

SITAM

Analysis of quantitative household survey

Malawi

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Summary

Introduction: As part of an on-going research project “Supporting smallholder farmers’ decision- making: Managing trade-offs and synergies for sustainable intensification (SITAM)” led by IIED, one of the requirements was to undertake a quantitative household survey. The main aims of the household survey were (1) to generate information that will help to understand the current situation of the study population in relation to agricultural practices, enabling population, interventions and livelihood outcome, and (2) to enable selecting case study households. The livelihood survey was undertaken in Mwansambo Extension Planning Area in Nkhota-kota, Central Malawi to establish a broad sample of farmers, their key components of SIA and their various outcomes; along with the key drivers of such outcomes in terms of past/on-going interventions and broader aspects of the enabling environment and overall climate resilience.

Methods: The study was led by the Lilongwe University of Agriculture and Natural Resources. Four University graduates were recruited to collect quantitative data through a semi-structured questionnaire on ODK software. The information was collected from Group Village Headmen Chikango and Mgombe and it covered 142 households. Data analysis was done using SPSS to generate frequencies, cross-tabs and graphs for various data sets.

Findings:

- The sampled households have an average household size of 5.49 persons. This is in line with the national household size of 5.5 persons. The minimum household size is 2 with a maximum of 11 persons per household.
- 89.5% of the respondents are married with 4.9% widowed
- Majority of the respondents (63.4%) have attended primary education and none has attained any university college qualification.
- Majority of the respondents (97.9%) use farming as the main source of income. The area has few opportunities for off-farm employment
- The respondents belong to different clubs and association with 35% being members of a Village Saving and Loans whilst 21% are members of cooperatives. The results also show that 24% of the respondent did not belong to any grouping
- More households have 2 agricultural plots (56.3%) and 25.4% have three plots with only 10% of the respondents having four and above.
- The sampled size has an average of 4.06 acres of land holding size followed by those that have 3.0 acres (14.8%). Based on land holding ranges, the results show that those with 1-3 acres are in majority (54.2%) followed by those with 4-6 acres (31.7%). The minimum farm size is 0.5 acres and the largest has 14 acres.
- 88.5% of the households own the land they are cultivating and only 11.5 are renting. In terms of change in agricultural land, the results show that there is no change (56.3%) followed by 27.5% that indicated that the land holding size is increasing
- 44% of the households raise chickens followed by those that raise goats (40%).
- All farmers in the sample grow groundnuts, followed by those that grow maize (95%). More farmland is located for groundnut (43.3% of plots) production followed by maize with 27.2% of plots.

- Crop residues is the main agricultural practice that is been undertaken by farmers that are doing conservation agriculture and is mostly applied to maize plots only.
- 51.4% of the respondents access their agricultural inputs from the local market which is also act as a rural growth centre since the area has a health centre, primary school, trading centre and other amenities that attract vendors from larger cities to bring farm inputs for sale.
- 90.8% use own labour for agricultural activities and on average, 3.8 persons work per plot
- 71.8% of the households have bicycles
- Most of the households are food secure in 8 months of the year but very few access milk and protein-based foods. (Low dietary diversification)

Conclusions

The quantitative survey has provided the information that will be used to understand the practices, environment and characteristics of the study area. It has provided information that is not only relevant to support answering the research questions to be addressed but also issues that can be used by other stakeholders as they address development goals. These results have also shown areas that will require the efforts of the government such as supporting education interventions, promoting environmental sustainability and addressing issues of markets. In addition, these results show the need to initiate programmes that can support livestock production.

The results have also provided several data and information that will be linked to sustainable indicators and how these play a role for households' livelihoods. It is known that whilst land is not a limiting factor at this stage, expansion of this land for groundnut production and linkage to population growth can have an impact on household assets let alone decision to invest in other off-farm households.

The findings have also shown that income sources in the area are limited to farming in general and specifically groundnuts. However, value of their produce is not well known since the market forces depend on vendors who dictate the buying price and the market is depend on the availability of external markets in Rwanda, Kenya and Tanzania.

Whilst the main source of the seed is the local market located within the EPA, there is no government intervention to check the quality of the seed. This neglect of government involvement has also a direct impact on household economy since some of the produce are sold whilst in the field. Finally, there is need to re-examine the SI developed for the country and understand the actual factors that can influence the change in these indicators.

Introduction

Background

The Lilongwe University of Agriculture and Natural Resources (LUANAR) is participating in a global research team undertaking a research titled “Supporting smallholder farmers’ decision-making: Managing trade-offs and synergies for sustainable intensification (SITAM). The project is being led by IIED based in UK and its being implemented in Ghana, Burkina Faso and Malawi. Locally, the partners include Total Land Care (TLC) and Practical Action and its being implemented in Mwansambo Extension Planning Area (EPA) in Nkhota-kota, central Malawi. Several research and capacity building interventions have been programmed under the project including field assessments, national consultations, linking findings to national policy framework. The overall objective of the project is to contribute to policies, investments and institutions (agricultural research, advisory services and markets) effectively support poor farmers to adopt and adapt sustainable intensification of agriculture. In addition, the project will help to understand and document the basis on which choices are made [along the crop/livestock – plot – farm – household – community – landscape –wider economy continuum (including off-farm employment and informal sectors)]. One of the activities of the project was to undertake a quantitative household survey in collaborating with country partners.

Objectives and importance of the survey

The main objectives of the study were (i) to understand the existing farming and livelihood systems in the study area in quantitative terms, thus adding value to the livelihoods analysis undertaken earlier by quantifying the phenomena described in these reports and (ii) to inform the selection of case study households for the next phase of the SITAM project, by plotting households along a range of (sustainable intensification of agriculture) indicators.

This the study has provided benchmark figures to work with as the study progresses. This will help inform the study of the changes that have occurred in terms of demographics, income, assets, and agriculture, within the project area within the time that the project was active. Beyond the project, this study may also assist in informing the Ministry of Agriculture, Irrigation and Water Development of current statistics within the area.

The study will also provide data and information to the Nkhota-kota District Development Committee to inform their programme on interventions in the areas. In turn, policy and decision makers at all levels will use this information in their development planning. It will provide the require interventions by the government and other development partners to improve the welfare of the communities. The survey has produced several information including that of education, land use, demographic outcomes, environment and economic livelihoods.

Methods used

The SIA indicators for the study area that were identified by Malawi project partners in a previous activity informed the study design. TLC as well as previous knowledge of the issues by LUANAR identified these indicators using previous experiences in the area. Information was collected from households in two Group Village headmen (Chikango and Mgombe). Households were randomly selected to have a sample size of 142 Households of which 52 were female-headed representing 36.6% of the sample size.

Stakeholder interviews conducted during the time also assisted in formulating the SIA indicators. These indicators were then compared for the 3 countries, and a questionnaire was formulated to suit the different study areas in the different countries. The questionnaire covered several issues including demographic characteristics, land resources and use, sources of income, household assets and livestock, and household food security.

ODK experts at LUANAR for easy collection and entering of data then programmed the questionnaire into tablets. Different partners did this for easy access of data since ODK enables remote access. The study recruited 4 enumerators to assist in the collection of data. These survey assistants underwent a 2-day training on understanding the objectives of the study, understanding the questions being asked, translation of questions into local language (Chichewa) and use of tablets and the ODK software. Upon completion of the training, the questionnaire was then pre-tested to account for any errors in programming as well as question structure. Data was analysed using SPSS, from which tables and frequencies were formulated. This was followed by compilation of the report on findings as illustrated in this report. This report will be shared with government officials of Mwansambo EPA and with the SAIRLA NLA (National Learning Alliance).

