

# Baseline Survey Report

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International center for Biosaline Agriculture

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# **Improving Agricultural Resilience to Salinity through Development and promotion of Pro-poor Technologies and Management Strategies in Selected Countries of Sub-Saharan Africa (RESADE)**

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## Executive summary

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### Project Information

<b>Project Name</b>	<b>Improving Agricultural Resilience to Salinity through Development and Promotion of Pro-poor Technologies and Management Strategies in Selected Countries of Sub-Saharan Africa (RESADE)</b>
Location	Mozambique, Sierra Leone, Liberia, The Gambia, Togo, Botswana
Duration	48 Months
Budget	<i>7.7 Million \$US</i>
Funding Agency	International Fund for Agricultural Development (IFAD) and the Arab Bank for Economic Development in Africa (BADEA).
Implementing Agency and Partners	International Center for Biosaline Agriculture (ICBA) in collaboration with National Agriculture Research Stations (NARES)

### Background

The objective of undertaking the baseline study is to establish benchmarks of the project results framework and to understand and measure the current situations of community's livelihoods, food security status, socioeconomic conditions, agricultural production systems, community vulnerability and susceptibility to shocks and climate change impacts, and capacities and livelihood capabilities in relation to climate-smart agricultural production and climate-resilient livelihood strategies. The findings of the study will be used as the basis for comparison and monitoring of the project activities, outcomes, and impact evaluation.

The methodology adopted in the baseline study involves several steps, including a review of the indicators; design of fieldwork and sampling; developing survey questionnaires; undertaking fieldwork; data analysis, generation of outputs and report writing. Using a two-stage sampling strategy with regions and villages as the primary units and households as the ultimate sampling unit, a total of 321 surveys were conducted in five countries, with the following distribution: 64 in Liberia, 82 in Sierra Leone, 51 in Mozambique, 60 in Gambia, and 64 were conducted in Togo. A minimum of about 5-10 villages within different regions and districts in each country were covered by the survey with fairly equal distribution of the interviews among villages.

## Findings

The first section of the report present data and analysis on the respondents' characteristics and household demography. The gender distribution of the survey respondents differs depending on the country. In Liberia, about 56% of the survey respondents were female, and 43% were males. Similarly, the participation of women in the survey was high in Togo, as more than half (53%) of the participants were women, and about 47% were male. In Sierra Leone, 32% of the respondents were female, whereas 68% were male. About 37% of the survey respondents in Mozambique were female, and nearly 60% were male. In the Gambia, however, only 18% of the survey participants were female (by far the lowest participation of females in the survey among the five countries), in contrast, the majority (82%) of the respondents in the sample were male.

Household size varies from country to country. With the estimated average size of 11.7 persons per households, The Gambia represents the largest value for the household size; in contrast, the estimated household size is the smallest in Mozambique, with an average of 4.90 persons. The estimated household size is reportedly similar among the households in the sample in Liberia (7.17), Sierra Leone (7.21), and Togo (6.90). In all five countries, the prime age-gender demographic group (members with age 15-65) dominates the household composition, followed by the children and minors (e.g., members aged 14 or less) demographic groups. Elderly (including household members with the age of 66 and older) comprise the smallest share of the household composition.

Data on the household education profile show that nearly half of the household heads in Liberia in the sample cannot read and write (e.g., illiterate). For those that are reportedly able to read and write, about 28% of them completed formal schooling (mainly primary and secondary school). In Sierra Leone, about 26% of the household heads were reported to have the ability to read and write, with 11% completing primary and secondary schools, and 7% being graduates of high school. About 52% of the household's heads in Mozambique were reportedly literate, with the majority of them completing only primary and secondary school. In the Gambia, the literacy rate among the household heads is the lowest, as only 13% of the heads were reportedly literate. In Togo, nearly two-thirds of the household heads were reported to be able to read and write, with 68% of them completing only primary and/or secondary school.

