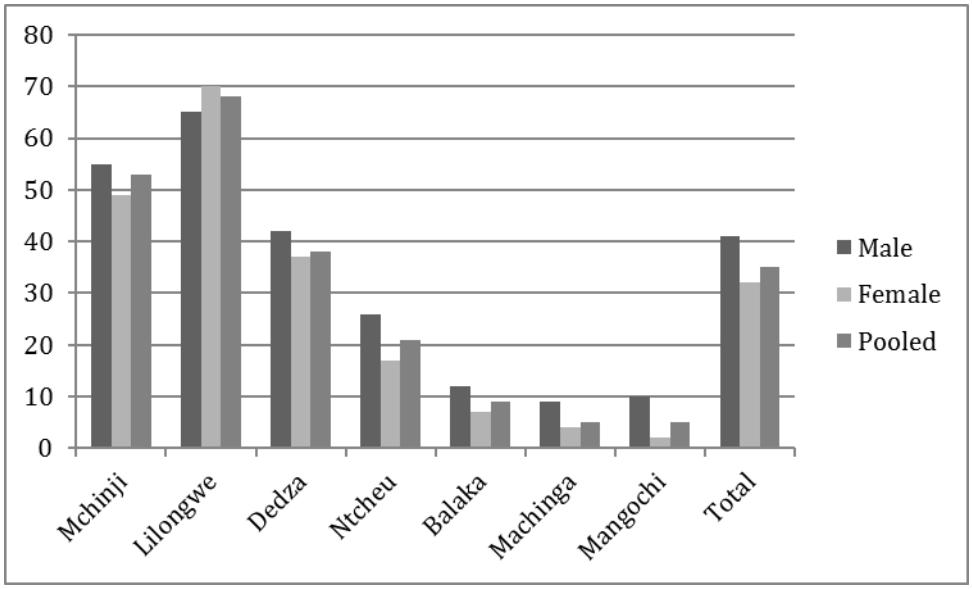

Figure 3. 5: Proportions of individuals who received safety standards training

3.6 Storage conditions for groundnuts

Enhancement of food security through consumption of required amounts of various foods and improved household incomes through marketing could be attained through proper storage of crop produce. Proper storage conditions ensure availability of safe foods and in required amounts with minimal storage losses. Summarized in Table 3.11 are proportions of beneficiary farmers who reported storing harvested groundnuts in proper storage conditions. Results show that about 94 percent of households stored their groundnuts in a cool dry place. While about 78 percent and 76 percent, stored their nuts in a raised and well-ventilated place, respectively. At least 70 percent of the beneficiaries in the sample stored their groundnuts in 50kg bags. Over 78 percent of the beneficiary farmers stored their groundnuts in leak proof places. Very low proportions of households storing their groundnuts 1 meter away from the walls and in interlocking stacks were reported across all the seven districts. Extension education should intensify on these two storage requirements.

Table 3. 11: Storage conditions of groundnuts by gender

Storage Type	Gender of beneficiary				Pooled	
	Male		Female			
	%	n	%	n	%	n
Cool and dry place	94	418	93	648	94	1066
Raised surface	81	359	76	529	78	888
Well ventilated	81	360	73	506	76	866
50Kg bags	71	317	75	523	74	840
1 meter from the walls/Roof	11	50	6	41	8	91
Leak proof roof	81	362	77	532	79	894
Interlocking stack	25	111	15	103	19	214

3.7 Source of information for various technologies and management practices

Beneficiary farmers were asked the sources of information for various technology and management practices they use. This was done for the study to evaluate the role various partners and INVC are taking in imparting knowledge to farmers through extension methods. Table 3.12 presents a summary of results of sources information on various technologies obtained by beneficiary farmers. In general, at least 55 percent of the beneficiaries got their information from other fellow farmers. While less than 10 percent got their information from radios, farmer groups, CADECOM, FUM, NASFAM and government agricultural extension workers. It appears lead farmers are doing more work in extension services than the mainstream government and NGO extension service.

Table 3. 12: Sources of information on technologies

Storage Type	Gender of beneficiary				Pooled	
	Male		Female			
	%	n	%	n	%	n
Government Extension	7	32	3	24	5	56
NASFAM	9	40	8	58	9	98
FUM	1	6	1	7	1	13
CADECOM	2	10	3	22	3	32
Farmer Group members	3	15	2	12	2	27
Other farmers	48	213	62	429	56	642
Radio	9	38	6	39	7	77
Other	21	91	15	103	17	194

3.8 Marketing technologies and practices for groundnuts

Farm produce can be sold in many different ways that farmers can take advantage of depending on the circumstances they are in. During this study beneficiary farmers were asked how they marketed their groundnuts. Table 3.13 gives a summary of the results of farmers that reported using various marketing technologies/practices for groundnut crop produce by gender and by district. As the results show, not many groundnuts farmers are using these modern ways of marketing or selling groundnuts. Less than 6 percent of the farmers were using any of the marketing technologies that the project is promoting. It appears that most farmers are not aware of these marketing technologies so there is need for intensified extension services that are geared towards establishing these marketing technologies. Care should be taken to ensure that established technologies are working towards uplifting the livelihoods of the beneficiary farmers.

Table 3. 13: Proportions of beneficiaries who reported knowledge of marketing technologies for groundnut crop

Marketing technology	Gender of beneficiary (%)				Pooled	
	Male		Female			
	%	n	%	n	%	n
Warehouse Receipt System	1.12	5	1.15	8	1.14	13
Bid Volume Offer	0.00	0	0.14	1	0.09	1
Marketing Information Point (MIP)	1.12	5	1.01	7	1.05	12
Forward contracts	0.22	1	0.29	2	0.26	3
Village aggregation Center	0.22	1	0.43	3	0.35	4
Collective marketing	2.91	13	1.44	10	2.02	23
Association led selling	6.05	27	4.32	30	5.00	57

It is reported that selling groundnuts in shells reduces labor and at the same time reduces aflatoxin threat. Farmers that sold groundnuts were asked if they sold the groundnuts in shells. Figure 3.6 presents results of households who reported that they sold groundnuts in shells by gender and by district in the study area. In general, at least 35 percent of farmers across the seven districts sold their groundnuts in shells. Lilongwe reported the highest observation with over 65 percent of farmers selling their groundnuts in shells. This was followed by Mchinji district with at least 50% of farmers reporting selling their groundnuts in shells. The southern districts of Balaka, Machinga and Mangochi reported the lowest proportions (less than 10%) of farmers who sold their groundnuts in shells.

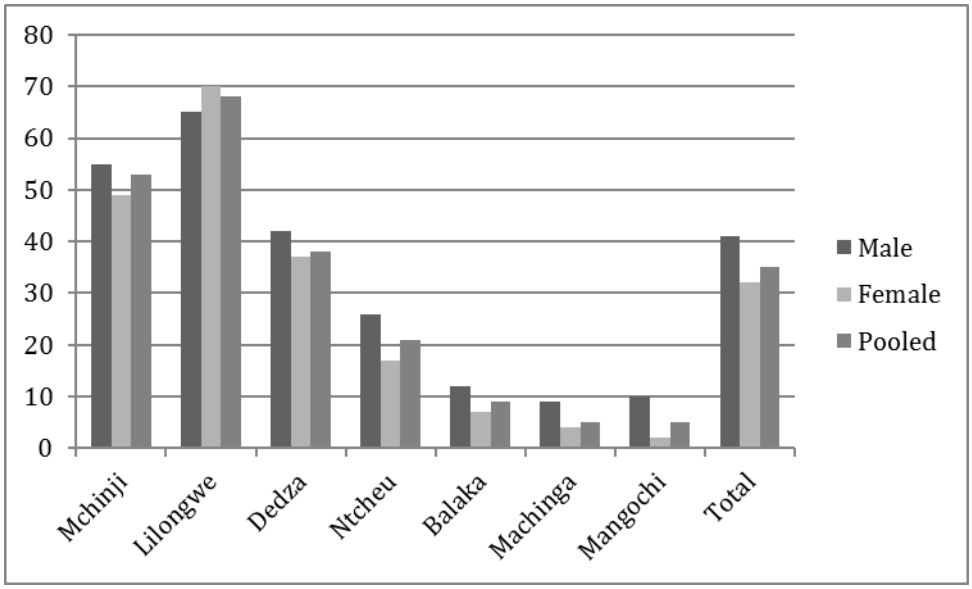

Figure 3. 6: Proportions of individuals who reported selling their groundnuts in shells

3.9 Groundnuts gross margin analysis

In the study gross margin analysis was undertaken to determine the contribution of groundnuts to household incomes. Table 3.14 presents results of the gross margin analysis in USD for groundnuts by decision-making power and INVC partner for groundnut beneficiaries during the 2013/14 reporting period. When results were disaggregated by decision-making power, beneficiaries who reported male as decision-making person reported highest gross margins per hectare of US$404.07 compared to beneficiaries who reported female as decision-making persons (i.e. gross margin of US$241.98). Households that reported joint decision-making power reported US$330.69. When results were disaggregated by INVC partners, the highest gross margin was observed among beneficiaries under FUM (i.e. US$420.45) followed by those under CADECOM (i.e. US$298.74) and then those beneficiaries under NASFAM (with gross margin of US$233.97). The study went further to analyze gross margins for farmers that only grew groundnuts only. Similarly, beneficiaries whose decision-making power were male had the highest gross margins (USD 406) followed by those beneficiaries whose decision-making was joint between male and female (US$310) and then beneficiaries whose decision-making was in the hands of females (US$226).

Male beneficiaries recorded higher gross margins per hectare than their female counterparts because, as observed in the technology adoption/usage tables above, male beneficiaries adopted the technologies more than the female beneficiary farmers. The ability for male beneficiary farmers to put into use modern land and crop husbandry practices on their plots put them at a higher advantage in levels of production per hectare than their female counterparts. This emphasizes the point that extension services should not leave out female beneficiary farmers who are in most cases vulnerable to food and income insecurity but should have deliberate policies and strategies that target the female beneficiary farmers.

Among the partners of INVC the results on gross margins showed that farmers under FUM had the best gross margins per hectare among the three beneficiaries. As stated above that during the survey farmers under NASFAM and CADECOM reported that the seeds that were distributed had very poor germination percentage, an issue that was also echoed by INVC and NASFAM officials. The second reason that can explain such low gross margins is the implementation program that NASFAM used. NASFAM, for reasons not explained by any interviewed staff in the field, distributed the seeds to beneficiaries very late in the agricultural season. A normal agricultural intervention with well-targeted objectives should ensure all farming inputs are with the farmers well before the onset of the first rains to allow planting with the first rains.

Agronomy teaches that early planting allows the plants/crops to take advantage of the first flush of nutrients, especially nitrogen, in the soil that comes with microbial activity of the coming of rains. There are other several factors that concern the soil environment and affects the growth pattern and physiological potential of a crop but all these may work to the disadvantage of crop growth if crops are planted late in the season. These include, but are not limited to: competition

from other plants already growing such as weeds; soil temperature at the time of planting affects germination rate and also growth rate; and soil moisture may not be conducive for good germination. In general, physiological plant growth for crop efficiency may have been affected because at a certain stage in the agricultural season the crop was expected to reach a particular level in the production cycle that was missed due to late planting. Many farmers complained bitterly about the late distribution of seeds and especially that despite this condition that was beyond their reproach they were still required to pay back the seed loan in its entirety the input cost of which adversely affected their gross margins lowering them further.