Findings and discussion

This section provides the findings and discusses some of these findings in the wider context of the situation in the district as well as in Malawi. The section has not linked the finding to the wider literature, as this will be completed in the other reports to be produced by the project. The findings are presented at Group Village Headman (GVH) level that has small villages under him or her. GVH tend to report to Senior Group Village Headman who in turn report to the Traditional Authority which has a larger area and he/she is responsible for all development issues at that level. The TA reports to the District Commissioner and he/she also attends all district development meetings through the District Executive Committee.

In terms of agriculture administration structures, the smallest unit is called a Section and 7-8 Sections make up an Extension Planning Area where the extension workers are housed. The EPAs in a district make up the District Agriculture Development Office (DADO). The DADOs depending on the agro-ecological size make up the Agricultural Development Divisions. The study is undertaken at Mwansambo EPA in Nkhota-kota DADO which is under Salima ADD.

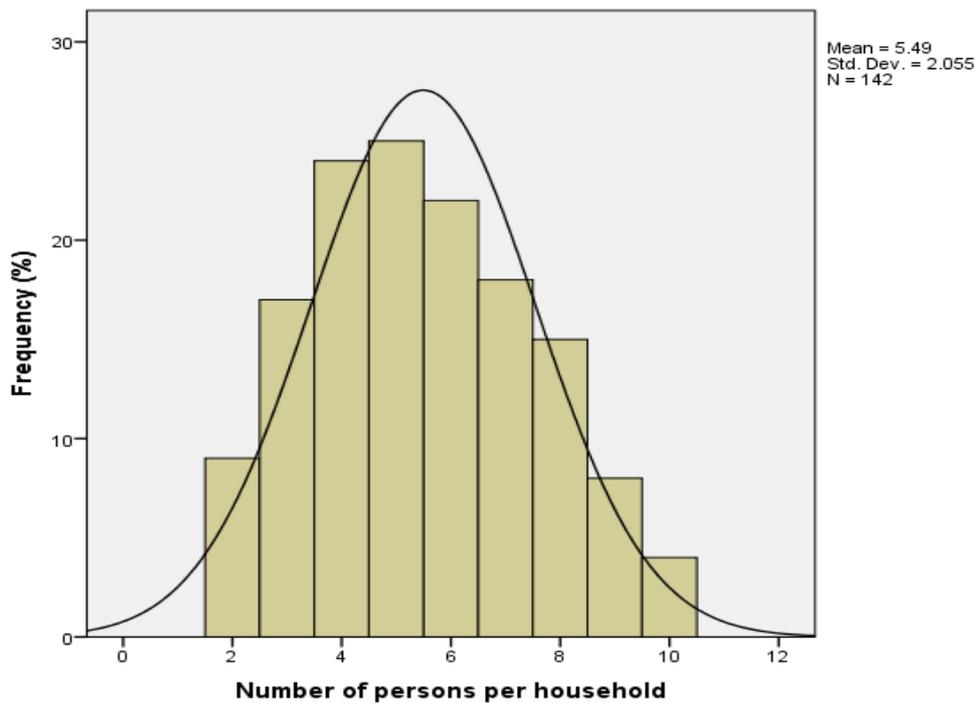
Demographic information

We start with the demographic information of the respondents of which 78% were head of households and are critical decision makers at household level.

Household Size

The results show that the sampled population has an average of 5.49 persons per household that is the same as the national household size of 5.5 persons (NSO, 2008).

Figure 1 Number of persons per household



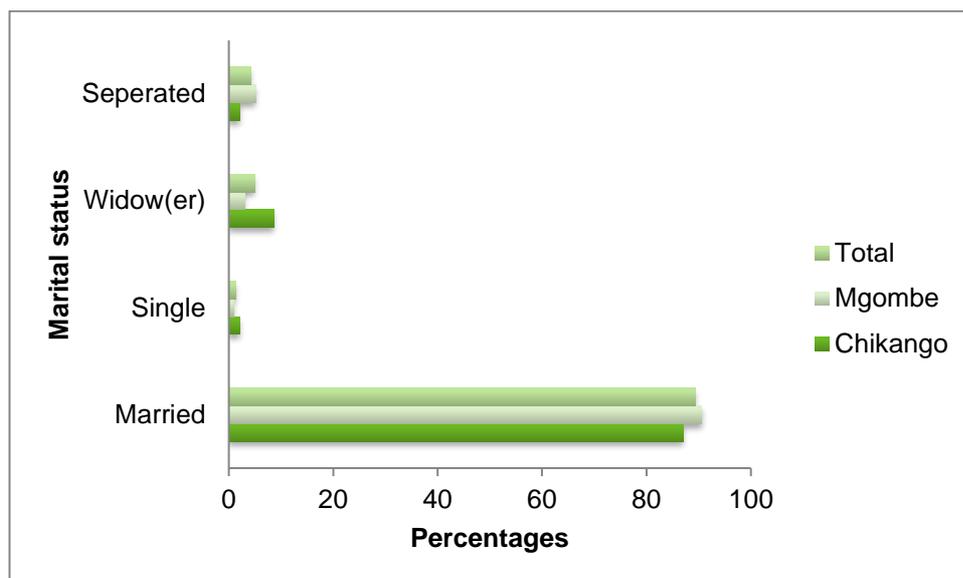
Between the GVHs, Mgombe has a slight bigger household size of 5.43 persons compared to Chikango that has 5.63 persons per household. The minimum number of persons per household was 2 and maximum was 10 persons for both GVHs. The study further agree with other findings whereby the family size is being decreasing over time due to several factors including increased awareness on family planning programmes, girl education especially that the TA for the area is a champion of education.

Other factors that are decreasing the household size include shortage of land and also migration of men to urban areas searching for economic opportunities.

Marital Status

Marital status is linked to stability of the community and household in most rural areas of the country. The results (Figure 2) show that 89.5% of the sampled population are married followed by widows at 4.9%.

Figure 2 Responses (%) on marital status of the respondent



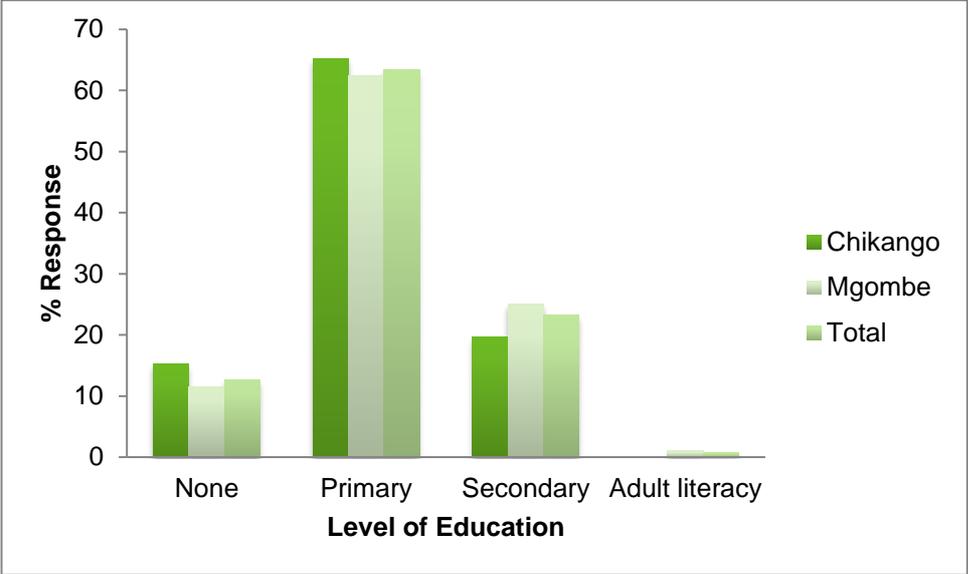
The outcome also shows that in such communities, decisions have to be made jointly even involving children especially when it comes to use of land for agriculture interventions. However, in some communities, men still dominate in making decision. Preliminary consultations with the farmers, it was noted that women are given the opportunity to make decision on what type of crops to grow and these are mostly legumes that are intercropped with maize or sometimes groundnuts (if grown as a cash crop).