The socioeconomic profile of the households covers data and analysis on the households' income, expenditures, and asset ownership. The estimates for the average household income greatly vary depending on the country. Estimated average household income for each country is: Liberia 131,560 Liberian Dollars (equivalent to about 661 \$US), Sierra Leone 4.82 million Sierra Leonian Leone (equivalent to 4,900 \$US), Mozambique 33,806 Mozambiquan Metical equivalent to about (483 \$US),

The Gambia (62,000 Gambia Dalasi (equivalent to about 1,200 \$US), and Togo 409,490 Togolese Francs (equivalent to about 735 \$US). Farming is by far the largest and the primary source of income, occupying the largest share in the total household income, followed by livestock, trade, and employment (temporary and permanent). The share of aid/financial assistance in the total households' income is significantly small and negligible. The data on expenditures show that at least half of the household's expenditures are food-related; in some countries, the share of spending on the food items occupies about two-thirds of the total households' expenditures.

The most common assets owned by the households are house, farm tools, household equipment such as kitchenware, telecommunication items, including phones/mobile phones, TV, and radio. Depending on the country, households have also reported owning other assets, including boats, cars and trucks, computers, washing machines, solar panels, and tractors, which are not as common. The majority of the assets are co-owned by both genders; however, the ownership of assets largely depends on the type of the assets; women tend to own the majority of the household items, whereas men are more likely to own farm tools, cars, and trucks, etc.

The next section of the report presents data and analysis on the households' landholding and agriculture production portfolio. As for the land tenure and access to farmland, nearly half of the land in all countries is owned by the households, whereas the rest is leased in or sharecropped. As for the land types, rainfed land occupies a significant share in the total land; irrigated land is only a small fraction of the total land operated by the households in the sample. With the estimated average of (32.66 ha), landholding size is the largest in Togo, followed by Liberia (6.91 ha), the Gambia (3.83 ha), and Mozambique (3.67). With an estimated average of 2.57 ha, landholding size is the smallest in Sierra Leone. Land use for crop production varies depending on the country. While the majority of the land operated by the households in Sierra Leone (91%), Mozambique (65%), the Gambia (80%), and Togo (85%) is cultivated, a major fraction of the total land in Liberia (about 75%) is left fallow.

Data on agriculture production show that households in almost all countries specialize in the production of one or two crops; that is, one or two crops dominate the production portfolio. In Liberia, cassava, rice, and maize occupy major share of the production. In Sierra Leone, pearl millet, rice, and cassava are the major crops that occupy majority of the land share. In Mozambique, maize, rubber, and some vegetables including cabbage and tomato appear as major crops. In the Gambia, groundnut, pearl millet, and maize dominate the production profile. In Togo, the most common crops grown by the households in the sample are maize, cassava, and groundnut. Reliance on single crops may signify that there exist production inefficiencies among farms due to misallocation of land resources, especially the allocation of a major share of farm land to low-yielding crops. Besides, mono-cropping

may result in greater exposure to production risks; for instance, in the case of crop failure, the loss will have a critical burden on household income and food consumption. As for livestock ownership, the majority of the households in the sample reportedly own livestock. Poultry production is common among households across the countries. Besides poultry, the most common animals owned by the households are goats, sheep, and in some countries, cows are also owned by the households.

While the majority of the households in Liberia (12.5%) and Sierra Leone (25%) indicated having no access to extension services, the majority in Mozambique (76%), The Gambia (73%), and Togo (65%) reported having access to extension services provided by the government extension department or externally funded projects. Nearly all the respondents in the sample across the countries who reported having access to extension services also reported to have membership in the farmers' organizations (e.g., growers or producer organizations, cooperatives, agribusiness associations, etc.). Households participation in collective groups such as farmers organizations must increase to ensure they are embedded in the social capital and have access to knowledge and local resources.

Though households in the sample in all countries reported hiring labour from the market at some point of the year, most likely at the time of harvest, household own labour (family labour) is the main source of manpower used to carry out farm activities. Perhaps households hire skilled labour from the market to undertake activities that require specialized expertise that the household own labour do not possess. Majority of the respondents in the sample also reported that the household labour is actively participating in the non-farm activities, including the service, manufacturing, trade, and other industrial sectors. This indicates that households are risk-averse and tend to shift away from relying on farming entirely and diversify into non-farming sectors.