Table 3. 14: Gross margin (GM) calculation for groundnut for direct beneficiaries during 2013/14 reporting period

	Decision power			Partner				Who grew Groundnut only			
	Male (*n*= 273)	Female (*n*=439)	Joint (*n*=427)	FUM (*n*= 371)	NASFAM (*n*=622)	CADECOM (*n*=146)	Pooled (*n*=1,139)	Male (*n*=99)	Female (*n*=162)	Joint (*n*=169)	Pooled (*n*=430)
Total Production (mt)	104.85	89.21	130.96	167.45	121.28	36.28	325.03	39.81	30.38	44.28	114.48
Total Value of Sales (USD)	20445.28	13215.57	21418.53	32747.43	16199.11	6132.84	55079.38	6615.43	4557.47	6893.20	18066.11
Total Quantity of Sales (mt)	49.20	33.16	53.14	79.67	42.52	13.31	135.52	15.43	10.97	16.43	42.85
Total Cash Input Costs (USD)	3927.87	3345.93	5052.8	5197.383	5788.9	1340.32	12326.6	1296.1	1070.9	1879.07	4246.07
Total Hectares planted (ha)	98.11	133.10	144.34	151.34	172.74	51.47	375.56	38.79	51.12	53.81	143.73
GM /Ha of groundnut (USD/ha)	404.07	241.98	330.69	420.45	233.97	298.74	318.92	406.60	225.95	310.32	306.27
Yield of groundnut (MT/ha)	1.069	0.670	0.907	1.106	0.702	0.705	0.865	1.026	0.594	0.823	0.796

CHAPTER 4

SOYBEANS ENTERPRISE VALUE CHAIN

4.0 Introduction

Soybeans are one of the legumes that are being promoted by the government and an export as well as food crop. Soybeans are known to be rich in proteins and are processed into flour that is mixed with maize flour for porridge. The crop has high demand, both locally and internationally, hence can be grown by farmers as a cash crop to enhance household incomes. This chapter presents results and discussion of farmer activities in soybeans production. It discusses technology adoption by farmers in various farm activities including plot management, crop management, crop and husbandry practices, post-harvest technologies and marketing.

4.1 Plot management practices among soybeans beneficiary farmers

Plot management included cropping system, application of manure and inorganic fertilizers on the plot, ridging and planting distances and mulching. Ideally plot management includes land husbandry practices that enhances water infiltration into the soil, soil moisture retention and soil fertility. The results show that a high proportion (over 90%) of farmers are involved in soil fertility management practices in the entire district where INVC is working.

4.1.1 Ridge spacing technology adoption

In Table 4.1 is a summary of results of proportion of farmers that reported using modern technologies on ridge preparation by gender, district and overall. The recommended technologies included clearing land of debris, ridge spacing of 75cm, wider ridge width, and tier/box ridges. Almost all farmers reported that they adopted the technologies. There were no differences across gender among the beneficiaries.

Table 4. 1: Proportion of farmers reporting on ridges preparation by gender, district and overall

District	Adopters by Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	99	106	100	79	99	185
Lilongwe	100	50	99	91	99	141
Dedza	100	46	100	79	100	125
Ntcheu	100	33	98	61	99	94
Balaka	100	75	100	108	100	183
Machinga	98	41	95	145	96	186
Mangochi	100	83	100	134	100	217
Total	100	434	99	697	99	1132

4.1.2 Planting spacing technology adoption

Table 4.2 summarizes the proportion of farmers reporting on planting techniques used, by gender, district and overall. In general, results indicate that 91 percent of farmers practiced planting techniques that included plant spacing of 15cm, double row 30cm, and doubled-up legumes. When results are disaggregated by gender, 92 percent of female beneficiaries practiced the planting techniques while 90 percent male beneficiaries practiced. Except for Ntcheu district, at least 90 percent of the beneficiary farmers reported to have used the techniques in their fields. Very high proportions were observed in Mchinji, Balaka and Mangochi. Even though the proportions are high, results indicate that some households still did not practice modern planting techniques. Beneficiaries should therefore be encouraged to adopt modern planting techniques.

Table 4. 2: Proportion of farmers reporting on planting techniques done by gender, district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	94	101	96	76	95	177
Lilongwe	92	46	90	83	91	129
Dedza	89	41	89	70	89	111
Ntcheu	73	24	85	53	81	77
Balaka	89	67	96	104	93	171
Machinga	93	39	89	136	90	175
Mangochi	92	76	94	126	93	202
Total	90	394	92	648	91	1042

As reported in the section on groundnuts, some soybeans farmers also observed gaps in the germination of soybeans seeds. Refer to Table B2.2 that shows that almost half of all soybeans farmers reported observing gaps in their soybeans fields. Out the farmers that reported observing gaps in the fields, in general across all the seven districts, 64 percent of the farmers reported to have filled the gaps in their soybeans fields.

4.1.3 Plot management decision maker

Table 4.3 summarizes results of proportion of farmers reporting who makes decision on soybeans plot management by district. Overall results show that female beneficiaries made most

decisions on plot management followed by males and then those who jointly made decision. This agrees with ownership as it was reported in chapter 2 that female beneficiaries owned most plots. Only Mchinji district reported more male than female beneficiaries making decisions on plot management again due to the fact that the district reported more male than female beneficiaries. In summary, the results show that most decisions on management of plot are left in the hands of the plot owner or project beneficiary.

Table 4. 3: Proportion of farmers reporting who makes decision on plot management by district and overall

District	Decision power					
	Male		Female		Joint	
	%	n	%	n	%	n
Mchinji	42	108	32	81	26	68
Lilongwe	31	77	49	122	21	52
Dedza	19	45	54	130	27	65
Ntcheu	33	69	50	103	17	35
Balaka	30	60	43	86	28	56
Machinga	14	27	52	104	34	68
Mangochi	23	50	45	99	32	69
Total	28	436	46	725	26	413

4.2 Adoption of crop husbandry practices by beneficiary farmers

Crop husbandry practices that are promoted by the project include early planting with the first rains, planting of pure hybrid varieties, crop rotation, proper storage of seed, filling of germination gaps, weeding, and treating diseases and pests if observed in crops. During the evaluation study beneficiary farmers were asked if they adopted any of the crop husbandry technologies.

4.2.1 Adoption of Selinade or Makwacha soybean varieties among beneficiary farmers

On soybean production the INVC project is promoting the adoption of either Selinade or Makwacha varieties. Summarized in Table 4.4 are the proportions of farmers that planted Selinade/Makwacha by gender of beneficiaries by district. In general almost 90 percent of the farmers among the seven districts adopted the improved varieties. The southern districts registered the highest adoption of the improved varieties (almost 100%) while Mchinji recorded the lowest adoption of all districts. Across gender, more female beneficiary farmers planted the improved varieties than the male beneficiaries. Extension methods on teaching farmers on the importance of Selinade and Makwacha varieties in comparison with the other varieties should be intensified so that the remaining farmers who are not planting these varieties, especially in the central region districts, may consider to plant them.

Table 4. 4: Proportions of farmers that planted Selinade/Makwacha varieties

District	Gender of beneficiary				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	71	76	68	54	70	130
Lilongwe	75	38	79	73	78	111
Dedza	85	39	89	70	87	109
Ntcheu	88	29	100	62	96	91
Balaka	99	74	100	108	99	181
Machinga	98	41	97	148	97	189
Mangochi	99	82	98	131	98	213
Total	87	379	91	646	90	1025

4.2.2 Source of seeds among beneficiary farmers

The evaluation study wanted to identify where farmers obtained Selinade or Makwacha soybeans seeds. Table 4.5 summarizes results of farmer responses of sources of soybeans seed by gender of beneficiaries. The results show that most farmers got their seeds from NASFAM (67%). This should be the case because among the partners NASFAM and CADECOM are the ones that are distributing seeds. But NASFAM has a wider coverage than CADECOM hence the large proportion of farmers receiving seed from NASFAM. FUM, on the other hand, does not distribute seeds but only engages in capacity building. A few other farmers got the seed from the local market (8%) and saved it from own harvest (7%).

Table 4. 5: Source of soybeans seed by gender of beneficiaries and by partner

Seed source	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Local agro-dealer	4	19	2	12	3	31
Local market	9	38	7	48	8	86
Purchased in distance town	0.7	3	0.3	2	0.4	5
Government	7	29	6	43	6	72
NASFAM	59	257	72	508	67	765
FUM	3	12	1	7	2	19
CADECOM	0.2	1	0.1	1	0.2	2
Saved from own harvest	9	38	7	46	7	84
Given by fellow farmer	4	19	4	26	4	45
Others	5	21	2	13	3	34

Similarly, since NASFAM was the biggest source of soybeans seeds due to the large membership the report of late seed distribution also affected soybeans farmers. Table B2.4 in

Annex 2 gives a summary of proportion of farmers who reported to have planted with the first rains. Only 25 percent across the seven districts managed to plant with the first rains. This late planting could result in poor harvest and hence poor sales and farm incomes.

4.2.3 Crop rotation practices among beneficiary farmers

Crop rotation is the practice of growing dissimilar crops in the same area in sequential seasons. Crop rotation is proved to replenish soil nitrogen through a sequence of legumes and cereals. Summarized in Table 4.6 are the proportion of farmers reporting on crop rotation (crop planted the previous year) by gender, district and overall. About 62 percent of beneficiary farmers reported that their plot was planted to maize in the previous season. The results show that there are still farmers that are rotating a legume crop with another legume crop though the numbers of these farmers are small. There is need for extension messages that go to the beneficiary farmers to include training on the importance of crop rotation and how to sequence crops involved in crop rotation.

Table 4. 6: Proportion of farmers reporting on crop rotation (crop planted the previous year) by gender by district and overall

Previous crops preceding current soybean plots	Gender of respondent				Pooled	
	Male		Female			
	%	n	%	n	%	n
Maize	59	258	63	446	62	704
Soya beans	0.5	2	0.4	3	0.4	5
Common beans	0	0	0.4	3	0.3	3
Cowpeas	12	51	7	52	9	103
Burley	3	14	3	18	3	32
Dark western tobacco	0.7	3	0.1	1	0.4	4
Cotton	9	41	8	56	9	97
Cassava	1	5	0.9	6	1	11
Sweet potatoes	4	16	5	32	4	48
Irish potatoes	1	5	0.3	2	0.6	7
Sorghum	0.2	1	1	7	0.7	8
Rice	0	0	0.1	1	0.1	1
Groundnut	3	11	3	17	3	28

Crop rotation is also supposed to aid in the reduction of pests and diseases. Farmers were asked if they observed significant diseases and pests. Results in Tables A2.6 and A2.7 give summaries of proportion of farmers who observed significant diseases and pests. About 33 percent and 45 percent of the farmers in the seven district reported observing diseases and pests, respectively.

4.2.4 Proportion of farmers reporting weeding practices by gender by district and overall

Weeds are undesirable plants that compete with crops for space, light, water and nutrients. Proper weeding enables crops to have sufficient nutrition and may result into higher output.

Table 4.7 summarizes results of the proportion of farmers that reported practicing recommended weeding practices by gender and district. The entire sample results show that only 11 percent of farmers followed the recommended weeding practices in their soybean farms. Generally the results show that a large proportion of the beneficiary farmers (over 80%) across gender and the seven districts did not practice the recommended way of weeding. The question could be that, are the extension messages not including weeding practices? Extension efforts should intensify proper weeding practices so that farmers benefit from the good yields that result from a properly weeded crop plots.

Table 4. 7: Proportion of farmers reporting weeding practices by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	17	18	16	13	17	31
Lilongwe	14	7	10	9	11	16
Dedza	2	1	3	2	2	3
Ntcheu	15	5	2	1	6	6
Balaka	9	7	24	26	18	33
Machinga	12	5	9	14	9	19
Mangochi	13	11	10	13	11	24
Total	12	54	11	78	11	132

4.3 Knowledge of harvesting time for soybean among beneficiary farmers

The evaluation study wanted to determine if farmers were aware of time to harvest soybeans. Extension methods recommend that soybeans be harvested 120 days after planting. If harvested late the farmers encounter crop product loss because some pods open. Table 4.8 summarizes the proportion of farmers that reported being aware of harvest time and average days to harvest after planting, by gender, by district and overall. The highest proportion of farmers who knew the right harvest time for soybeans was observed in Mchinji. In general the results show that most farmers (over 75%) are not aware of the average days the crop takes in the field before harvesting. The farmers reported using other methods (like leaves drying, pods opening) to determine harvest time of soybeans. Extension services to soybean beneficiary farmers need to intensify and include lessons on the number of days to harvest after planting.