Level of Education

Education is critical tool for sustainable development, poverty reduction and it helps in making decision for several livelihoods among communities. Graph 3 presents findings on the level of education for the sampled population. The results show that majority of the respondents (63.4%) have attained primary education followed by those with secondary education (23.2%).

It can also be observed that about 13% of the population are illiterate which is still a challenge in countries like Malawi. Between the GVHs the results are not statistically different for both the primary and secondary education. The results further show an indication of high levels of school drop-out within the Mwansambo area as communicated in previous interviews with district government workers. This can be due to the attractiveness of income generated from farming. Only 25% and 19.6% in Mgombe and Chikango village respectively went as high as secondary school, with remaining houses having not attained any form of education.

Figure 3 Responses (%) on level of education of respondent

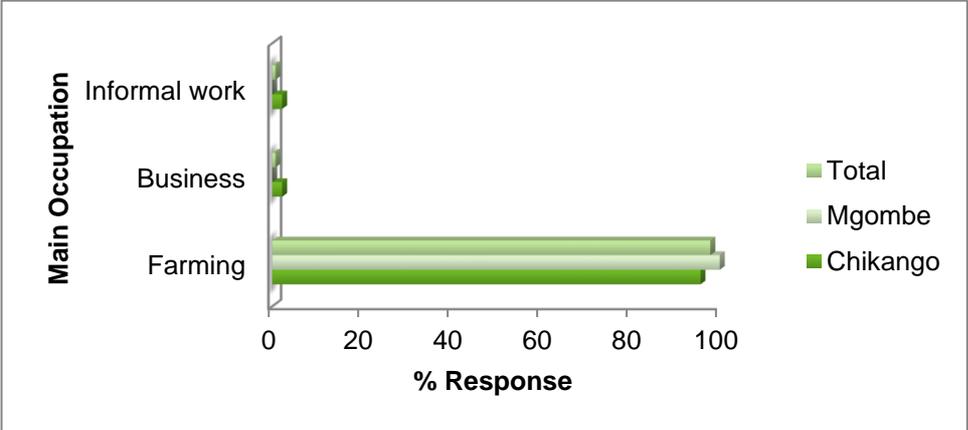


The picture given by the study is that there are few people that are moving out of the community due to education advancement and that very few are entering secondary education. This has an implication on natural resources since they population will continue depending on natural resources for livelihoods. Even though the basic education is an added advantage for extension workers, the adopted of advance technologies will still be a challenge for such groups.

Main source of income / occupation

Figure 4 show that most households within the 2 GVHs take farming as their main occupation. Other occupations are not very common within the two GVH, which is not very surprising because Mwansambo is a food basket for other surrounding areas, hence high investment in farming as a source of income.

Figure 4 Responses (%) on main occupation of the respondent

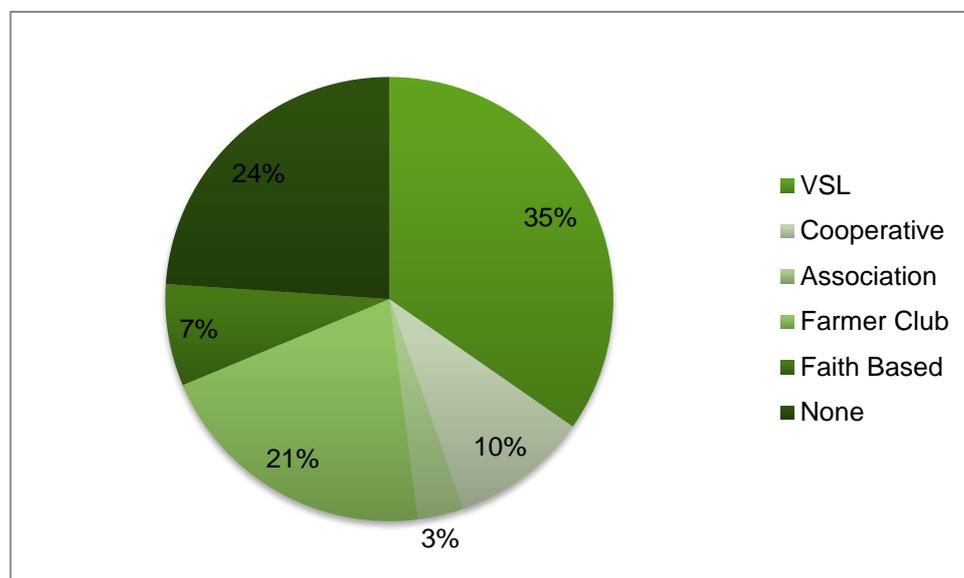


The agricultural land and favourable weather conditions tend to support almost all crops in the areas. The EPA is one of the main sources of food for the district and both smallholder and commercial farmers dominate it. The results further show that the area has not provided opportunity to create off-farm jobs thereby can easily be affected by climate and weather-related challenges.

Club/Association Membership

Social capital has been regarded as a strong indicator of community cohesion and belonging to a club or an association has several advantages to rural communities. Figure 5 provides detailed results on the responses to membership affiliation in the two GVHs. The results show that majority of household heads (35%) were affiliated to Village Savings and Loans followed by farmer clubs (21%) and then cooperatives (10%).

Figure 5 Responses (%) of households on affiliation to a club or association by the respondent



The results further show that 24% seem not to be affiliated to any type of the club or association. The community has the opportunity to diversify their economy through the cooperatives. It also shows that extension workers in the areas have an added advantage of reaching farmers through farmer clubs and the cooperatives. However, knowing that 24% of the respondents were not affiliated to any grouping, there is need to find mechanism to facilitate the entry of these household to the clubs.

Land resources

Number of plots

The study (See Table 1) has found that on average, more respondents (56.3% have 2 plots each followed by those with 3 plots (25.4%) and those with one plot (7.7%). Only one respondent had 7 plots (0.7%). The average number of plots is 2.4 plots and very few households had over 4 and above plots (10%).