In general, natural disasters and shocks are quite common across the countries. However, the type of shocks, the probability of occurrence, and the impact severity vary from country to country. The most common shocks reported by the households in Liberia include a surge in food prices, pests and diseases outbreaks, and drought. In Sierra Leone, a surge in food prices, pests and diseases outbreak, decline in the household income, and flooding were reported as the most probable shocks threatening agriculture production and the household's wellbeing. In Mozambique, flooding, surge in food prices, and loss of assets (including animals, land, etc.) were reported to affect the wellbeing of the households. Among other shocks, drought is reportedly the most severe threat in the context of Gambia and Togo. Understanding shocks are essential for the beneficiaries as well as the project management to ensure effective coping strategies are in place to mitigate the unprecedented impacts of potential risks and to achieve the target impact.

Salinization was reported as a common problem across the countries; the majority of the households in the sample (over 90% of the households in each country) reported that salinity was a common problem in their community directly effecting agricultural lands. However, the extent of salt-affected lands slightly varies depending on the country. With an estimated average of 99% lands affected, households in Liberia are severely affected, followed by Sierra Leone with 60% of the total land is affected by salt, the Gambia with 33% of the total lands affected by salinity, and Togo with 25% of the total lands reportedly affected by salinity. With about 11% of the land reportedly affected, salinization is relatively less common in Mozambique. Though the severity and the impact of salinization in terms of losses in yields vary depending up on the country, the reported loses as a result of salinity ranges from 5% to 100% in the production.

Households reported that the appearance of a white crust on the surface of the soil along with low infiltration of water in the soil and soil compactness are the most common symptoms of salinization. Households in the sample reported different factors and causes underlying salinization, including natural causes (e.g. parent material), climate change, high concentration of salts in the irrigation water, and poor irrigation methods and practices. Households devised different intervention strategies to cope with salinization and mitigate potential losses in crop production due to salinity. Among others, crop diversification and rotation, soil amendment, improved irrigation methods and practices, and drainage were reported to be the most common strategies. Most of the households across the countries reported that they had not received any trainings on salinity management. Given the serious threat posed by salinity, improving households' skills on innovative methods to manage salinity as well as improving the adaptive capacity of the households in the context of Biosaline agriculture are critical to mitigate losses and optimize production.

The gender section of the baseline survey presents data on gender mainstreaming in agriculture, women involvement in different sectors, and women empowerment (e.g., women participation in decisions related to the household in general, and farming in particular). The descriptive analysis reveals that women are a critical part of crop farming; however, in almost all cases, women's participation in the livestock sector was reportedly low. The majority of the respondents reported women's participation in off-farm activities. More than 90% of the survey respondents confirmed women's participation in the decision-making related to the household in general as well as decisions related to farming (i.e., leasing lands, crop production choices, input supply, and market participation). The role of women in income generation and labour activity is also significant in the context of all countries.

The food security of the target households is the ultimate objective of the current project. Data were collected on household's, access to food especially staple foods, food consumption (e.g. utilization), and sources of food items. The analysis reveals that cassava, rice, maize, pearl millet, and groundnut are the primary food crops for households across the countries that play a critical role in the households' diets. Data on access to the mentioned staple foods varies: In Liberia, Mozambique, and The Gambia, households had access for four days in a week to consume these foods, whereas in the case of Togo and Sierra Leone households have reported that they had access to staple foods for at least 6 days in a week. In Liberia and Gambia, households reported greater reliance on market for staple foods; In contrast, in Sierra Leone and Mozambique, the household demand for staple foods is met through own production and markets. In Togo, on the contrary, a significant share of the household demand for consumption is met through the household's own production. Perhaps this is explained by the abundant land resources available to the farm households in Togo.