Table 4. 8: Proportion of farmers reporting on knowledge of harvest time and average days to harvest after planting by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	35	37	29	11	32	48

Lilongwe	24	12	22	10	22	22
Dedza	13	6	22	9	18	15
Ntcheu	27	9	16	5	20	14
Balaka	24	18	23	12	24	30
Machinga	21	9	20	15	21	24
Mangochi	19	16	20	13	20	29
Total	24	107	22	75	23	182

4.4 Marketing of soybeans by beneficiary farmers

Table 4.9 summarizes the proportion of farmers who sold their soybeans by gender, by district and overall. In general, the results show that over 80 percent of the farmers in Mchinji, Lilongwe and Dedza sold their soybeans followed by Ntcheu that reported 71 percent of farmers selling soybeans. Observations from the southern districts showed that, by the time of the survey, most farmers had not yet sold their soybeans. In some cases the farmers reported that the crop was taken by NASFAM to storage and in some cases the crop had poor germination so the farmers did not harvest enough to sale. There were also cases where farmers reported that it was their first time to grow soybeans and the crop was attacked by pests and diseases that they did not know what to do about. Their efforts to get assistance from NASFAM extension officers and government extension officers did not yield anything. The most notable reason that may contribute to fewer farmers able to sale their crop was reported to be late distribution of seeds by NASFAM to the beneficiary farmers. Most farmers reported very willing to engage in legume production but were held back due to late distribution of seeds by NASFAM (in some cases seeds were reported distributed in January 2014, which was way after the first rains) that resulted in poor production of the crop. Efforts should be made to distribute seeds before the onset of rains so that farmers can plant with the first rains to get advantage of the first flash of soil nutrients. Extension service should intensify in areas that are known to grow soybeans for the first time to train farmers on possible diseases and pests for the crop and how to respond. Many farmers have reported the issue of poor germination of seeds. The project needs to look into the poor germination of seeds and late distribution of seeds by partners issues seriously if the project objectives are to be attained. If such problems are not addressed the farmers would be discontented, lose interest in the farming activity thereby affecting the sustainability of the project after funding phase out. A good and well-implemented project will automatically win the hearts of farmers and result into a big success.

Table 4. 9: Proportion of farmers who sold their soybeans by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	92	98	89	70	90	167

Lilongwe	82	41	85	78	84	119
Dedza	91	42	96	76	94	118
Ntcheu	79	26	66	41	71	67
Balaka	12	9	25	27	20	37
Machinga	48	20	33	50	36	70
Mangochi	57	47	45	60	49	106
Total	65	283	57	403	60	686

4.5 Post-harvest handling of soybeans

Post-harvest processing of produce is one way of adding value to the produce. In the modern competitive market farmers need to learn to move up the value chain through vertical integration so that they can capture some of the price benefits that usually obtained by the traders and vendors who are operating up the value chain. Extension in agribusiness needs to take charge and gear up farmers for a little vertical integration by encouraging them to sell processed produce.

4.5.1 Farmers who applied post-harvest processing to soybeans

Table 4.10 gives a summary of the proportion of farmers who applied post-harvest technologies to soybeans before selling, by gender, by district and overall. In general the results show that most farmers (over 80%) clean and sort their crop produce before selling. Very few farmers grade, package and label their crop produce. This may be because farmers do not see the added value of the extra post-harvest handling of the soybeans because they do not get premium for such added costs. The other reason farmers do not engage in post-harvest processing of legume produce could be because most smallholder farmers sell their produce to vendors or intermediate buyers not directly to supermarkets where they can get the premium for processing. It is important to organize farmers in groups to take advantage of group marketing and sell their product in bulk to supermarkets to fetch higher prices due to the value addition that may come about after post-harvest processing. Presently, very few farmers process their soybeans before they sell (Table B2.8 in Annex 2).

Table 4. 10: Proportion of farmers who applied post-harvest technologies to soybeans before selling by gender

Post-harvest technologies	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Cleaning	99	431	99	698	99	1129
Sorting	85	368	86	605	85	973
Grading	39	170	36	257	38	427
Packaging	9	38	3	23	6	61

Labeling	0.4	2	0.3	2	0.3	4

4.5.2 Proportion of farmers reporting receiving training on grading and packaging

As noted in Table 4.10 above some of the post-harvest handling that were done by the least proportion of famers were grading, packaging and labeling. As discussed in section 4.5.1 post-harvest handling of crops add value to the product. To enhance legume farmer household income training them in post-harvest handling is essential. Grading and packaging are key determinants of revenue in grain enterprises. Most agricultural commodities fetch lower prices because less attention is given towards grading and packaging. Summarized in Table 4.11 are results of the proportion of farmers that reported they received training on grading and packaging by gender and by district. In general, very few farmers (17%) reported that they received training on grading and packaging. There is a one percent difference between male beneficiaries (17%) and female beneficiaries (16%) who reported that they received training on grading and packaging. Despite the program targeting female beneficiaries, results generally indicate that, except in Lilongwe, Ntcheu and Balaka districts, male beneficiaries had attended more training than female beneficiaries. One possible reason could be that soybeans are usually viewed as a cash crop and most cash crops easily catch the attention of men. Nevertheless, the results agree with observations in Table 4.10 above that showed very few farmers involved in grading and packaging. Extension services by partners should intensify training in post-harvest handling for value addition.

Table 4. 11: Proportion of farmers reporting receiving training on grading and packaging by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	9	10	9	7	9	17
Lilongwe	8	4	12	11	10	15
Dedza	11	5	6	5	8	10
Ntcheu	6	2	11	7	9	9
Balaka	11	8	16	17	14	25
Machinga	33	14	16	24	19	38
Mangochi	37	31	33	44	35	75
Total	17	74	16	115	17	187

4.5.3 Proportion of farmers who reported aware of the country's safety standards for soybeans products

Safety standards ensure that food that is provided to people is free of substances or organisms that may cause harm. Training in safety standards is one of INVCs focus areas as it ensured that

farmers handle the produce appropriately to prevent accumulation of aflatoxins. Summarized in Table 4.12 are the proportion of beneficiaries who reported that they were aware of the country's safety standards for soybean products by gender and district. In general, about 13 percent of the beneficiaries reported that they were aware of the safety standards. This shows that knowledge of safety standards is lower among beneficiaries across the sample. One possible explanation is that literacy levels among beneficiaries are low and that affects the ability to access and to synthesize information. The differences are very small across gender with more male beneficiaries being aware of the safety standards than their female counterparts. Efforts should be made to design simple and comprehensible messages for farmers to understand the importance of safety in handling food for human health. Issues of aflatoxin accumulation in foods should be stressed and their impact on trade and hence national income.

Table 4. 12: Proportion of farmers who reported aware of the country's safety standards for soybeans products by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	11	12	14	11	12	23
Lilongwe	10	5	8	7	8	12
Dedza	13	6	3	2	6	8
Ntcheu	6	2	5	3	5	5
Balaka	11	8	7	8	9	16
Machinga	24	10	13	20	15	30
Mangochi	30	25	26	35	28	60
Total	16	68	12	86	13	155

4.5.4 Proportion of farmers who reported to have received training on safety or quality standards for soybeans products

The Table 4.13 below shows that partners in the INVC project conducted some training on safety and quality standards. The Table gives a summary of the proportions of farmers who reported that they received training on safety or quality standards for soybeans products by gender and by district. Ironically, though few farmers reported aware of the country's safety standards but most of them reported that they received training on the same. In the districts of Lilongwe, Dedza and Balaka that had very low numbers of farmers who are aware of country's safety standards for legumes (Table 4.12), it was observed all interviewed farmers reported to have received training on the same. In general, 73 percent of beneficiaries received training on safety standards. Of note, slightly more female beneficiaries (74%) reported that they received training than male beneficiaries (72%).

Table 4. 13: Proportion of farmers who reported to have received training on safety or quality standards for groundnut products by gender by district and overall

District	Gender of beneficiaries				Pooled	
	Male		Female			
	%	n	%	n	%	n
Mchinji	42	45	73	58	57	103
Lilongwe	100	50	100	92	100	142
Dedza	100	46	100	79	100	125
Ntcheu	67	22	67	42	67	64
Balaka	100	75	100	108	100	183
Machinga	58	24	52	80	53	104
Mangochi	70	58	80	107	76	165
Total	72	320	74	566	73	886

4.6 Storage technologies for soybeans

Storage is an important component of marketing agricultural commodities. It enables farmers to keep the commodity over time from time of plenty to time of scarcity thereby gaining value. Table 4.14 summarizes the proportions of farmers who reported conditions of storage facilities for soybeans by gender, by district and overall. The report shows that most farmers store their produce in cool and dry places, well ventilated places, with leak proof roof and in 50 kg bags. The results show that there are still few farmers (about 33%) that do not store their produce on raised surface. A lot more farmers across gender and districts (over 90%) did not store their produce 1 meter away from the walls and in interlocking stacks. Extension services should encourage farmers to store their produce following recommended practices.

Table 4. 14: Proportion of farmers who reported storage conditions for soybeans by gender by district and overall

Storage Type	Gender of respondent				Total	
	Male		Female			
	%	n	%	n	%	n
Cool and dry place	96	419	92	650	93	1069
Raised surface	70	305	66	467	67	772
Well ventilated	83	362	74	523	77	885
50Kg bags	80	349	75	530	77	879
1 meter from the walls/Roof	8	35	2	14	5	49
Leak proof roof	89	388	80	566	83	954
Interlocking stack	15	65	8	57	10	122

4.7 Source of information for various technologies and management practices

Access to information for various technologies plays an important role in facilitating adoption. Table 4.15 presents results of the number of farmers who reported source of information for the various technologies and management practices by gender, by district and overall. In general, 57 percent of farmers reported that they obtained their information from other farmers. The second widely used source of information was NASFAM with 16 percent of the beneficiaries reporting using it as their source of information. A few other farmers (about 6%) reported obtaining information from government extension workers. Therefore, the results show that farmer-to-farmer information sharing is important when sharing information about various technologies and management practices.

Table 4. 15: Number of farmers who reported sources of information for the various technologies and management practices by gender, by district and overall

Information source	Gender of beneficiary				Pooled	
	Male		Female			
	%	n	%	n	%	n
Government Extension	8	34	5	34	6	68
NASFAM	15	66	17	122	16	188
FUM	2	9	0.7	5	1	14
CADECOM	0.2	1	0.6	4	0.4	5
Farmer Group members	3	13	4	26	3	39
Other farmers	52	227	60	421	57	648
Radio	6	25	1	9	3	34

4.8 Marketing technologies and practices for soybeans

Table 4.16 presents a summary of the proportion of farmers who reported using various marketing technologies/practices for soybean crop produce by gender, by district and overall. In general the results show that most farmers are not yet involved in these marketing techniques. Slightly more male farmer beneficiaries sold their produce through these marketing channels than female beneficiaries. During the study most farmers did not know any of the marketing techniques being promoted here. Most farmers under FUM sold their produce, if any, to intermediate buyers and those under NASFAM either had not yet sold their produce or sold to NASFAM. As we noted above that not many farmers sold their produce due to late planting, poor germination and poor harvest. If these are technologies being promoted by the project then farmers need to be trained in all of them and provision need to be made for farmers to access these marketing techniques.

Table 4. 16: Number of farmers who reported using various marketing technologies/practices for soybeans crop produce by gender by district and overall

Marketing technology	Gender of beneficiary (%)		Pooled
	Male	Female	

	%	n	%	n	%	n
Warehouse Receipt System	2.1	9	1.0	6	1.3	15
Bid Volume Offer	0.2	1	0	0	0.1	1
Marketing Information Point (MIP)	1.1	5	1.0	7	1.1	12
Forward contracts	0.2	1	0	0	0.1	1
Village aggregation Center	2.1	9	0.6	4	1.1	13
Collective marketing	3.0	13	2.4	17	2.6	30
Association led selling	10.0	43	7.3	52	8.3	95

4.9 Soybeans gross margin analysis

Gross margins assist in determining profitability of an enterprise. They may also aid in pricing decisions. Positive gross margins indicate that a particular enterprise is profitable while negative gross margins indicate losses. Table 4.17 summarizes results of the gross margin analysis for soybeans. Results have been disaggregated by decision-making power on the farm, partner organization and by whether the farmer grew soybeans only. Results generally indicate that regardless of aggregation, all beneficiaries realized positive gross margins when all costs were factored in. This is evidenced by a pooled gross margin of $165.50. Of note, beneficiaries who reported that males had more decision-making power on soybean farms realized the highest gross margin i.e. US$260. Noteworthy, the INVC project targeted female beneficiaries but despite that, male beneficiaries realized higher gross margins than females.