Table 1 Responses (%) on number of plots per household

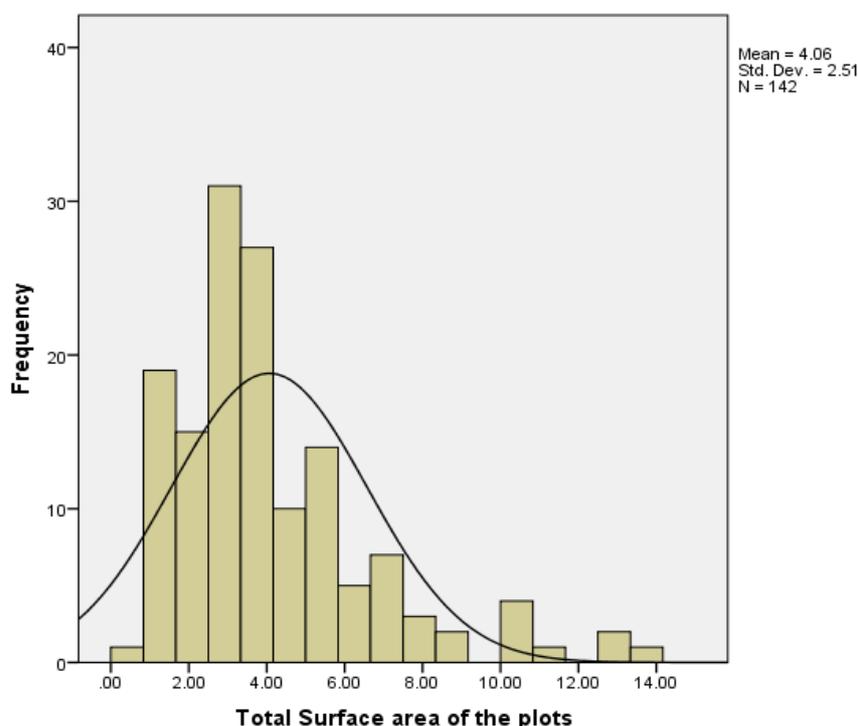
GVH	Total number of plots cultivated by the household					
	1	2	3	4	5	7
Chikango	4.3	50.0	37.0	6.5	2.2	0.0
Mgombe	9.4	59.4	19.8	7.3	3.1	1.0
Total	7.7	56.3	25.4	7.0	2.8	0.7

Majority of households in both Chikango and Mgombe have 2 plots (50% and 59.4% respectively). Only very few households had above 4 plots (10.0%). Between the two GVHs, Chikango had a maximum of 5 plots per household as compared to 7 in Mgombe GVH. On average, Mgombe has 3.6 plots compared to 3.0 plots in Chikango. The findings could be linked to population size and also shortage of land for expansion of agriculture interventions.

Size of land holdings

In terms of total land holding, the study has found that on average, the sampled population has 4.06 acres with majority of the households having agricultural land sizes of 3.0 acres (14.8%). When analysed in ranges, majority of the households have plots that ranges from 1-3 acres (54.2%) followed by those with 4-6 acres (31.7%).

Figure 6 Responses (%) from respondents on total farm size (acres)



Compared to other areas in the district and at country level, these results show that the households have larger plots for agricultural intervention. For example, some of the household covered had more than 10 acres of land (5.6%). When compared between GVHs, the results show that the differences are not statistically significant (See Table 2)

Table 2 Information on land holding sizes (Acres) between GVHs

GVH	Minimum	Maximum	Mean	SD
Chikango	0.5	13	4.6457	2.8501
Mgombe	1	14	3.7849	2.29377
Overall	0.5	14	4.0637	2.51014

Land Ownership

For land ownership and tenure, the findings have shown that most of the plots are owned by the households (88.5% on average) followed by those that are renting the agricultural plot (11.5%). This is very common especially that the study area is in remote and rural areas with less urbanisation taking place. Those that migrate to the area are mostly non-Malawians who are purchasing agricultural produce from the farmers especially groundnuts and or are doing other businesses that do not require land.

Several factors affect changes in land holding sizes among communities in Malawi. These include population increase, selling the land, but also donating to other relatives. However, the study (See Table 3) has shown that for the decade, the land holding size has not changed (56.3% responses) and only 27.5% of the respondents indicated that the land has increased with more households in Mgombe (29.2%).

Table 3 Responses (%) on changes of land holding sizes

GVH	Responses on changes in land holding sizes		
	Increased	Decreased	No Change
Chikango	23.9	26.1	50.0
Mgombe	29.2	11.5	59.4
Total	27.5	16.2	56.3

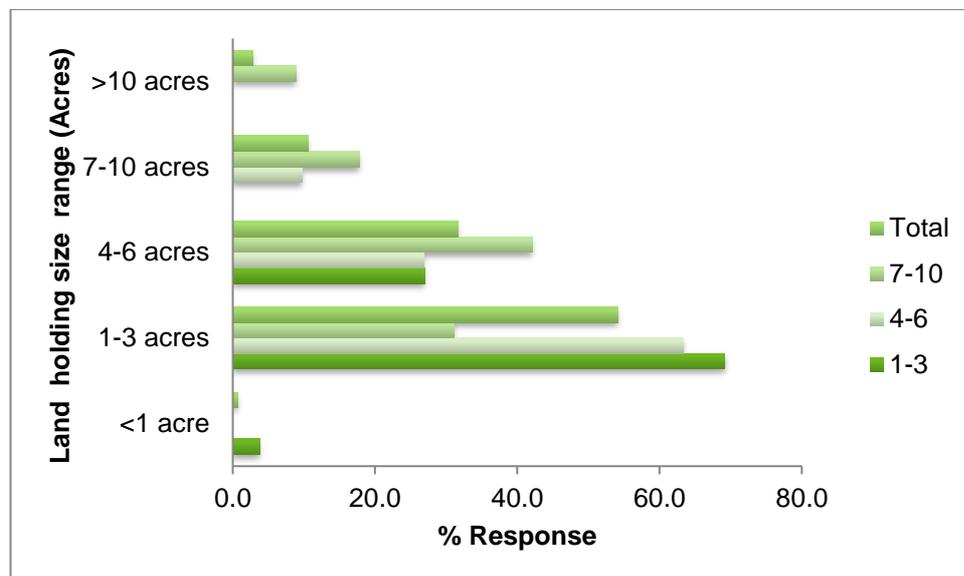
The results also show that 16.2% of the responded have witnessed a decrease in the land holding size especially those in Chikango (26.1%). The respondents provided several reasons for the changes including giving to farming more land, increase in number of crops to grow.

The farmers have been able to increase farmland through opening up of new land, renting or buying from their neighbours. The farmers were able to increase land size, grow more food or cash crops. An increase in family size also necessitated an increase in land size for one to be able to feed -their growing household size.

The farmers experience a decreased in their land sizes because of fragmentation, as parents subdivide their land with children. Some land is also eroded by rainwater and becomes unproductive and this reduces the land size. Some households also have reduced land size because they had sold, or rented out some. An increase in price of inputs also made some farmers to reduce their land sizes. Some recorded no change because they are either new farmers or they have not changed their farming for the past 5 years.

The analysis wanted to understand if there is any correlation between the size of the household and land holding sizes. The results are given in Figure 7 and show that there is no correlation since majority of the household have land holdings of 1-3 acres irrespective of household sizes.

Figure 7 Responses on land holding and household size



Therefore, the size of the household is large without dependency on available land. This has implications that calls for joint implementation of family planning and programming of agricultural interventions. Even though experts argue that agricultural productivity is restricted by land ownership, these findings show that there is an opportunity to support interventions that can promote agricultural productivity knowing the households own that most of the land.

Livestock

The proportions of households that have livestock have been presented in table 4. Majority of households have chickens (57.7%) and goats (52.8%), over 50 % of households in both GVH have both goats and Chickens. Very few households have cattle ducks and guinea fowls.

Table 4 Proportion of households with type of livestock

Type of Livestock	Proportion of households with type of livestock		
	Chikango	Mgombe	Total
Chicken	58.7	57.3	57.7
Cattle	2.2	4.2	3.5
Goat	52.2	53.1	52.8
Pig	6.5	18.8	14.8
Pigeon	2.2	3.1	2.8
Duck	0.0	2.1	1.4
Guinea Fowl	0.0	1.0	0.7

Consultations revealed that most household are not keeping cattle because of theft as well challenges in providing feed to them due to restriction that have emerged due to conservation agriculture. The consultations further revealed that both chickens and goats are easy to keep since they don't need special type of feed/folder.