Nearly all the households in the sample confirmed having access to the nearest permanent food markets and all-season derivable roads. Most of the households in the sample confirmed that markets are located within the community or within a radius of less than 60 minutes. Besides, most of the households confirmed that markets are reached by either walking or biking. More than 80% of the households indicated having access to market information in Sierra Leone and in the Gambia, about two-thirds of the households in Mozambique and Togo have had access to market information, whereas just under a third of the households in Liberia have declared having access to the market information. For the households who had access to information, most of them indicated that the information they obtained was useful in terms of decision-making related to market patriation for the input supply or selling surplus products.

Data on access to public services, including health and educational facility, and drinking water, reveal that except for the Gambia, the majority of the households (80-100) of the households had access to basic services including health and educational facilities and drinking water. However, households' access to credit is limited, indicating that low financial liquidity could be a binding constraint for agriculture production. The distribution of households in terms of access to credit is as follows: 17% of the households had access to credit in Togo, followed by Liberia (16%), The Gambia (13%) Sierra Leone (12%). In Mozambique, only 4% of the households have access to credit. In addition to credit, households' access to transportation services and electricity is limited and may present barriers for agriculture production.



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## Introduction

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The RESADE project is funded by the International Fund for Agricultural Development (IFAD) and the Arab Bank for Economic Development in Africa (BADEA). The project is implemented by the International Center for Biosaline Agriculture (ICBA) in partnership with national partners- the national agricultural research and extension services (NARES). RESADE will target seven in SSA countries in which salinization of agricultural land is a growing problem – namely The Gambia, Liberia, Sierra Leone and Togo in Western Africa, and Botswana, Mozambique and Namibia in Southern Africa. The project is designed to support national agricultural development policies and strategies of the target countries by rehabilitating and increasing the productivity of salinity-affected lands, and will provide technical assistance in salinity management to other IFAD- and BADEA-funded projects being implemented in these countries. It will draw from ICBA’s past, and ongoing projects as sources of relevant and valuable experience in the introduction of salinity management approaches to smallholder farmers in marginal environments.

### 1.1. About the Project

The goal of the project is to improve food security and reduce poverty of poor smallholder farmers, particularly women, in salinity-affected areas in Botswana, The Gambia, Liberia, Mozambique, Namibia, Sierra Leone, and Togo. The development objective of the project is to increase agricultural productivity and incomes in salinity-affected agricultural areas by:

- Introducing salt-tolerant crops and best agronomic management practices
- Developing value chains for introduced cropping systems
- Building the capacity of farmers and extension workers in salinity-resilient and climate smart agriculture in collaboration with national agricultural research and extension services (NARES).
- Incorporating climate-smart and salinity-resilient agricultural models and approaches into national agricultural development policies and strategies in the seven target countries.

The project is expected to deliver the following outcomes:

- Around 11,550 smallholder farmers in targeted areas, at least half of them women, adopt new cropping systems that are resilient to salinity and climate change, and utilize climate-smart

innovative intensification technologies and practices that increase productivity and mitigate/prevent further salinization.

- In targeted areas, productivity of saline lands is increased by 30% and economic returns to smallholder farmers are increased by 20%.
- Climate-smart and salinity-resilient agricultural models and approaches are incorporated into national agricultural development policies and strategies in the seven target countries.

### **1.2. Objective of the Baseline Survey**

The purpose of the baseline socioeconomic study is to provide an information base against which the International Center for Biosaline Agriculture (ICBA) will measure the impact and quality of change being brought about by the project. The baseline study, an early element of the project monitoring framework, is in effect the first step in the project monitoring and evaluation system. The baseline study intends to present an independently assessed data on the pre-determined indicators against which the project's progress and effectiveness and performance can be monitored and assessed both during the implementation of the project's activities and after the completion of the project. The specific objectives of the baseline study were:

- To determine the baseline values for all impact and outcome level performance indicators in the targeted countries.
- To collect and analyze information on the existing situation among the targeted beneficiaries.
- To collect and analyze information on sources and levels of production, income, food security situation, access and control to available productive resources, and nutrition and food security of targeted beneficiaries
- To demine the extent of salinity and its impact on crop production/yields and potential coping strategies

### **1.3. Methodology**

Prior to the design of the survey tools, project documents including the project concept note and proposal, approved logical framework of the project, beneficiaries' details, and list of project stakeholders were reviewed to gain clear understanding about the proposed intervention and pre-determined indicators. Such desk review has been instrumental in developing the methodology and study tools. The survey work was conducted by the local partners under the supervision of ICBA scientists and project management team. Using structured questionnaires, primary data were collected from sampled beneficiaries in the target county. The questionnaires were translated to local

languages when needed, to avoid misinterpretation of questions by the respondents and reduce the time taken to complete each survey.