As noted before, male beneficiaries recorded higher gross margins per hectare than their female counterparts but unlike in the case of groundnuts, proportions of soybeans farmers across gender did not differ that much hence that cannot explain the difference. But of note is that male beneficiary farmers have less planted soy hectares than female beneficiaries even though their level of production is much higher than that of female beneficiaries. There could be something about the production system of male farmers that was not well captured. Hence the recommendation stated in section 4.9 that extension services should not leave out female beneficiary farmers who are in most cases vulnerable to food and income insecurity but should have deliberate policies and strategies that target the female beneficiary farmers also applies here.

Among the partners of INVC the results on gross margins showed that farmers under NASFAM had the best gross margins per hectare among the three beneficiaries. Among the partners NASFAM distributed the recommended variety of seeds. Furthermore, the gross margin for NASFAM farmers could have been higher than reported had it been the seeds were distributed on time. The reasons for the lower yields due to late distribution of seeds are as discussed in the groundnuts section on gross margin (Section 4.9 above).

During the survey some farmers under FUM who were asked the source of seeds and their varieties reported obtaining the seeds from fellow farmers and did not know the variety. It could be that farmers under FUM and CADECOM (since CADECOM did not distribute soy seeds but groundnuts seeds only) planted poor varieties that affected their yields hence gross margins per hectare. It could be important for INVC to include local agro-dealers in their partnership so that local farmers have access to improved varieties of soybeans seeds (i.e. Selinade and Makwacha) and groundnuts seeds (i.e. CG 7).

Table 4. 17: Gross margin calculation for Soybean for direct beneficiaries during 2013/14 reporting period

	By Decision power			By Partner				Who grew soy only			
	Male (*n*=272)	Female (*n*=459)	Joint (*n*=412)	FUM (*n*=286)	NASFAM (*n*=801)	CADECOM (*n*=51)	Pooled (*n*=1143)	Male (*n*=95)	Female (*n*=189)	Joint (*n*=150)	Pooled (*n*=434)
Total Production (mt)	67.45	53.45	74.91	54.93	132.34	8.53	195.81	28.88	20.74	27.90	77.54
Total Value of Sales (USD)	11083.01	8789.12	13611.2	10415.7	21327.82	1739.817	33483.34	4698.67	3132.1	5071.33	12902.11
Total Quantity of Sales (mt)	36.39	28.96	47.15	35.81	71.32	5.37	112.51	17.45	10.65	17.07	45.18
Total Cash Input Costs (USD)	2608.22	2103.48	3757.25	2693.53	5339.08	436.34	8468.96	1293.6	944.42	1537.03	3775.05
Total Hectares planted (ha)	69.05	109.37	114.13	81.53	194.05	16.97	292.56	26.29	43.78	40.87	110.96
GM /hectare soy (USD/Ha)	259.73	129.09	156.56	162.93	176.43	137.14	170.24	246.59	117.75	165.20	165.54
Yield of soybeans (MT/ha)	0.977	0.489	0.656	0.674	0.682	0.503	0.669	1.099	0.474	0.683	0.699

CHAPTER 5

CONCLUSIONS

5.1 Plot management practices among beneficiary farmers

The study found that there were no differences across gender and no major differences across the districts in terms soil fertility management. Over 98 percent of farmers applied soil fertility management practices in groundnuts field plots. Similar results were observed among soybeans farmer beneficiaries. A high proportion (over 90%) of farmers were involved in soil fertility management practices in all the district where INVC is working. Slightly more female beneficiaries applied soil fertility management practices in their fields than their male counterparts.

The project is promoting ridge preparation technology such as clearing the land of debris, ridge spacing of 75cm, wider ridge width, and tier/box ridges. In groundnuts, the results generally indicate that over 90 percent of all the beneficiary farmers adopted at least one of these technologies with low proportions observed in Machinga and Mangochi districts. Nevertheless, female beneficiaries had adopted the technology more than male beneficiaries in four out of seven districts. In soybeans farmers it was observed that almost all farmers reported that they adopted the technology. There were no differences across gender among the beneficiaries.

The project promoted planting techniques that included plant spacing of 15cm, double row 30cm, and doubled-up legumes. Observed results for groundnuts beneficiary farmers indicate that over 80 percent of all the beneficiary farmers adopted the planting techniques. Specifically, at district levels male beneficiaries adopted the technology more than female beneficiaries, with the exception of Balaka district. In general, results for soybeans beneficiary farmers indicate that except for Ntcheu district, at least 90 percent of the beneficiary farmers reported to have used the techniques in their fields. However, the results indicate that some households still did not practice modern planting techniques.

On decision-making on plot management for groundnuts and soybeans, female beneficiary farmers made most decisions. As noted in demographic characteristics, most of the beneficiaries, except for Mchinji district, were females hence the results prove that most of the decisions on plot management are made by beneficiaries themselves.

5.2 Crop management practices

Crop husbandry practices that are promoted by the project include early planting with the first rains, planting of pure hybrid varieties, crop rotation, proper storage of seed, filling of germination gaps, weeding, and treating diseases and pests if observed in crops. During the evaluation study beneficiary farmers were asked if they adopted any of the crop husbandry technologies.

In general, results show that slightly over half of the beneficiaries grew CG7 groundnut varieties. The districts that reported the least proportions of beneficiaries growing CG7 were Mangochi, Balaka and Machinga districts. For soybeans, almost 90 percent of the farmers among the seven districts adopted the improved varieties of Selinade and Makwacha. The southern districts registered the highest adoption of the improved varieties (almost

100%) while Mchinji recorded the lowest adoption of all districts. Across gender, more female beneficiary farmers planted the improved varieties than the male beneficiaries.

As regards to sources of seeds for groundnuts and soybeans, most farmers reported NASFAM as the main sources followed by own harvest and then fellow farmers. The results for groundnuts farmers indicate that over 30 percent of the beneficiaries obtained their seed from NASFAM. This was seconded by 20 percent who reported to acquire seed from their own harvest. The results for soybeans farmers show that most farmers got their seeds from NASFAM (67%).

On crop rotation, results indicate that 78 percent of respondents planted maize during the previous season in groundnuts plot. About 62 percent of beneficiary soybeans farmers reported that their plot was planted to maize in the previous season. This shows that most farmers follow the proper crop rotation by rotating cereals and legumes. However, the results showed that there were still farmers that were rotating a legume crop with another legume crop though the numbers of these farmers are small.

Beneficiary farmers were asked if they weeded as soon as weeds appear or at least 3 times in the past season. Among beneficiary groundnut farmers, very few farmers practiced recommended weeding practices in their fields. Overall, 16 percent of the farmers reported weeding as soon as weeds appeared and/or weeding at least three times in the past season. Similarly among the soybeans farmers, results show that only 11 percent of farmers followed the recommended weeding practices in their soybean farms. During interview discussions with farmers it was learnt that farmers do weed the fields but most of them did not weed as soon as weeds appear while others reported weeding once or twice in the past season.

5.3 Harvesting and drying technologies among beneficiary farmers

Extension methods recommend that groundnuts should be harvested between 130-150 days after planting. Results of the survey show low proportions of farmers who knew the exact period for harvesting groundnuts. Similarly for soybeans, the results show that most farmers (over 75%) are not aware of the average days the crop takes in the field before harvesting.

On crop drying techniques practiced by beneficiary farmers, overall, among all the districts, only half of the farmers (50%) reported following the recommended drying methods. Most farmers reported that they do not dry their crop in the field due to theft. Usually farmers harvest raw groundnuts and dry it at home.

5.4 Crop sales and post-harvest processing

The results generally indicate that 61 percent of the beneficiaries sold their groundnuts. When the results were disaggregated by gender, 70 percent of farmers who reported selling groundnuts were male and 55 percent were female beneficiaries. The results show that few farmers access the market with their produce. Out of over 1000 farmers that reported growing groundnuts only 695 sold their groundnuts. Groundnuts as a crop has high gross margins hence they are a good income enhancement crop among farmers. Farmers are encouraged to grow enough for home consumption and sell the surplus for income. The story was somehow different for soybeans farmers, in general, the results show that over 80 percent of the farmers in Mchinji, Lilongwe and Dedza sold their soybeans followed by Ntcheu which reported 71 percent of farmers selling soybeans. Observations from the southern districts showed that, by the time of the survey, most farmers had not yet sold their soybeans. The most

notable reasons that may contributed to less farmers able to sale their crops was reported to be late distribution of seeds by NASFAM to the beneficiary farmers, poor germination of the crops and disease and pests infestation that lacked assistance from extension services.

5.5 Post-harvest handling and processing

On post-harvest processing results show that over 65 percent of the groundnuts farmers cleaned and sorted their groundnuts. Very low numbers of farmers do grade, package or label their crop produce before they sell. Similar results were observed among soybeans farmers. In general the results showed that most farmers (over 80%) clean and sort their soybean crop produce before selling. Very few farmers grade, package and label their crop produce. Very few farmers process their produce into other products (i.e. 2% and 4% for groundnuts and soybeans, respectively).

On farmer training in grading and packaging the results indicated that there were very low proportions of groundnuts farmers (less than 20%) across the districts that got trained in grading and packaging. Similarly, among soybeans farmers only 17 percent reported that they received training on grading and packaging.

On awareness of the country's safety standards, especially, to control aflatoxins the results showed that very few beneficiary farmers knew about the country's safety standards on foods such as groundnuts and soybeans. This is a concern as reports have shown that the high levels of aflatoxins that have been found in the country's exported groundnuts have affected groundnuts exports to the EU. There is need to intensify awareness to local farmers on the country's food safety standards that meet international trade requirements since we are operating in a global economy. However, high proportions of beneficiary farmers (over 50% in some districts) reported being trained in the country's safety standards on foods. There were other districts that had low observations on those trained on food safety standards.

5.6 Storage conditions for groundnuts

Proper storage conditions ensure availability of safe foods and in required amounts with minimal storage losses. Results show that about 94 percent of households stored their groundnuts in a cool dry place. While about 78 percent and 76 percent, stored their nuts in a raised and well-ventilated place, respectively. At least 70 percent of the beneficiaries in the sample stored their groundnuts in 50kg bags. Over 78 percent of the beneficiary farmers stored their groundnuts in leak proof places. Very low proportions of households storing their groundnuts 1 meter away from the walls and in interlocking stacks were reported across all the seven districts.

On soybeans storage results show that most farmers store their produce in cool and dry places, well ventilated places, with leak proof roof and in 50 kg bags. The results show that there are still few farmers (about 33%) that do not store their produce on raised surface. A lot more farmers across gender and districts (over 90%) did not store their produce 1 meter away from the walls and in interlocking stacks.

5.7 Source of information for various technologies and management practices

Beneficiary farmers were asked the sources of information for various technology and management practices they use. In general, at least 55 percent and 57 percent of the groundnuts and soybeans farmers, respectively, got their information from fellow farmers. While less than 20 percent got their information from radios, farmer groups,

CADECOM, FUM, NASFAM and government agricultural extension workers. It appears lead farmers are doing more work in extension services than the mainstream government and NGO extension service.

5.8 Marketing technologies and practices

Farm produce can be sold in many different ways that farmers can take advantage of depending on the circumstances they are in. Beneficiary farmers were asked how they marketed their groundnuts. The results showed that not many farmers were using these modern ways of marketing or selling groundnuts. Less than 6 percent of the farmers were using any of the marketing technologies that the project is promoting. It appears that most farmers were not aware of these marketing technologies so there is need for intensified extension services that are geared towards establishing these marketing technologies. If these are technologies being promoted by the project then farmers need to be trained in all of them and provision need to be made for farmers to access these marketing techniques.

It is reported that selling groundnuts in shells reduces labor and at the same time reduces aflatoxin threat. In general, at least 35 percent of farmers across the seven districts sold their groundnuts in shells. Lilongwe reported the highest observation with over 65 percent of farmers selling their groundnuts in shells. This was followed by Mchinji district with at least 50% of farmers reporting selling their groundnuts in shells. The southern districts of Balaka, Machinga and Mangochi reported the lowest proportions (less than 10%) of farmers who sold their groundnuts in shells.