Distribution of livestock by households' size

The distribution of livestock per household size has been presented in Table 5.

Table 5 Distribution of livestock against household size

Type of livestock	Family size range	Quantity of livestock within household			
		1-5	6-10	11-15	>15
Cattle	4-6	2	1		
	7-10	3			
Chicken	1-3	5	5		2
	4-6	13	21	2	5
	7-10	11	7	3	8
Goat	1-3	6	5	1	0
	4-6	27	7	0	0
	7-10	14	9	4	1
Pig	1-3	2	1	0	0
	4-6	6	4	0	0

Type of livestock	Family size range	Quantity of livestock within household				
		1-5	6-10	11-15	>15	
	7-10		6	2	0	0
Pigeon	1-3					1
	4-6		0	1		1
	7-10		0	1		
Duck	4-6		2			
Guinea Fowl	7-10		1			

The results show that there is a relationship between household size and number of livestock. It can also be observed that households that have more persons mainly keep cattle. This could be as a result of labour available for farming interventions. The results further agree with field consultations that the area is not into livestock farming.

Crops grown and amount produced

Types of crops grown

There are different types of crops that are grown in the area. The most grown crop is groundnuts and the least is cotton. Even though maize is the main staple food, it still comes second to groundnuts that is grown as a cash crop. Table 6 below shows crops grown in order from most produced (i.e. produced by most farmers) to least (by few farmers).

Table 6 Types of crops grown in order of proportion of farmers growing it

Type of crop	Rank
Groundnuts	1
Maize	2
Soya	3
Cowpeas/ pigeon peas	4
Cassava/sweet potato	5
Vegetables	6
Tobacco	7
Rice	8
Paprika/Other spices	9
Beans	10
Cotton	11

Groundnuts are grown as a cash crop and also improve the nitrogen status of the soil and that is why the farmers in the two GVHs prefer to grow groundnuts. In addition, the crop has replaced tobacco in the area which was the main cash crop due to low market prices. The key

challenge with groundnuts is availability of fresh seed from seed suppliers which has forced farmers to recycle the seed thereby affecting the yield. This challenge is also affecting farmers to expand land for more groundnuts.

Groundnuts are grown in rotation with maize to realise higher maize yields in the subsequent season. Cassava is grown for food. Scarcity of adequate water for growing rice makes most of the farmers unable to grow rice and that is why it is grown by fewer farmers. Falling tobacco prices have made some farmers to abandon the crop. Cotton markets are unreliable in the area and most farmers have stopped growing it.

Proportion of farmers growing different crops

For both GVH proportions of farmers growing groundnuts are the highest (44%), followed by Maize with 38% and then Soy Bean with 6.6% (see Table 7). These results are in agreement with the area profile that shows that Mwansambo EPA is a high producer of the two crops.

Table 7 Proportion of farmers growing different types of crops

Type of crop	Chikango	Mgombe	Total [%]
Maize	93.5	94.8	95.0
Groundnuts	100.0	100.0	100.0
Beans	4.3	0	1.4
Tobacco	4.3	1.0	2.1
Vegetables	2.2	3.1	2.8
Cassava/Sweet Potato	0	8.3	5.6
Rice	2.2	2.1	2.1
Soy Bean	32.6	9.4	16.9
Cowpeas/Pigeon Peas	0	16.7	11.3
Paprika/other spices	2.2	2.1	2.1
Cotton	0	1.0	0.7

Table 8 show that groundnut production is allocated the highest number of plots (43.3%), followed by maize (27.2%) and then lastly soy bean (10.7%).

Table 8 Proportion of plots under different Crops

Type of crop grown	Percent (of total number of plots)
Maize	27.2
Groundnuts	43.3
Beans	0.9
Tobacco	1.3
Vegetables	1.8
Cassava/sweet potato	4.5
Rice	1.3
Soya	10.7
Cowpeas/ pigeon peas	7.1
Paprika/Other spices	1.3
Cotton	0.4

Because of the financial gain from groundnuts, farmers are more willing to invest their land in groundnut production unlike tobacco, beans and rice amongst other crops.

Farming practices

Type of CA practices

Different household used different practices for conservation agriculture in the area. We analysed farmers’ responses on agricultural practices for their first / main plot (see Table 9). The findings show that incorporation of crop residues is the main CA practice, followed by the use of crop rotation, zero or minimum tillage and boundary bunds.

Table 9 Proportion of farmers using different conservation agricultural practices

Type of Conservation Method Used	Chikango	Mgombe	Total
Crop residue	40.2	41.2	40.8
Boundary bunds	15.6	4.9	9.1
Vegetative barrier	7.0	3.6	4.9
Minimum zero tillage	8.2	14.1	11.7
Green manure	6.2	4.1	4.9
Crop rotation	22.7	32.2	28.4

The results further show that the rest of the practices are not received much attention especially green manure and vegetative barriers that are important for improved soil quality.

The results also show that CA was only used on plots grown with maize and not crops where groundnuts were grown.

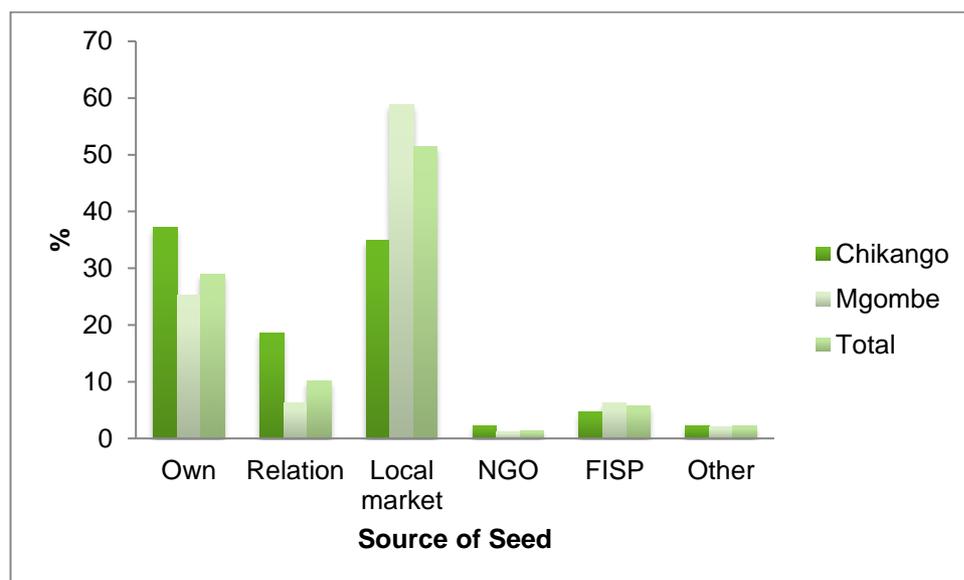
Type of inputs

During the 2016/17 agricultural seasons, different types of inputs were applied or used by the households. For example, for plot 1, the main inputs that were used were NPK fertilizer (21.2%) followed by hybrid maize (18.3%) and Urea fertilizer (17.6%). Some farmers used recycled seed (4.2%) or chemicals such as Round Up (4.2%). For plot 2, Urea was the highest (23.2% households) followed by NPK (27.5%). In general fertilizers are the main inputs followed by seed.

Sources of inputs

The study has found that the main source of the inputs (see Figure 9) is the local market (51.4%) on average with more households (58.9%) accessing inputs from the local market from Mgombe GVH.