#### **1.4. Sampling Techniques**

Selection criteria were developed to choose respondents in target districts/regions. The respondents were selected through a single-stage cluster sampling method in target regions of each country. Using two-stage sampling (e.g. villages/regions as primary sampling units; and households as a secondary/ultimate sampling) in different regions in each target countries, a total of 321 households (HHs) were interviewed. Lack of budget allocation was a challenge and greater limitation in conducting this study. The size of the sample was determined considering the available time and resources for data collection.

#### **1.5. Questionnaire Development**

The baseline data are collected using a structured questionnaire that consists of 10 sections. Each section is designed to collect data on a certain aspect of the farm household that is relevant to the project. Some of these aspects are perhaps not directly relevant or linked to the project activities, however at the end of the implementation, conducting impact evaluation will require understanding of other indirect but closely related facets too. Hence, it is typical of the baseline surveys to collect information on the farm (i.e. technical information related to farming), and farmer or household characteristics including demographic, social, cultural, and economic factors. The survey also intends to collect information on geographical and other spatial elements that are affect farming (i.e. natural disasters and shocks, market and road access, etc.).

Understanding the socioeconomic profile of a household/community requires exploring a broader picture of the social and economic situation. Technically, the mandate of the project is to work with farmers in adopting salt-affected crops and salinity-affected lands at the activity or output level, however up the result chain (i.e. at the outcome and objective levels), the impact evaluation team will need to measure broader concepts and impacts such as improvements in poverty and livelihoods and food (in)security that are not entirely attributed to or driven by introducing some new crops or improvements in salt-affected land alone, but also other socioeconomic variables play an equal or even more important role.

#### **1.6. Data Collection and Data Processing**

Using the structured questionnaire, data were collected by the NARES teams in each country. The survey work was conducted in the period of Jan–March 2020. The completed questionnaires were

scrutinized and field tested before the execution of the survey work, and data coding was done through the proper code plan for the qualitative responses. Initially, a database was designed using an online data portal. Unfortunately, due to the lack of internet and/or low speed of internet in the NARES headquarters, the online database could not be used. Hence, an alternative database using Microsoft Access was designed and shared ICBA and shared with the NARES teams. The collected data were entered into the MS access database. Upon the completion of data entry, the data were imported into STATA software for analysis.

## Country: Liberia

Liberia is in West Africa with an area of 111,369 square kilometres and population of 4.97 million (2019 world Bank estimate). Table 1.1 provides a quick overview of the country's profile. As per the World Bank estimate in 2016, nearly half of the Liberian population lived below the poverty line.

Table 2. 1: Country profile – Liberia

Indicator	Unit	Estimation
Population (2019 est.)	Millions	4.97
Agricultural Land (2016 est.)	Sq.km	27,000
Agricultural Land (2016 est.)	% of land area	37.43
GDP (in billions) (2019 est.)	Current US\$	3.07
GDP Per capita (2019 est.)	Current US\$	621.9
GDP Growth (2019 est.)	Annual %	2.47
Poverty headcount ratio (2016 est.)	% of population	50.9

*Source: World Bank Microdata-World Development Indicators (World Bank, 2020)*

The agriculture, forestry, fishing, and hunting sector is the mainstay of the Liberian economy, contributing 70.3% of real GDP in 2017 (Baffoe, 2018). Majority of the population relies on agriculture for food security and livelihood. Hence, development in agriculture sector holds the key to breaking the poverty trap and food security. Rubber, cocoa, crude palm oil are the major agriculture commodities in Liberian agricultural economic sector.