5.9 Gross margin analysis

In the study gross margin analysis was undertaken to determine the contribution of the crop to household income. The gross margin analysis results for the 2013/14 reporting period were presented in US dollar according to decision-making household member and INVC partners. When results were disaggregated according to decision-making household member, beneficiaries who reported male as decision-making person reported highest gross margins per hectare (US$404.07 for those that grew groundnuts and soybeans and US$406.00 for those that grew groundnuts only). Furthermore, when results were disaggregated based on INVC partners, the highest gross margin was observed among beneficiaries under FUM (i.e. US$420.45).

Male beneficiaries recorded higher gross margins per hectare than their female counterparts because, as observed in the technology adoption/usage tables above, male beneficiaries adopted the technologies more than the female beneficiary farmers. Among the partners of INVC the results on gross margins showed that farmers under FUM had the best gross margins per hectare among the three beneficiaries. The low gross margins for farmers NASFAM and CADECOM could be because of poor seed germination percentage and distribution of seeds to beneficiaries very late in the agricultural season.

Similarly, Soybeans beneficiaries who reported that males had more decision making power on soybean farms realized the highest gross margin i.e. US$260 for those that grew both groundnuts and soy and US$176.43 for those that grew soybeans only. Among the INVC partners, NASFAM reported the highest gross margin of US$246.59.

As noted before, male beneficiaries recorded higher gross margins per hectare than their female counterparts but unlike in the case of groundnuts, proportions of soybeans farmers across gender did not differ that much hence

that cannot explain the difference. There could be something about the production system of male farmers that was not well captured.

Among the partners NASFAM distributed the recommended variety of seeds. During the survey some farmers under FUM who were asked the source of seeds and their varieties reported that they obtained the seeds from fellow farmers and did not know the variety. It could be that farmers under FUM and CADECOM planted poor varieties that affected their yields hence gross margins per hectare. It could be important for INVC to include local agro-dealers in their partnership so that local farmers have access to improved varieties of soybeans seeds (i.e. Selinade and Makwacha) and groundnuts seeds (i.e. CG 7).

B. Recommendations

B1. Extension messages on soil fertility management should still be intensified to target the remaining few farmers that are not practicing these technologies.

B2. Despite the good results farmers still need to be commended and encourage to keep up with the ridge spacing technologies by adopting all of them.

B3. Beneficiary farmers should be encouraged to adopt modern planting techniques. There is need for extension services to encourage female beneficiaries and other remaining farmers to adopt the modern planting technologies.

B4. There is still need for extension services to promote CG7 among beneficiary farmers and also make it readily accessible to the farmers.

B5. Extension methods on teaching farmers on the importance of Selinade and Makwacha varieties in comparison with the other varieties should be intensified so that the remaining farmers who are not planting these varieties, especially in the central region districts, may consider to plant them.

B6. There is need for extension messages that go to the beneficiary farmers to include training on the importance of crop rotation and how to sequence crops involved in crop rotation.

B7. Extension services should aim at intensifying training farmers on the importance of recommended weeding practices so as to enhance their crop production.

B8. Extension advice should also include training farmers on days that the two legume crops take to mature for ready to harvest.

B9. Very few farmers access the market with groundnuts. Farmers need to be encouraged to grow more groundnuts and sell the surplus.

B10. NASFAM should distribute seed way before the onset of the rains to allow farmers plant with the first rains.

B11. Seed germination rate is another big concern that require multidisciplinary approach to identify whether the seed sold to farmers is really good seed. Seed distributors should take this matter seriously and work to resolve the issue that could seem taking advantage of the poor rural masses that derive their livelihoods from farming.

B12. Government extension service in coordination with partners, especially NASFAM, should work hard to assist farmers when they encounter disease and pests infestation, especially in areas where they are growing soybeans.

B13. Extension training should encourage farmers to engage in valuable post-harvest processing of their groundnuts and soybeans to take advantage of good prices.

B14. There is need to intensify awareness to local farmers on the country's food safety standards that meet international trade requirements since we are operating in a global economy. Efforts should be made to design simple and comprehensible messages for farmers to understand the importance of safety in handling food for human health. Issues of aflatoxin accumulation in foods should be stressed and their impact on trade and hence national income.

B15. Extension services should encourage farmers to store their produce following recommended practices.

B16. On marketing technologies, the results were clear that most farmers were not aware of the marketing technologies so there is need for intensified extension services that are geared towards establishing these marketing technologies.

B17. Extension services should not leave out female beneficiary farmers who are in most cases vulnerable to food and income insecurity but should have deliberate policies and strategies that target the female beneficiary farmers.

ANNEXES

ANNEX 1: HOUSEHOLD QUESTIONNAIRE

QUESTIONNAIRE NUMBER: ……

(Instruction: Interview should be done with the INVC beneficiary in the household. Book for a call back if beneficiary is not at home)

Introduction: *Enumerators, please introduce the purpose of the survey and state confidentiality of the responses. Please tell the respondent that participation in this study is voluntary and that he/she will not receive any direct benefit due to participation in this study. Use the introductory sheet provided to you.*

Good Morning my name is ----------I am here with a group of research workers from Lilongwe University of Agriculture and Natural Resources, Bunda Campus, and a project called Feed the Future - Integrating Nutrition in Value Chains (INVC).

The project aims at helping communities such as this one to grow more legumes. The aim is to improve the nutrition and incomes of households in this community by helping the local community to organize themselves and find ways to produce more food and be able to sell the extra.

This interview is meant to help us understand the current state of production of groundnuts and soya beans. You have been randomly selected to be part of the group of households to provide the information needed to assess the existing situation. The information is needed to help clarify what are the best ways to assist the community to develop itself. Among other things, I will ask you a number of questions regarding your farming activities, crops grown, the types and amounts of inputs used, how much is you harvest, how much you sell, where and at what prices. All the answers you give in this interview will be treated with strict confidentiality. The answers we get from you will be treated completely anonymously. Your name or the names of your family members or those related to you will NOT be used to identify your answers. No one will be able to identify your answers with you or your family members. Are you willing to answer these questions? **YES/NO**.

Thank you for accepting to participate. During this interview, you have the right to stop this interview for any reason and not proceed any further, at that time you have the right to refuse your data to be used in this research.

Moni. Dzina langa ndine ----------Ndili mmudzi mwanu muno ndi gulu la kafukufuku lochokera ku sukulu ya zaukachenjede ya Bunda Koleji mogwirizana. Kafukufukuyu ndi wa pulojekiti yotchedwa KUDYETSA FUKO LAMTSOGOLO – NDINSO KUTUKULA MADYEDWE ABWINO

Gwero la Purojekitiyi ndi kuthandiza kutukula ulimi wa mbewu za mtundu wa nyemba. Cholinga chake ndi kuchulukitsa zokolola kuchokera ku Mtedza ndi Soya komanso mkaka kuti alimi adzipeza phindu ndi chakudya chokwanira.

Kafukufukuyu atithandiza kuti tidziwe momwe ulimi wa mbewu za mtedza nad soya zikuyendera. Khomo lanu lino lasankhidwa mwamayere. Zomwe mutifotokozere zidzathandiza kupeza njira zotukulira ulimi wa makono. Zina mwa zomwe ndikufunseni ndi momwe ulimi ukuyendera pa khomo pano. Zonse zomwe mutiuze pano zikhala za chinsinsi. Kodi ndinu omasuka kuyankha mafunsowa? ***INDE/AYI***

Zikomo potenga nawo gawo mukafukufuku. Mkati mwa mwakufunsana kwathu muli ndi ufulu kusiya kuyankha komanso kuleketsa kuti ndisapitirize kukufunsani ndipo simuli wokakamizidwa kuti munene zifukwa zosiyira kuyankha. Muli nayonso mphamvu yoletsa kuti zomwe mwayankha kale zisakagwiritsidwe ntchito ndipo kuti ziwonongedwe mukuona.

Interview Date (dd/mm):___/_/2014

Time Interview started: _____:_____

Time Interview Ended: ____:_____

IDENTIFICATION INFORMATION

ENUMERATOR CODE: _____

SUPERVISOR CODE:_____

DISTRICT: _____ →see codes below

Codes: *1=Mchinji* *2=Lilongwe*
3=Dedza *4=Ntcheu*
5=Balaka *6=Machinga*
7=Mangochi

EPA _____

TRADITIONAL AUTHORITY NAME_____

GROUP VILLAGE HEADMAN (GVH) NAME _____

NAME OF VILLAGE _____

NAME OF HOUSEHOLD HEAD _____

SEX OF HOUSEHOLD HEAD _____*1=Male, 0= Female*

MODULE A: GENERAL INFORMATION OF THE BENEFICIARY

A1. Name of INVC Beneficiary (Indicate same as above if beneficiary is HH head in identification information)_____

A2. What is the sex of the Beneficiary?_____
Codes:
01= Male *02=Female*

A3. Beneficiary's ID number _____

A4. What is the relationship of this beneficiary to household head (*Ubale ndi mwini nyumba*) see relationship codes below)._____
Codes: *01 = Head; 02 = Husband; 03 = Wife; 4= Son/Daughter 9=Others (Specify)*_____

A5. What is the age of this beneficiary? (*Zaka zobadwa*) (years)_____

A6. What level of formal education has this beneficiary attained? (*Analekezera pati maphunziro*?)
_____
Codes:
1=None *2= Junior primary* *3 = Senior primary*
4 =Junior secondary *5 =Senior secondary* *6 = Tertiary College*
7=University *8= Don't Know*

A7. What informal education has this beneficiary attended? (Maphunziro ena osati a kusukulu)_____
Codes:
1=None; *2=Adult Education;* *3=Farm training;*

4=Artisan training; *5=Farm training and Adult Education;*

6=Farm training and Artisan; *7=Adult Education and Artisan;* *99=Other (specify)*_____

A8. Does the beneficiary belong to any farmer's club/group? _____ **Codes:** *1=Yes; 0= No*

A9. If yes what is the name of the club? _____

A10. Are you a member of FUM, NASFAM, CADECOM or other?_____
Codes: *1 = FUM; 2 = NASFAM; 3 = CADECOM; 4 = Other (Specify)*_____

MODULE B: LAND OWNERSHIP AND ALLOCATION TO CROPS

B1. Please report the plots that this household held during 2013/2014 season (Malo omwe munali nawo mchaka cha 2013/14)

	Holdings	Total Area (Acres)
1.	Own cultivated (Include dimba)	
2.	Sharecropped in	
3.	Borrowed	

4.	Rented out (for money)	
5	Sharecropped out	
6	Lent out (for free)	
7	Rented in	
8	Fallowed	

B2. Besides groundnuts or soy what other crops did you grow this past growing season?