Figure 8 Proportion of households surveyed using seeds from different sources



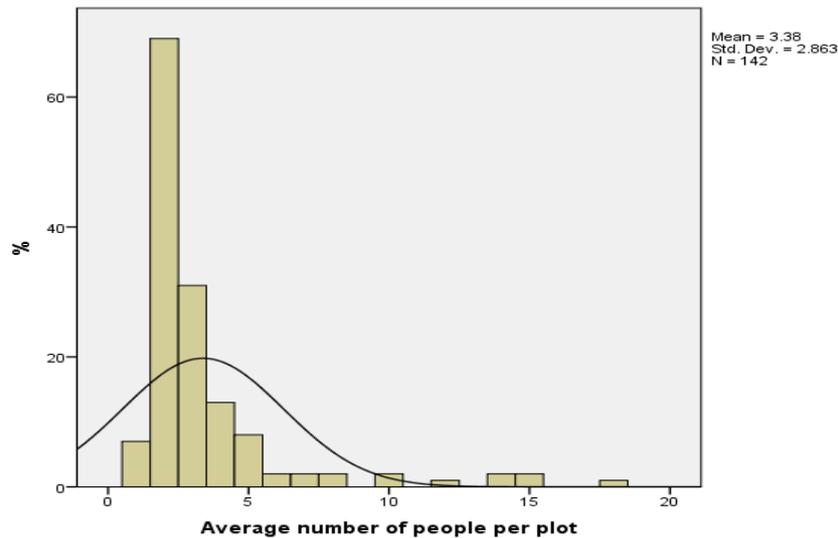
Some of the farmers used their own seed especially those that were growing groundnuts. The results further show that the area is not targeted for the free input subsidies (FISD) by the government.

Type of labour used

The results show that on average, most of the households (90.8%) were using their own labour for all the agricultural practices. This was mainly during agricultural land preparation (89.3%) followed by planting (6.4%) More households (93.8%) in Mgombe used own labour during land preparation whilst more households in Chikango (11.4%) used own labour during planting.

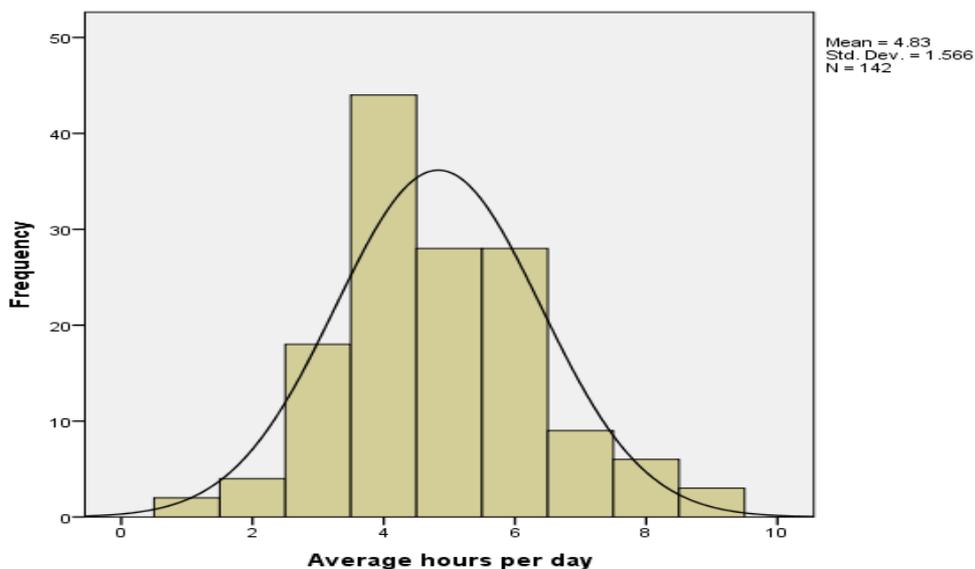
For example, the analysis on plot one shows that on average, 3.8 persons were working per plot. This is also directly linked to household size since those with larger family sizes had more persons providing labour. However, it will be ideal to assess how labour demand is associated with farm operations within the season and whether such demand are also linked to availability of assets.

Figure 9 Distribution of the number of persons working per plot 1



On average, the results show each person was taking 4.83 hours per day working on the plot 1. This is unlike those that are working in the formal employment where on average they take 8 hours per day.

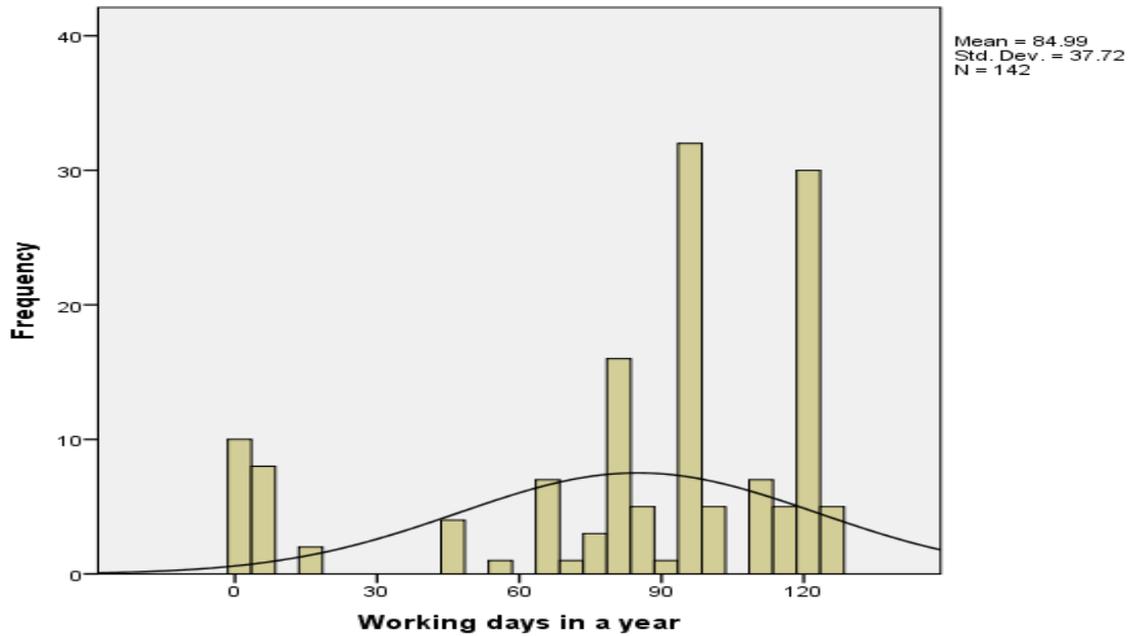
Figure 10 Distribution of the number of hours per day that farmers spend working on their plots (Example for plot 1)



Some of the farmers were covering 3 hours in the morning and another 1 or more in the afternoon. Even those that had more hours on their plots, this was divided between morning and afternoon hours.

Figure 12 has approximate number of days in a year and the findings show that the household were working 90 days that is mostly the three months of rainfall in Malawi.

Figure 11 Distribution of the number of days people work on their land (Example 1)



This is also directly linked to the type of operations for each value chain since some of the crops don't require more operations when they have reached maturity stage such as maize and most of legumes.