### 2.1. General Information and Household Demography

The baseline survey was carried out in District No. 1 in several villages and regions (Table 2.2). A total number of 64 household surveys were conducted in five regions and six villages throughout the district. The surveys are fairly equally distributed among regions and villages.

Table 2. 2: Survey coverage and spatial distribution

Region	Village						Total
	Edina	Edina City	King Town	Kingsville	Pluncal	Sam Town	
Grand Bassa County	0	0	0	0	1	0	1
Lower Bassa	3	2	5	3	8	6	27
Lower Bassa County	0	0	1	0	2	1	4
Lower Grand Bassa	0	1	9	1	7	0	18
Lower Grand Bassa County	0	0	4	0	8	2	14
<b>Total</b>	<b>3</b>	<b>3</b>	<b>19</b>	<b>4</b>	<b>26</b>	<b>9</b>	<b>64</b>

The participants of the survey were both male and female members of the household, majority of whom were household heads. With a slightly higher participation, women accounted for about 56% of the participants. The average age of the respondent was estimated at 37 years.

Table 2. 3: Respondent information

Respondent	Freq.	Percentage	Mean age (years)
Male	28	43.75	41.21
Female	36	56.25	33.39
Total sample	64	100.00	36.81

The survey provided data on the household gender and age composition of the household members (Table 2.4). With the average size of about 7 people, the household composition shows that no of prime male (aged 15-65) and prime female (aged 15-65) accounted for the highest gender-age demographic group followed by the young members (aged 14 years or less).

Table 2. 4: Household size by the age and gender groups

Household size, age, and sex groups	Mean	Min	Max	Median	Std. Dev.
Household Size (persons)	7.17	1.00	18.00	7.00	3.54
No. of male (14 years & less)	1.64	0.00	6.00	2.00	1.42
No. of female (14 years & less)	1.39	0.00	6.00	1.00	1.36
No of male (15 – 65 years)	1.97	0.00	6.00	1.00	1.62
No. female (15 – 65 years)	2.05	0.00	7.00	1.50	1.48
No. of males (65 years & above)	0.08	0.00	1.00	0.00	0.27
No. of females (64 years & above)	0.10	0.00	3.00	0.00	0.43

Table 2.5 summarizes the household head age, gender, and marital statues. About 69% of the household heads were male and 31% of them were female. On average, about 91% of the household male heads are married with an average age of 43 years, whereas only 7% are single. On average, about 50% of the household female heads are married with an average age of about 37 years, whereas 10%% are single.

Table 2. 5: Household head age by gender and marital status

Marital Status	Male			Female		
	Mean age	Freq.	Percent	Mean age	Freq.	Percent
Married	43.05	40	91%	37.3	10	50%
Single	38.66	3	7%	24	2	10%
Engaged	-	-	-	24	2	10%
Divorced/ Separated	-	-	-	40.75	4	20%
Widowed	42	1	2%	55	2	10%
Overall	42.73	44	100%	37.1	20	100%

The household literacy and education profile is summarized in Table 2.5. nearly 50% of the household heads in the sample were reported to be literate (e.g. able to read and write), 42% of the household heads were reported to be illiterate, whereas data on literacy for about 9% of the households were missing/not reported. Literacy was defined in the survey as household head’s ability to read and write. This means households heads who could not read and write were considered as illiterate. Household heads that could read and write were asked to provide information on the formal schooling and highest degree completed. While majority them completed only primary and secondary school, only about 20% of the total household heads in the sample completed high school and college. The average education completed for those household heads that went to formal schooling is about 8 years.