	Crop	Response [*Yes=1; No=0*]
1	Maize	
2	Rice	
3	Common beans	
4	Cowpeas (khobwe)	
5	Sorghum (mapila)	
6	Tobacco	
7	Cotton	
8	Cassava	
9	Sweet potatoes	
10	Irish potatoes	
11	Others Specify_____	

[***Enumerator's note for questions in Sections below:*** *please ask broad questions and put the code in the space provided for the technology mentioned by beneficiary and don't read the list to him/her. Probe as broadly as possible, where necessary, without leading the farmer to the answer.]*

Now I would like to ask you on what you did on groundnuts and soybean cultivation during 2013/14 growing season. (Tiuzeni za malimidwe a mbewu za mtedza ndi soya, ndi komwe munatenga mbeu chaka cha 2013/14)

B3. Did you grow **groundnuts, soya, both** or neither in the 2013/14 growing season? _____

Codes: *1= groundnuts; 2=soya* **[if 2 only skip to D1]***; 3=both, 4=neither (if neither skip the survey)*

MODULE C1: GROUNDNUT ENTERPRISE VALUE CHAIN (Plot Management)

C1. On how many plots (*zilele/minda*) did you grow your **groundnuts**? _____

C2. Did you plant groundnut as a sole crop or in combination with other crops? _____*1=Sole crop; 0=Mixed cropping*

C3. At what distance did you plant **between** ridges (*Mizere*)? _____*1=75cm; 0= Otherwise*

C4. At what distance did you plant **within** the ridge (*Mapando*)? _____ *1=15cm; 0= Otherwise*

C5. Did you add manure?_____ *1=Yes, 0=No* ***If No >>C7***

C6. If so what type?_____ *1=livestock; 2=Compost; 3=Green manure*

C7. Did you add mulch? _____ *1=Yes, 0=No*

C8. Did you add fertilizer? _____ *1=Yes, 0=No* ***If No >>C10***

C9. If so what type?_____ *1=23:21:04s; 2=CAN; 3=UREA; 4=DAP; 5=Others*

Plot ID	**C10.** 1 Area (**Acre**s)	**C10.2** Soil Type 1= sandy 2= loamy 3= clay 4= clay/loamy 5= sandy loamy	**C10.3** What type of groundnut seed did you use 1= CG 7 0= Other	**C10.4** What was the source of the seed *See codes below table*	**C10.5** How did you store the seed 1=Aerated bags 2=Plastic bags 3=Basket 4= Granary 99=Other (specify) _____	**C10.6** Did you plant improved seed whole plot or part of it? 1= whole plot **skip >>C10.8** 2= part of the plot	**C10.7** If part of the plot, what is the area (**Acres)**	**C10.8** Did you observe gaps in groundnut germination 1=Yes 0=No **If No >>C10.10**	**C10.9** If Yes, were they filled 1=Yes 0=No	**C10.10** Who made decisions on the management of the plot 1= Myself 2= Spouse 3= Joint 4=Others (specify) _____	**C10.11** How did you prepare the land (see note) 1= all of them 2= some of them 3= none ***NOTE*** *(Enumerator)* *1= Ridge spacing 75cm* *2=wider ridge width* *3= tier/ box ridges* *4= Land cleared of debris*	**C10.12**How did you plant groundnuts (see note) 1= all of them 2= some of them 3= none ***NOTE*** *(Enumerator)* *1= plant spacing 15cm* *2= Double row 30cm* *3= doubled-up legume*[1]	**C10.13** what crop was planted on this plot (2012/13)
R1													
R2													
R3													

Enumerator: This is an approach that takes advantage of beneficial interactions between the 2 legume crops. Successful doubled-up legume intercropping systems mostly involve pigeon peas

R4													
R5													
R6													
R7													

MODULE C2: GROUNDNUT ENTERPRISE VALUE CHAIN (Plot Roster)

C6.4 Source of seeds codes: *01=Local agro-dealer; 02=Local market; 03=Purchased in distance town; 04=Government; 05=NASFAM; 06=FUM; 07=CADECOM; 08= saved from own harvest; 10=given by fellow farmer; 99= Others (Specify)_____*

C6.13 Crop Codes: *01 = Maize; 02 = Soya beans, 03 = Common beans, 04 = Cowpeas, 05= Burley; 06=Dark western tobacco; 7=Cotton; 8=Cassava; 9=Sweet potatoes; 10=Irish potatoes; 11=Sorghum; 12=Rice 13=Groundnut ; 99=Others (Specify)_____*

MODULE C3: GROUNDNUT ENTERPRISE VALUE CHAIN (Husbandry practices)

C11. When did you plant the groundnut crop? _____ [*Enumerator: enquire about when the first rains came (month) before asking this question so you can know if they planted with the first rains*]

Codes: *1 = With first rains; 0 = Otherwise*

C12. When did you plant the groundnut crop (month, year)? _____

C13. Describe your weeding practices? How many times did you weed this plot?

C13.1 Done as soon as weeds appeared_____*1 = Yes; 0 = No*

C13.2 A minimum of 3 times of weeding _____*1 = Yes; 0 = No*

C14. Did you apply herbicides? _____*1 = Yes; 0 = No* ***if No>>C17***

C15. If applied herbicides, which ones_____ *1=Roundup; 2=Bulletin; 3=Others; 4=don't know*

C16. If so how often?_____*1=Once; 2=Twice; 3=More than twice*

C17. Did you notice any significant diseases? _____*1 = Yes; 0 = No* ***if No>>C21***

C18. If so which ones? _____ *1=Leaf spot; 2=Rosette; 3= Others (Specify)*_____

C19. Did you practice any type of disease control?_____ *1 = Yes; 0 = No*

C20. If so, which methods did you use? _____*1=Biological; 2=Chemical; 3=Mechanical; 4=Cultural*

C21. Did you notice any significant pests? _____*1 = Yes; 0 = No* ***if No>>C23***

C22. If so which ones? _____

Codes: *1=Aphids (Nsabwe); 2=Grasshopper; 3=Catterpillars (Mbozi) 4; Others (Specify)*_____

C23. Did you practice any type of pest control? _____*1 = Yes; 0 = No* ***if No>>C27***

C24. If so, which methods did you use? _____*1=Biological; 2=Chemical; 3=Mechanical; 4=Cultural*

C25. If pesticides were used, which ones_____
Codes: *1=Cypermethrine; 2=Dimethoate; 3=Fungicides; 4=Dont know; 5= Others (Specify)*_____

C26. If so, how often did you use pesticides?_____
Codes: *1=Once; 2=Twice; 3 = More than twice; 9=Not applicable*

MODULE C4: GROUNDNUT ENTERPRISE VALUE CHAIN (Harvesting Groundnuts)

C27. When did you harvest the groundnut crop (month, year)? _____

C28. How did you know it was time for harvest?

C28.1 *Done after 130-150 days from the day of planting*_____*1 = Yes; 0 = No*

C28.2 *Do random maturity sampling*_____*1 = Yes; 0 = No* [Enumerator choose yes if the farmers explain the signs as given below]

[Enumerator: Signs of mature groundnuts include:-scraped pod shows brown colour and the inside of the pod has spots and start harvesting when 70% of the sampled groundnuts are mature]

C29. How did you dry your groundnuts?

C29.1 Leave the harvested groundnuts on the row for 3 to 4 days to wilt, pluck and then further dry_____*1 = Yes; 0 = No*

C29.2 Mandela Cock*:* _____*1 = Yes; 0 = No*

Enumerator look for an answer that is describing the process for a ***Mandela cock*** *as follows: Leave the harvested groundnuts on the row for 3 to 4 days to wilt. To create a Mandela cock drying system, first build a circular platform of soil about 1-2 meters across and 18 inches high. Place the peanut plants in a circle around the perimeter of the platform, with the pods in the inner part of the circle. Continue to place the plants around the circle, building up the layers and gradually reducing the diameter of the circle until there is only a small opening at the top of the cock. Then cover this opening with peanut plants with the pods turned downwards. The cock can be built to a height of one to one and half meters and it takes 4-6 weeks of drying to reach the recommended moisture content of 6-8%.*

C29.3 Leave it for 4 to 6 weeks before plucking to dry_____*1 = Yes; 0 = No*

C30. Did you apply the above management practice to all of your farm (plots) or part of the farm? _____

1 = whole plot (skip to MODULE C5) ; 2 = part of the plot

C31. If only part then how big was the area where you applied this practice? [*Enumerator please enter area in Acres]* _____

MODULE C5: GROUNDNUT ENTERPRISE VALUE CHAIN (Post-Harvest Processing Groundnuts)

[Enumerator: Both shelled and unshelled groundnuts are graded into their respective grades

Grading enhances quality and therefore increases the price

Grading also prevents aflatoxin contamination]

C32. Did you sell any of your groundnuts?_____ *1=Yes; 0=No* ***if No>>C38***

C33. Did you clean (Kupeta) your groundnuts before selling? _____ *1=Yes; 0=No*

C34. Did you sort (Kupatula/kuchotsa zosakanikirana) your groundnuts before selling? _____ *1=Yes; 0=No*

C35. Did you grade (Kusankha) groundnuts before selling? _____ *1=Yes; 0=No*

C36. Did you package (Kupakila) groundnuts before selling? _____ *1=Yes; 0=No*

C37. Did you label or brand (Kuika chizindikiro) your groundnuts before selling? _____ *1=Yes; 0=No*

C38. Have you received training on grading or packaging groundnuts products? _____ 1=*Yes; 0=No (**if no skip to C40**)*

C39. Who provided the training on grading/packaging groundnut products? (*circle the right answer)*

1= NASFAM, 2=FUM, 3=CADECOM; 4= Government Staff; 5= Other NGOs

C40. Did you process the groundnuts before selling?_____ 1=yes; 0=No *(**if no skip to C42**)*

C41. What products did you produce from groundnuts?_____

*01=groundnut oil expulsion; 02=groundnut butter/paste; 03=groundnut flour 04=Other(specify)*_____

C42. Have you received training (Maphunziro/Upangiri) on processing of groundnut products? _____ *1=Yes; 0=No*

C43. Are you aware of the country's safety standards for groundnut products (Ndondomeko zovomerezeka zakasamalidwe kokonzera mtedza ndi zakudya zochokera ku mtedza)? _____ 1=*Yes; 0=No*

C44. Did you receive training on safety or quality standards for groundnut products?_____1=*Yes; 0=No*

C45. Who provided the training on quality standards for groundnut products? _____

*1= NASFAM, 2=FUM, 3=CADECOM; 4= Government Staff; 5= Others (Specify)*_____

MODULE C6: GROUNDNUT ENTERPRISE VALUE CHAIN (Storage of Groundnuts)

Describe storage practices for your groundnuts crop? *(Enumerator inspect the storage facility)*

C46. *Store in a cool and dry place*_____ *1=Yes; 0=No*

C47. *Put on a raised surface (i.e.thandala)*_____ *1=Yes; 0=No*

C48. *The place should be well ventilated*_____ *1=Yes; 0=No*

C49. *It should be kept in 50Kg bags*_____ *1=Yes; 0=No*

C50. *It should be 1 meter from the walls as well as from the roof*_____ *1=Yes; 0=No*

C51. *The roof should not leak*_____ *1=Yes; 0=No*

C52. *It should be interlocking stack and there is need for a good sanitation in and around the structure*_____ *1=Yes; 0=No*

C53. What was the source of information of the various technologies and management practices? _____

Codes:

1=*Government Extension workers,*	*2=NASFAM,*
3= FUM,	*4=CADECOM,*
5=Farmer Group members,	*6=Other farmers,*
7=Radio,	*9=Other (specify)*_____

MODULE C7: GROUNDNUT ENTERPRISE VALUE CHAIN (Marketing Technologies / practices for Groundnuts)

What marketing technologies/practices did you use on your groundnuts crop produce? [*Enumerator: pick the right answer as the farmers is explaining and answer yes or no using codes given*]

C54. ***Warehouse Receipt System*:** Farmers produce are stored in a certified warehouse where it is safely kept awaiting for appropriate price increase to sell_____ 1=*Yes; 0=No*

C55. *Bid Volume Offer*: Farmers produce information regarding the crop, type volume and location are placed on the internet platform for buyers to bid for purchase_____ 1=*Yes; 0=No*

C56. *Marketing Information Point (MIP):* Marketing information such as Prevailing Prices at Various Markets in Malawi are displayed_____ 1=*Yes; 0=No*

C57. *Forward contracts*: Marketing practice where potential buyers are requested to provide indicative volumes of produce they may purchase so that farmers can gear towards satisfying the demand_____ 1=*Yes; 0=No*

C58. *Village aggregation Center*: Farmers aggregate their produce at a local center for temporal storage to attract market_____ 1=*Yes; 0=No*

C59. *Collective marketing*: Farmers agree to sell together as a group_____ 1=*Yes; 0=No*

C60. *Association led selling*: Farmers agree to sell together as a group spearheaded by the association_____ 1=Yes; 0= No

C61. Were the groundnuts shelled? *[Enumerator: Selling groundnuts in shells: To reduce labor demand for shelling and to prevent Aflatoxin threat]* _____ 1=*Yes; 0=No*

If No >>D1

C62. If the groundnuts were sold shelled was a mechanical sheller (Makina) utilized*?* _____ 1=*Yes; 0=No*

MODULE D1: SOYBEANS ENTERPRISE VALUE CHAIN (Plot Management)

D1. On how many plots (*minda*) did you grow your **Soya beans**? _____

D2. Did you plant soybeans as a sole crop or in combination with other crops? _____*1=Sole crop; 0=Mixed cropping*

D3. If answer is (2), how did you mix?_____ *1=intercropping; 2=mixed cropping; 3=strip cropping*

D4. At what distance did you plant **between** ridges (*Mizere*)? _____*1=75cm; 0= Otherwise*

D5. At what distance did you plant **within** the ridge (*Mapando*)? _____ *1=5cm; 0= Otherwise*