Energy and Water

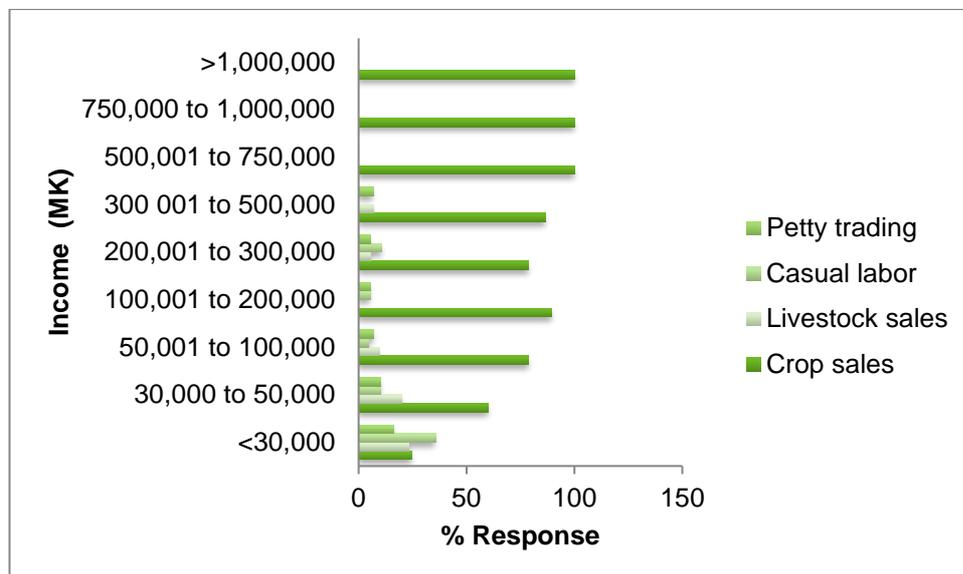
The findings have shown that 99.3% of the household use firewood as the main source of energy with only 0.7% using generator. This has implication on natural resource degradation that can also affect water sources and soil quality that are critical for agriculture. In terms of lighting, the study has revealed that 82.3% use torch/lamp for lighting followed by solar panels (12.8%).

Income and credit

The main source of income for the households is sales from crops. Figure 13 show that there are a few households that are able to achieve incomes from crop sales of more than Mk500,000 (n=14) and the majority of households are in the range of MK 100,000.00 to Mk 500,000.00. A small number of the households were earning less than K100,000 (n=6) per year from crop sales, and one household achieved an income of K3,406,000.00.

Besides crops sales, other sources of income include sale of livestock, casual labour and petty trade – but they make up only 3.6, 4.5 and 3.7% of the total income earned by the sample households, respectively.

Figure 12 Responses (%) by households on the main source of income



In terms of income distribution, the results show that most of the households earn less than MK 500,000.00 per year. Compared to other household in the district and also at country level, these results show that the area has progressive farmers through not many as well as household that are making money from agriculture. Observations and indeed consultations revealed that the main cash crop in the area is a groundnut that does not require many inputs. Whilst livestock is a very good income earner, the results show that the area does not enough livestock. This is an opportunity for the district office to promote livestock production especially pigs and goats due to the tropical environment of the area.

Assets

Despite that the income from crop sales in better among the households, this is not translating to type and even number of assets per households. The results (Table 10) show that most of the households own mobile bicycles (71.8%) followed by mobile phones (16.4%).

Very few households have radios and almost all the household have no beds, chairs, ox-carts and motorbikes. This show that the agriculture interventions in the area are not used to invest in tangible assets that can support off farm livelihoods. The study further assessed whether the households supplement their income with loans. The results show that 67.5% and 32.5% of male and female heads of household were able to access loan and most of these (91.2%) were married. When compared to education level, the results show that 62.5% of those with primary education accessed the loan more than those with secondary education. This is because most of the households in the area have gone up to primary school. The loans were mostly from neighbours (32.5%) and savings groups (36.2%) with few households sourcing the loan from the bank (8.8%).

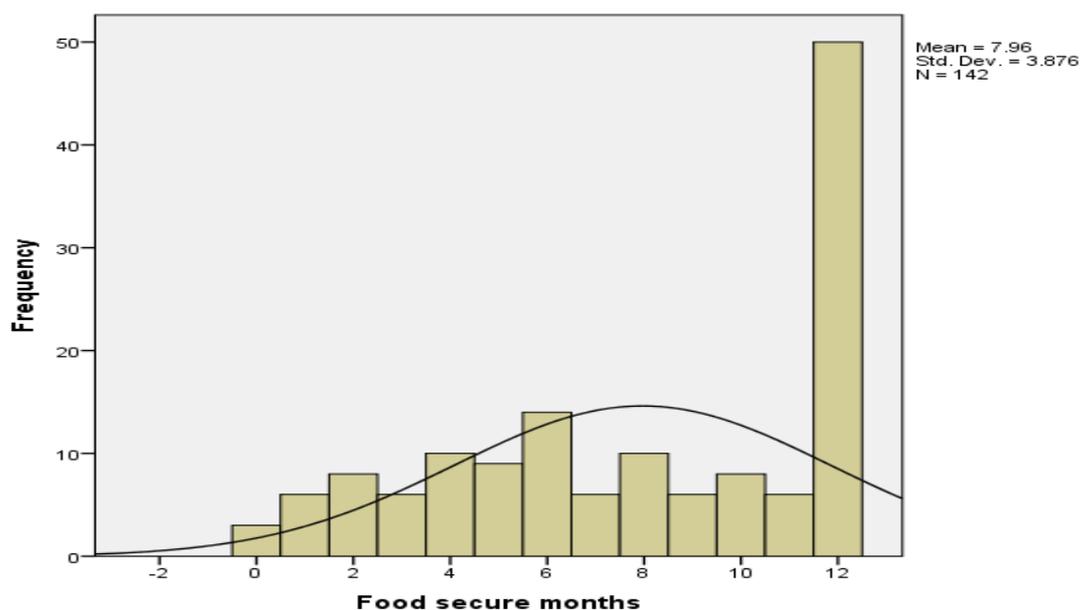
Table 10 Responses (%) on households' assets

Type of Asset	Chikango	Mgombe	Total
Bicycle	66.7	74.0	71.8
Motorbike	3.0	0.0	0.9
Ox cart	3.0	0.0	0.9
Mobile Phone	18.2	15.6	16.4
TV	0.0	0.0	0.0
Radio	6.1	6.5	6.4
Bed	0.0	1.3	0.9
Chairs	0.0	1.8	1.8

Food security

Food security was assessed based on own production, labour based, market based and donations. The results show that about half of the households in the area are food secure for 12 months in a year, but nearly 20% are food secure for 3 months or less (see Figure 13).

Figure 13 Household food secure months



For those that don't produce food crops, most of them (89.7%) indicated that they purchased after (market based food entitlement). This could be true because most of the land in the area is being allocated to groundnut production is the main income earner due to good prices on the market (see Table 11).

Table 11 Sources of food other than own production

Name of GVH	Other Sources of food			
	Donation	Bought	Gift	Other
Chikango	7.4	77.8	3.7	11.1
Mgombe	1.7	95.0	0.0	3.3
Total	3.4	89.7	1.1	5.7

The results also show that about 3.4% of the household access their food through donations and others through gifts from relatives.

The results further show that in terms of food secure months (See Table 12), most of the households (51.8%) indicated that these months have decreased over time followed by those who indicated that the period has increased (41.8%).

Table 12 Responses by households (%) on changes in food secure months

Name of GVH	Change in number of food secure months		
	Increased	Decreased	No change
Chikango	52.2	39.1	8.7
Mgombe	36.8	57.9	5.3
Total	41.8	51.8	6.4

Despite these results, and also based on field consultations, the area has not been faced with food security related problems. The chiefs from the area indicated most of the people from surrounding districts access their food from the EPA due to its favourable weather conditions. Even through the country was faced with El Nino and then La Nina during the 2015/2016 and then 2016/17 seasons respectively, the area was not affected. The results for number of days in a week that the households are food secure are presented in Table 13.