Table 2. 6: Household head literacy and formal education

<b>Literacy rate</b>		
Literacy	Freq.	Percent
Literate (can read & write)	32.00	50.00
Illiterate (cannot read & write)	27.00	42.19
Missing/not responded	5.00	7.81
<b>Total</b>	<b>64</b>	<b>100</b>
<b>Formal Education</b>		
Highest degree obtained	Freq.	Percent
Primary School	12.00	18.75
Secondary School	7.00	10.94
High School	6.00	9.38
Diploma	6.00	9.38
Other	1.00	1.56
Illiterate ( <i>did not go to school</i> )	32.00	50.00
<b>Total</b>	<b>64</b>	<b>100</b>
Average schooling years	7.6	

## 2.2. Household Socioeconomic Profile

Data on household income for different activities (including livestock, farming, wages from permanent and temporary employment, trade, remittances, and any other sources) was collected with segregation by gender. Average income for the sample was reported to be about 131,000 Liberian dollars, out of which about 2/3 of it is earned by men, and the rest by women members and both male and female members of the households. Converting Liberian Dollar to US dollars at an exchange rate of (1 Liberian Dollar= 0.005 \$US), the estimated income is equivalent to about 660 US dollars per household.



Table 2. 7: Household income by gender

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total Income (LCU)	64	131,560	30,033	0.00	1,831,200
Total Income by men (LCU)	64	78,164	286,124	0.00	1,680,000
Income earned by Women (LCU)	64	20,951	60,310	0.00	310,800
Income earned by both men and women (LCU)	64	20,799	34,738	0.00	181,400

The most important source of income was reported to be farming, followed by employment and trade. About 33% of the household income is from farming, 27 percent of the household income come from permanent employment, and 21% from trade. Aid appears to comprise a significantly smaller fraction of the household's income.

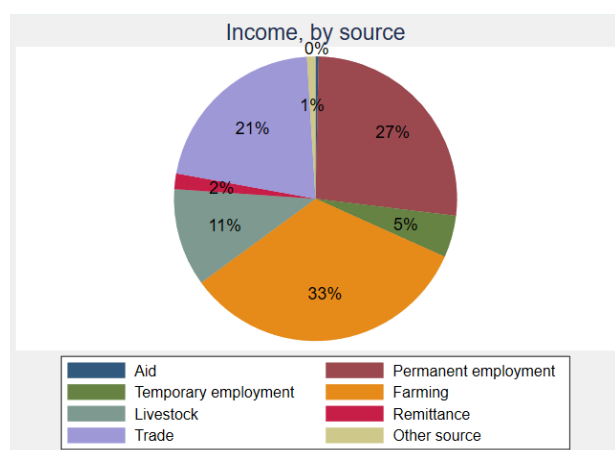


Figure 2. 1: Household income sources

Data on Household expenditures were collected in the baseline for both food and non-food expenditures and expenditures over a 12 months period. Data show that that expenditures on food items occupy about 77% of the annual spending, whereas this percentage share for non-food items in the total household's expenditures is about 22 percent. Total average spending of the household is estimated at about 18,000 Liberian dollars.

Table 2. 8: Household's expenditures

Variable	Obs.	Mean	Std. Dev.	Min	Max
Expenses (food)	64	14,202.34	21,978.565	1500	180,000
Expenses (non-food)	64	4,044.531	4,701.63	500	30,000

Data on asset ownership show that about 90% of the households own farm tools with an average number of 3.63 per households. The information on assets are important in the context of the project to construct asset index which is set as indicator for the household wealth. The following figure show information about the percent of households that own particular assets as well as the number of assets owned by the households.