D6. Did you add manure?_____ *1=Yes, 0=No* **if No>>D7**

D7. If so what type?_____ *1=livestock; 2=Compost; 3=Green manure*

D8. Did you add mulch? _____ *1=Yes, 0=No*

D9. Did you add fertilizer? _____ *1=Yes, 0=No* **if No>>D10**

D10. If so what type?_____ *1=23:21:04s; 2=CAN; 3=UREA; 4=DAP; 5=Others (Specify)*_____

D11. Did you use innoculant? _____ *1=Yes, 0=No*

MODULE D2: SOYBEANS ENTERPRISE VALUE CHAIN (Plot Roster)

Plot ID	**D12.** 1 Area (**Acre**s)	D11.2 Soil Type 1= sandy 2= loamy 3= clay 4= clay/loamy 5= sandy loamy	D11.3 What type of soybean seed did you use 1= Selinade 2= Makwacha 9= Other	D11.4 What was the source of the seed *See code below*	D11.5 How did you store the seed 1=Aerated bags 2=Plastic bags 3=Basket 4= Granary 5=didn't store seed 9=Other (specify)	D11.6 Did you plant improved seed on the whole plot or part of it 1= whole plot (>>D11.8) 2= part of the plot	D11.7 If part of the plot, what is the area? (**Acres)**	D11.8 Did you observe gaps in soybean germination? 1=Yes 0=No **If No >>D11.10**	D11.9 If Yes, were they filled? 1=Yes 0=No	D11.10 Who made decisions on the management of the plot 1= Myself 2= Spouse 3= Joint 4=Others	D11.11 How did you prepare the land? 1= all of them 2= some of them 3= none ***NOTE*** *(Enumerator)* *1=Land cleared of debris* *2= Ridge spacing 75cm* *3=wider ridge width* *4= tier/ box ridges*	D11.12How did you plant soyabeans? 1= all of them 2= some of them 3= none ***NOTE*** *(Enumerator)* *1= plant spacing 5cm* *2= Double row 15cm* *3= doubled-up legume*[2]	D11.13 what crop was planted in 2012/13 on this plot? *See crop codes below*
D1													
D2													
D3													
D4													

[2] *Enumerator: This is an approach that takes advantage of beneficial interactions between the 2 legume crops. Successful doubled-up legume intercropping systems mostly involve pigeon peas*

D5													
D6													
D7													

D11.4 Source of seeds codes: *01=Local agro-dealer; 02=Local market; 03=Purchased in distance town; 04=Government; 05=NASFAM; 06=FUM; 07=CADECOM; 08= saved from own harvest; 10=given by fellow farmer; 99= Others (Specify)*_____

D11.13 Crop Codes: *01 = Maize, 02 = Common beans, 03 = Cowpeas, 04 = Groundnuts, 05= Burley; 06=Dark western tobacco; 7=Cotton; 8=Cassava; 9=Sweet potatoes; 10=Irish potatoes; 11=Sorghum; 12=Rice; 13=soyabeans 99=Others (Specify)*_____

MODULE D3: SOYBEANS ENTERPRISE VALUE CHAIN (Husbandry Practices)

D13. When did you plant the soybean crop? _____[*Enumerator: enquire about when the first rains came (month) before asking this question so you can know if they planted with the first rains]*

Codes: *1 = Planted with first rains; 0 = Otherwise*

D14. When did you plant the soybean crop (month, year)? _____

D15. Describe your weeding practices; How many times did you weed this plot?

D14.1 *Done as soon as weeds appeared*_____*1 = Yes; 0 = No*

D14.2 *A minimum of 3 times of weeding* _____*1 = Yes; 0 = No*

D16. Did you apply the above management practices to all of your farm (plots) or part of the farm? _____

1= whole plot; ***skip to D17;*** *2 = part of the plot*

D17. If only part then how big was the area where you applied these practices? [*Enumerator please enter area in Acres]* _____

D18. Did you apply herbicides? _____*1 = Yes; 0 = No* ***if No>>C17***

D19. If applied herbicides, which ones_____ *1=Roundup; 2=Bulletin; 3=Others (Specify)*_____*; 4=don't know*

D20. If so how often?_____*1=Once; 2=Twice; 3=More than twice*

D21. Did you notice any significant diseases? _____*1 = Yes; 0 = No* ***if No>>C21***

D22. If so which ones? _____ *1=Soybean rust; 2=Soybean cyst nematode; 3= Others (Specify)*_____

D23. Did you practice any type of disease control?_____ *1 = Yes; 0 = No*

D24. If so, which methods did you use? _____*1=Biological; 2=Chemical; 3=Mechanical; 4=Cultural*

D25. Did you notice any significant pests? _____*1 = Yes; 0 = No* ***if No>>C23***

D26. If so which ones? _____

Codes: *1=Termites; 2=Pod-sucking bug; 3=Catterpillars (Mbozi) 4=Others (Specify)*_____

D27. Did you practice any type of pest control? _____*1 = Yes; 0 = No* ***if No>>C27***

D28. If so, which methods did you use? _____*1=Biological; 2=Chemical; 3=Mechanical; 4=Cultural*

D29. If pesticides were used, which ones_____
Codes: *1=Cypermethrine; 2=Dimethoate; 3=Fungicides; 4=Dont know; 5= Others*

D30. If so, how often did you use pesticides?_____
Codes: *1=Once; 2=Twice; 3 = More than twice; 9=Not applicable*

MODULE D4: SOYBEANS ENTERPRISE VALUE CHAIN (Harvesting Soy)

D31. When did you harvest the soybean crop (month, year)? _____

D32. How did you know it was time for harvesting? _____

1= *Harvesting soybeans when matured at most 120 days before the pods starts opening up*

9= Other (Specify) _____

D33. Did you apply the above management practices to the whole plot or part of the farm? _____

1= whole plot; ***skip to D21;*** *2 = part of the plot*

D34. How big was the area where you applied these practices? [*Enumerator please enter area in Acres]* _____

MODULE D5: SOYBEANS ENTERPRISE VALUE CHAIN (Storage Soy)

Describe storage practices for your soybean crop? *(Enumerator inspect the storage facility)*

D35. *Store in a cool and dry place*_____ *1=Yes; 0=No*

D36. *Put on a raised surface (i.e.thandala)*_____ *1=Yes; 0=No*

D37. *The place should be well ventilated*_____ *1=Yes; 0=No*

D38. *It should be kept in 50Kg bags*_____ *1=Yes; 0=No*

D39. *It should be 1 meter from the walls as well as from the roof*_____ *1=Yes; 0=No*

D40. *The roof should not leak*_____ *1=Yes; 0=No*

D41. *It should be interlocking stack and there is need for a good sanitation in and around the structure*_____ *1=Yes; 0=No*

D42. What was the source of information of the various technologies and management practices? _____

Codes:

1=*Government Extension workers,*	*2=NASFAM,*
3= FUM,	*4=CADECOM,*
5=Farmer Group members,	*6=Other farmers,*
7=Radio,	*9=Other (specify)*_____

MODULE D6: SOYBEANS ENTERPRISE VALUE CHAIN (Post Harvest Processing Soybean)

D43. Did you sell any of your soybean crop? _____ *1=Yes; 0=No* ***if No>>D35***

D44. Did you clean (kupeta) your soybeans before selling? _____ *1=Yes; 0=No*

D45. Did you sort (kupatula) your soybeans before selling? _____ *1=Yes; 0=No*

D46. Did you grade (kusankha) your soybeans before selling? _____ *1=Yes; 0=No*

D47. Did you package (kupakila) your soybeans before selling? _____ *1=Yes; 0=No*

D48. Did you label or brand (chizindikiro) your soybeans before selling? _____ *1=Yes; 0=No*

D49. Have you received training on grading or packaging soybeans products? _____ 1=*Yes; 0=No* ***if No>>D37***

D50. Who provided the training on grading/packaging soybean products? _____

1= NASFAM, 2=FUM, 3=CADECOM; 4= Government Staff; 5= Other NGOs

D51. Did you process the soybean before selling? _____ *1=Yes; 0=No* ***if No>>D39***

D52. What products did you produce? _____

Codes: *01=Cakes/Scones; 02=Soy bean milk; 03=Soy bean flour; 9=Others (Specify)*_____

D53. Are you aware of the country's safety standards (ndondomeko zovomelezeka zakasamalidwe) for soybean products? _____ 1=*Yes; 0=No* ***if No>>D42***

D54. Did you receive training on safety or quality standards for soybean products?_____

1=*Yes; 0=No*

D55. Who provided the training on quality standards for soybean products? _____

1= NASFAM, 2=FUM, 3=CADECOM; 4= Government Staff; 5= Other NGOs

D7. SOYBEANS ENTERPRISE VALUE CHAIN (Marketing Technologies / practices for Soybeans)

What marketing technologies/practices did you use on your soybean crop produce? [*Enumerator: pick the right answer as the farmers is explaining and answer yes or no using codes given]* ***if the farmer did not sell, skip to E1***

D56. *Warehouse Receipt System*: Farmers produce are stored in a certified warehouse where it is safely kept awaiting for appropriate price increase to sell_____ 1=*Yes; 0=No*

D57. *Bid Volume Offer*: Farmers produce information regarding the crop, type volume and location are placed on the internet platform for buyers to bid for purchase_____ 1=*Yes; 0=No*

D58. *Marketing Information Point (MIP):* Marketing information such as Prevailing Prices at Various Markets in Malawi are displayed_____ 1=*Yes; 0=No*

D59. *Forward contracts*: Marketing practice where potential buyers are requested to provide indicative volumes of produce they may purchase so that farmers can gear towards satisfying the demand_____ 1=*Yes; 0=No*

D60. *Village aggregation Center*: Farmers aggregate their produce at a local center for temporal storage to attract market_____ 1=*Yes; 0=No*

D61. *Collective marketing*: Farmers agree to sell together as a group_____ 1=*Yes; 0=No*

D62. *Association led selling*: Farmers agree to sell together as a group spearheaded by the association_____ 1=Yes; 0= No

MODULE E1: GROSS MARGINS FOR GROUNDNUTS (QUANTITIES)

The purpose of this section is to help us determine the profit potential of your GROUNDNUT crop enterprises. By answering the questions in the tables below, we will be able to approximate whether you are able to make a profit or not. This will be useful in giving you and your neighbors, advice on how to improve or maintain the good work as the case may be.

Please answer as accurately as possible the following questions. Please refer to 2013/14 season

E1.	Total quantity harvested (UNSHELLED groundnuts) (including home consumption/ shared/given away) ***Kuchuluka kwa mtedza onse okololedwa osaswa***		**Codes for units of quantities:** 1 = Kg 2 = 50kg bag 3 = 90kg bag 4 = 100kg bag 5 = pail 6 = Basket 7 = Ox-cart 8 = Others (Specify)
E2.	**Units of total output (see unit codes)**		
E3.	**Weight of the unit (conversion factor)**		
E4.	*During 2013/14 season, did you sell any of your groundnuts unshelled 1=Yes, 2=No*		
E5.	Total quantity of groundnuts sold UNSHELLED during 2013/14 season		
E6.	**Units of quantity of unshelled groundnuts sold (Total)**		
E7.	**Weight of the unit (conversion factor)**		
E8.	Total revenue from groundnuts sold UNSHELLED during 2013/14 season). ***Kuchuluka kwa ndalama zomwe munapeza kuchokera ku mtedza wosasenda***		
E9.	During 2013/14 season, did you sell any of your groundnuts shelled **Codes:** *1=Yes, 2=No*		
E10.	**Total** quantity of groundnuts sold SHELLED during 2013/14 season		
E11.	**Units of quantity of shelled groundnuts sold (Total)**		
E12.	**Weight of the unit (conversion factor)**		
E13.	Total revenue from groundnuts sold SHELLED during 2013/14 season) ***Kuchuluka kwa ndalama zomwe munapeza kuchokera ku mtedza wosenda***		
E14.	Total quantity of by-product (e.g. shells, husks) sold, if any? ***Kuchuluka kwa zotsala monga masangwi ndi makoko a mtedza zomwe zinagulitsidwa.***		
E15.	**Units of by-product sold**		
E16.	**Weight of the unit (conversion factor)**		
E17.	Total revenue from by-products (e.g. shells, husks)***Kuchuluka kwa ndalama zomwe munapeza kuchokera ku zotsala monga masangwi ndi makokoza mtedza***		
E18.	Total quantity of groundnuts lost after harvest (due to rotting, spoilage, leakages during bagging, transportation or processing) ***Kuchuluka***		

	kwamtedza woonongeka		
E19.	**Units of quantity of groundnuts lost**		
E20.	**Weight of the unit (conversion factor)**		
E21.	All other revenue from processed groundunts (MK)		