Table 13 Responses by gender on number of days without food in the last 7 days

Gender	Number of days without food in the last 7 days			
	None	One	Two	Three
Male	90.0	3.3	5.6	1.1
Female	88.5	1.9	7.7	1.9
Total	89.4	2.8	6.3	1.4

The results show that 89.4% of the households have food throughout the week even though some (1.4%) run out of food for three days in a week. This further shows how good the food security status in the area.

But when it comes to specific food items such milk, the results show that most of the households (79.6%) did not access milk in a week and only 2.9% had milk (See Table 14).

Table 14 Responses by gender on number of days with selected food items in a week

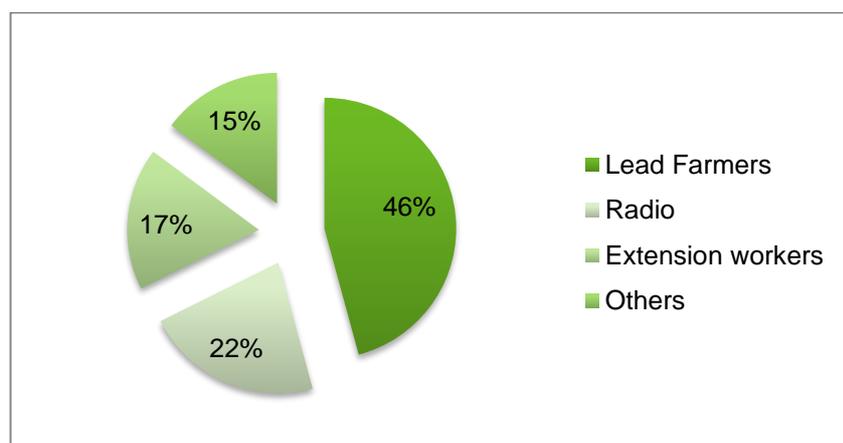
Gender	Type of food	Number of days with selected type of food eaten in a week							
		None	One	Two	Three	Four	Five	Six	Seven
Male	Milk	79.1	7.0	3.5	4.7	1.2	1.2	0.0	3.5
	Legumes	21.3	21.3	14.6	14.6	10.1	6.7	2.2	9.0
Female	Milk	80.4	3.9	0.0	7.8	2.0	3.9	0.0	2.0
	Legumes	21.6	33.3	21.6	9.8	5.9	5.9	0.0	2.0
Total	Milk	79.6	5.8	2.2	5.8	1.5	2.2	0.0	2.9
	Legumes	21.4	25.7	17.1	12.9	8.6	6.4	1.4	6.4

Compared to legumes, the results show that about 25.7% of the households accessed legumes once in a week. These results show that when it comes to food security the main item is maize rather than animal based a product that is directly linked to reduced number of livestock that the household are keeping.

Source of information

The results (see Figure 14) show that majority of the households (46%) access agricultural information through lead farmers, followed by radio (22%). Knowing that most the households don't have radio, there is need to devise other mechanism that can allow more farmers to access information for planning and management purpose. This is even critical due to weather changes within the growing season.

Figure 14 Responses by households on the main source of information



In terms of gender, the results show that more females (46.2%) got their agricultural information from lead farmers compared to 45.6% male-headed households. Agriculture extension workers were also reaching more female females (23.1%) as compared to 14.4%

males. However, the radio was the main source for males (25.6%) compared to females (15.4%).

Conclusions

The quantitative survey has provided several important findings that will act as a platform for supporting the research work by the partners. The information will also be important to agricultural extension workers, district officials and the general public that is working in the agricultural sector in the EPA and the district.

Demographically, the study has found that the family size is higher compared to the national average family size. This has resulted in high population thereby affecting the size of agricultural land. This outcome has a direct relationship with agricultural intensification, as it will be assumed that the increased population will promote having several crop and livestock interventions on one plot. However, the results have shown that despite increased population, household in this area have more land compared to other EPAs and even districts in the country. More land is allocated to groundnuts rather than maize, as is not the normal case in many part of the country.

Therefore, these results show that, given the opportunity, farmers will invest more on cash crops than food crops since they are able to meet their food entitlements through market-based food acquisition. This therefore has resulted in food security-income trade-offs whereby maize is not given much attention as an income earner, despite the fact that a few years ago, the country was facing food shortages. However, the lost opportunity for the household in the area is that they are selling their groundnuts without processing. Processing could have also supported other agricultural interventions, especially production of livestock feed, and other products that could have created off-farm income opportunities.

Even through in general, agricultural land is decreasing due to increased population, this outcome has not affected the food security status, as most of the households are food secure almost throughout the year. This outcome is directly linked to favourable climate and weather conditions rather than intensive agricultural practices.

The area has very few well-educated households with the majority of households head being educated only up to primary school level That is a challenge when promoting the adoption of technologies. This could be associated with depending on traditional agricultural methods that have been practiced for decades in such communities. For example, intercropping of legumes with maize could not be regarded as a deliberate intensification due to shortage of land but a long time inter-generational practice that has been used to enhance soil fertility and diversify diets. This, therefore, could call for research interventions that will aim to understand the root causes of these traditional practices and how new thinking can complement them to sustainable livelihoods.

It can also be concluded that farmers, whose main source of income is farming, dominate the EPA. There are very few opportunities of other sources of income off-farm. This has implication for future development, as climate change related risks will be associated with increased temperatures and decreased precipitation, impacting on crop yields. The main crop is groundnut that is sold unprocessed to traders from Burundi, Rwanda, Kenya, Tanzania and these tend to control the market pricing.

The study has also shown that there are poor market structures and there is no official control or provision of information to support farmers during marketing of crop produce. In terms of

research, this will require exploring how extension approaches can enhance farmer's decision making on agriculture investments in the face of the changing environments. The other approach is to explore how the marketing model can support agricultural input use, especially for those involved in maize production and who are not involved in conservation agriculture.

It is also very clear that most of the households are not involved in livestock production. Whilst livestock have been regarded as a good practice to support synergies at farm level, there is need for the project to further isolate critical factors that are impinging livestock farming. This will call for the development of a model that brings both crops and livestock to promote agriculture intensification. In addition, there are several benefits that the livestock sector can contribute to the livelihoods of the households, including provision of manure and food in terms of lean months.

Despite that these results are showing available land and food for most households, it is clear that, due to population growth as well as migration of people from other areas due to its economic opportunities, pressures on food systems are eminent. Such pressures, coupled with climate change and increased per capita consumption, will require new interventions that can be fully explored by the research project. This could also be directly linked to provision of possible solution to management of agricultural waste, moderating demand and provision of right information to farmers, especially as some household tend to sell their produce whilst in the field. Agricultural intensification interventions should be linked to post-harvest processing and value addition that can further result in generation of products and services to support agricultural intensification. There is also a need to explore how SIA, if advocated, will interact with other local level food systems and other issues especially land use, biodiversity and human nutrition.

In terms of environmental outcomes, the study has concluded that the households depend more on natural resources for energy. This has also been directly linked to land degradation that in the future can affect their agricultural interventions. This will then call for supporting interventions that can promote alternative sources of energy or promotion of tree plantation for future energy needs. Otherwise, there is need to find technologies that can transform agricultural waste, especially groundnut holms that are not being used for manure or livestock feed.

Finally, even though the area has the potential to transform the livelihoods of the communities and several development indicators are favourable, there is a need to introduce a transformative development framework that can be used to utilise available labour and natural resources. This can be linked to better agricultural markets and engagements of the private sector.