INPUT EXPENSES FOR GROUNDNUTS *Please indicate to me what it cost you to produce all the groundnuts on all your plots* *Kodi munagwiritsa ntchito ndalama zingati kuti mulime mtedza pa minda yanu yonse?*		**a. Quantity of INPUT PURCHASED or rented in**	**b. Unit Codes** 1 = kg 2 = 50kg bag 3 = persondays 4 = litres 5 = milliliters 6= per trip 7 = per day 8 =per month 9= per year 10 = per pail 11=Acres 12 = N/A 99 = Others (Specify)	**c. Total cost of inputs purchased or rented in or hired in (MK)**
E22.	Seed			
E23.	Pesticides *(mankhwala ophela tizilombo toononga mbewu)*			
E24.	Herbicides *(mankhwala ophela udzu)*			
E25.	Land rental (Acres/season)			
E26.	**Hired Labor *(aganyu)***			
E25.1	Land preparation ***(kusosa ndi kugalauza***			
E25.2.	Planting ***(kubzala)***			
E25.3.	Weeding ***(kupalira)***			
E25.4.	Harvesting ***(kukolola)***			
E25.5.	Post-harvest handling drying, cleaning, bagging) *(Kusamala zokolola)*			
E27.	Transport (of inputs from market to the plot)			
E28.	Transport (of groundnuts from farm			

	to market)			
E29.	Any other marketing fees *(ziphaso za ku msika)*			
E30.	Other cash inputs specify ----------			

MODULE E2: GROSS MARGINS FOR GROUNDNUTS (COSTS)

MODULE F1: GROSS MARGINS FOR SOYBEANS (QUANTITIES)

The purpose of this section is to help us determine the profit potential of your SOYBEAN crop enterprises. By answering the questions in the tables below, we will be able to approximate whether you are able to make a profit or not. This will be useful in giving you and your neighbors, advice on how to improve or maintain the good work as the case may be.

Please answer as accurately as possible the following questions. Please refer to 2013/14 season

F1.	Total quantity of soybean harvested (including home consumption/ shared/given away) ***Kuchuluka kwa soya onse okololedwa***		**Codes for units of quantities:** 1 = Kg 2 = 50kg bag 3 = 90kg bag 4 = 100kg bag 5 = pail 6 = Basket 7 = Ox-cart 8 = Others (Specify)
F2.	**Units of total output (see unit codes)**		
F3.	**Weight of the unit (conversion factor)**		
F4.	During 2013/14 season, did you sell any of your soyabean *1=Yes, 2=No*		
F5.	Total quantity of soybeans sold during 2013/14 season		
F6.	**Units of quantity of soybeans sold**		
F7.	**Weight of the unit (conversion factor)**		
F8.	Total revenue from soybeans sold during 2013/14 season)		
F9.	Total quantity of by-product (e.g. shells, husks) sold, if any? ***Kuchuluka kwa zotsala monga makoko ndi masangwi omwe munagulitsa***		
F10.	**Units of by-product sold**		
F11.	**Weight of the unit (conversion factor)**		

F12.	Total revenue from by-products (e.g. shells, husks) (MK) ***Ndalama zomwe munapeza pogulitsa zotsala za soya***		
F13.	Total quantity of soybeans lost after harvest (due to rotting, spoilage, leakages during bagging, transportation or processing) ***Kuchuluka kwa soya owonongeka***		
F14.	**Units of quantity of soybeans lost**		
F15.	**Weight of the unit (conversion factor)**		

MODULE F2: GROSS MARGINS FOR SOYBEANS (COSTS)

INPUT EXPENSES FOR SOYBEANS *(NDALAMA ZOMWE MUNAGWIRITSA NTCHITO PA MUNDA WA SOYA MPAKA KUKOLORA)* ***Please indicate to me what it cost you to produce all the soybeans on all your plots*** ***Kodi munagwiritsa ntchito ndalama zingati kuti mulime soya pa minda yanu yonse?***		Quantity of Input purchased or rented in *Mulingo wa zinthu zogulidwa kapena za rent (Zochuluka bwanji / Ochuluka bwanji/ mochuluka bwanji)*	**Unit of quantity Codes:** 1 = kg 2 = 50kg bag 3 = persondays 4 = litres 5 = milliliters 6= per trip 7 = per day 8 =per month 9= per year 10 = per pail 11=Acres 12 = N/A 99 = Others (Specify)	Total cost of inputs purchased or rented in or hired in (MK) *Ndalama zomwe zinagwiritsid wa ntchito kugulira zinthu*
F16.	Seed *(Mbeu)*			
F17.	Innoculant			
F18.	Pesticide *(Mankhwala ophera tizilombo)*			
F19.	Herbicides *(Mankhwala ophera tchire la mmunda)*			
F20.	Land rental			
F21.	**Hired Labor (ganyu)**			
	F21.1 Land preparation (sosa, galauza)			
	FE21.2 Planting			
	F21.3 Weeding			
	F21.4 Harvesting			
F22.	**Post harvest handling**			
	F22.1 Threshing,			
	F22.2 Drying,			
	F22.3 Cleaning,			
	F22.4 Bagging			
F23.	Transport (of inputs from market to the plot)*Transport kuchokera malo ogula kufikila kumudzi*			
F24.	Transport (of soyabean from farm to market) *Transport ya mbeu ya soya kupita kumsika*			
F25.	Any other marketing fees *Msonkho wa kumsika*			

F26.	**What are other cash input costs? Specify** ----------			

THANK YOU VERY MUCH
END OF QUESTIONNAIRE

CG 7/ groundnuts

1 Pail	= 9 Kgs
1 x 50 Kg Bag	= 2.5 pails (unshelled)
1 x 50 Kg Bag	= 22.5 Kgs
1 x 90 Kg Bag	= 40.5 Kgs
1 oxcart	= 170 Kgs (5 x 34 kg Bags)
1 Basket	= 1.5 pails (13.5 Kgs)
100kg bag	= 45 kgs

Note: shelled weight = 0.4*unshelled groundnuts weight)

Beans, Cowpeas, pigeon peas, sweet peas, soya

1 pail	= 26 Kgs
3 Pails	= 1 x 50 kg bag (78 kgs)
1 Basket	= 2 pails (52 kgs)
1 Basin	= 13 kgs

ANNEX 2: RESULTS TABLES FOR GROUNDNUTS AND SOYBEANS VALUE CHAINS

Table A2.1: Average number of groundnuts plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	1.16	1.16	1.16
Lilongwe	1.38	1.33	1.35
Dedza	1.30	1.22	1.24
Ntcheu	1.13	1.07	1.09
Balaka	1.23	1.13	1.17
Machinga	1.13	1.15	1.14
Mangochi	1.16	1.16	1.16
Total	1.22	1.18	1.20

Table A2.2: Proportion of farmers that reported observing gaps in groundnut germination

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	64	60	62
Lilongwe	66	73	70
Dedza	64	74	71
Ntcheu	80	86	84
Balaka	58	55	57
Machinga	52	56	55
Mangochi	52	39	44
Total	64	66	65

Table A2.3: Proportion of farmers that reported filling the gaps observed in groundnuts plots during germination

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	45	33	40
Lilongwe	33	39	37
Dedza	35	30	31
Ntcheu	65	69	68
Balaka	40	45	42
Machinga	31	42	40
Mangochi	63	64	63
Total	44	43	43

Table A2.4: Proportion of farmers that reported planting groundnuts with first rains

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	60	52	57
Lilongwe	57	49	52
Dedza	36	28	30
Ntcheu	30	28	29
Balaka	28	23	26
Machinga	65	43	47
Mangochi	58	34	43
Total	49	37	43

Table A2.5: Proportion of farmers that reported applying herbicides in groundnut plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	0.75	1.03	0.87
Lilongwe	0.00	1.53	0.90
Dedza	0.00	1.33	0.99
Ntcheu	0.00	1.16	0.71
Balaka	3.33	0.00	1.55
Machinga	0.00	0.95	0.78
Mangochi	3.23	0.00	1.15
Total	0.90	1.01	0.96

Table A2.6: Proportion of farmers that observed significant diseases in groundnuts plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	66	66	66
Lilongwe	58	59	59
Dedza	55	61	59
Ntcheu	59	63	61
Balaka	35	54	45
Machinga	52	57	56
Mangochi	45	43	44
Total	56	59	58

Table A2.7: Proportion of farmers that reported significant pests in groundnuts plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	46	41	44
Lilongwe	38	39	39
Dedza	40	37	37
Ntcheu	67	53	59
Balaka	63	61	62
Machinga	35	50	47
Mangochi	26	27	26
Total	46	43	45

Table A2.8: Proportion of farmers who processed groundnuts before selling

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	4.48	2.06	3.46
Lilongwe	3.30	3.05	3.15
Dedza	0.00	0.67	0.49
Ntcheu	1.85	1.16	1.43
Balaka	0.00	0.00	0.00
Machinga	0.00	0.95	0.78
Mangochi	0.00	3.57	2.30
Total	2.24	1.59	1.84

Table B2.1. Average number of soybeans plots

District	Gender of respondent		Pooled
	Male	Female	
Mchinji	1.09	1.09	1.09
Lilongwe	1.02	1.12	1.08
Dedza	1.20	1.15	1.17
Ntcheu	1.18	1.10	1.13
Balaka	1.04	1.06	1.05
Machinga	1.05	1.05	1.05
Mangochi	1.08	1.07	1.07
Total	1.08	1.08	1.08

Table B2.2 Proportion of farmers reporting observing gaps in soybean germination

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	46	43	45
Lilongwe	41	46	44
Dedza	37	29	32
Ntcheu	55	56	56
Balaka	72	64	67
Machinga	50	58	56
Mangochi	41	44	43
Total	49	50	49

Table B2.3: Proportion of farmers that reported filling the gaps observed in soybeans plots during germination

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	38	50	43
Lilongwe	33	40	38
Dedza	41	26	33
Ntcheu	56	74	68
Balaka	72	91	83
Machinga	62	72	70
Mangochi	79	78	78
Total	57	68	64

Table B2.4: Proportion of farmers reporting planting soybeans with first rains

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	40	37	39
Lilongwe	37	33	34
Dedza	26	34	31
Ntcheu	27	34	32
Balaka	15	11	13
Machinga	21	19	19
Mangochi	16	19	18
Total	27	24	25

Table B2.5: Proportion of farmers who reported applying herbicides in soybean plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	3.74	1.27	2.69
Lilongwe	0.00	0.00	0.00
Dedza	0.00	0.00	0.00
Ntcheu	3.03	1.61	2.11
Balaka	0.00	0.93	0.55
Machinga	0.00	1.31	1.03
Mangochi	0.00	0.00	0.00
Total	1.14	0.71	0.87

Table B2.6: Proportion of farmers that observed significant diseases in soybeans plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	24	28	26
Lilongwe	29	33	31
Dedza	20	20	20
Ntcheu	33	35	35
Balaka	36	32	34
Machinga	26	45	41
Mangochi	34	40	38
Total	29	35	33

Table B2.7: Proportion of farmers that reported significant pests in soybeans plots

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	50	37	44
Lilongwe	45	37	40
Dedza	39	44	42
Ntcheu	33	40	38
Balaka	47	52	50
Machinga	40	53	50
Mangochi	51	44	47
Total	46	45	45

Table B2.8: Proportion of farmers who processed soybeans before selling

District	Gender of beneficiaries		Pooled
	Male	Female	
Mchinji	5.61	10.13	7.53
Lilongwe	3.92	14.13	10.49
Dedza	2.17	10.13	7.20
Ntcheu	0.00	1.61	1.05
Balaka	0.00	0.00	0.00
Machinga	0.00	0.65	0.51
Mangochi	0.00	2.24	1.38
Total	2.06	4.81	3.76