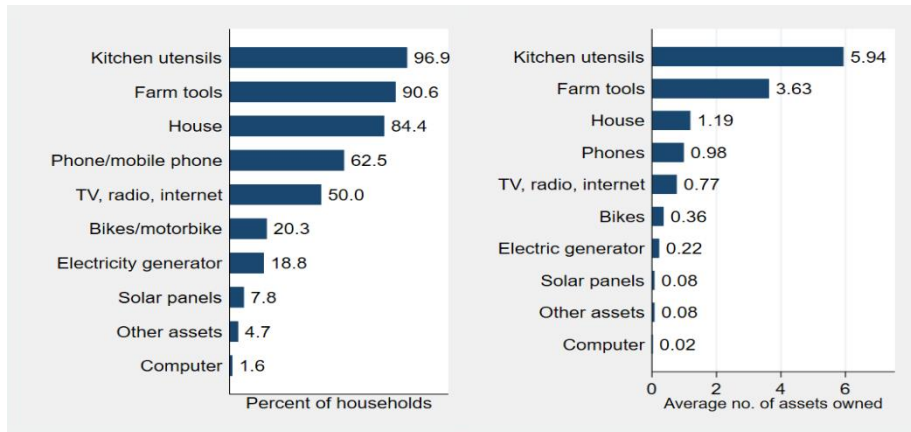


Figure 2. 2: Households asset ownership

The asset ownership data were segregated by gender to determine the variation in ownership based on gender. Households were asked if certain assets are owned by male only, female only, and both male and female members. The sum of assets owned by different genders is equal to the total assets reported in the previous figure. It appears that majority of the household assets are co-owned by both male and females. However, the ownership of assets by gender depends on the type of assets. For instance, majority of the kitchen utensils are owned by female members of the households, whereas majority of the farming tools are owned by the male members of the households.

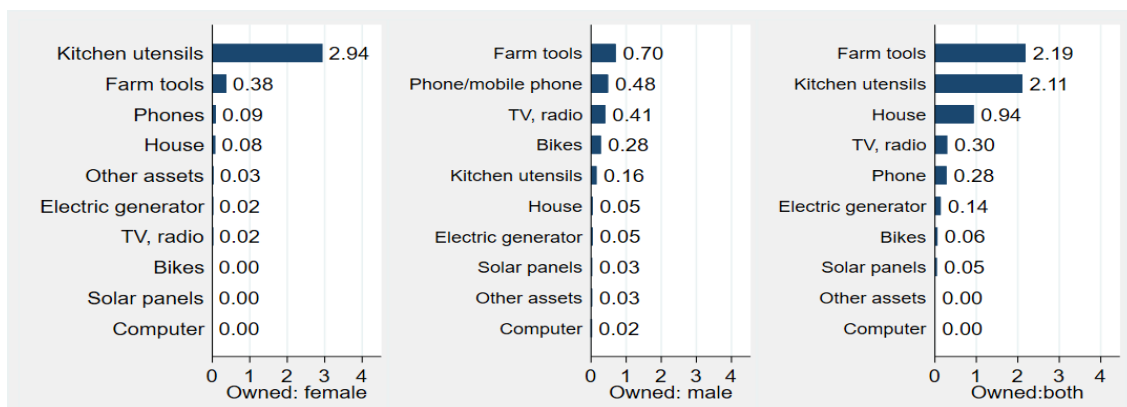


Figure 2. 3: Asset ownership by gender

### 2.3. Landholding and Agriculture Production Portfolio

This section of the household survey asks whether households have access to own, leased or share-cropped farmland. In addition, data on agriculture production, most common crops grown by the households, yields, and area allocated to individual crops are collected and analysed in this section. Data on the access show that nearly half of the land operated by the household is either leased in by the households or sharecropped. The remaining portion of the land operated by the household is owned by the households.

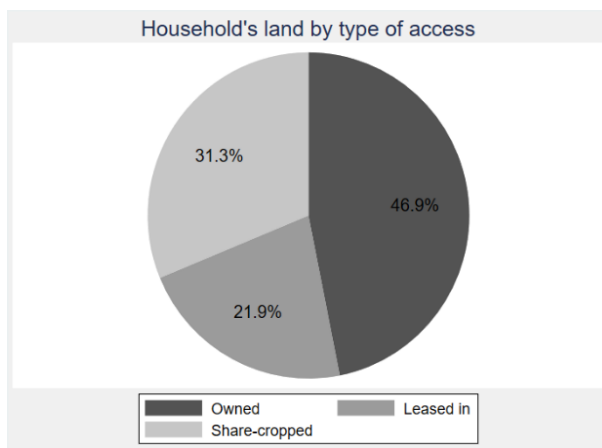


Figure 2. 4: households' agricultural land holding by type of access

The average size of the total land holding (including own, leased in and/or sharecropped) is about 6.91 hectares, out of which 1.63 ha is cultivated and 5.26 hectares is left fallow (Figure 2.5). All the land operated by the household was reported to be rainfed, no irrigated land was reported to be owned or leased by the households. The average land rental rate was estimated at about 1,619 in local currency.

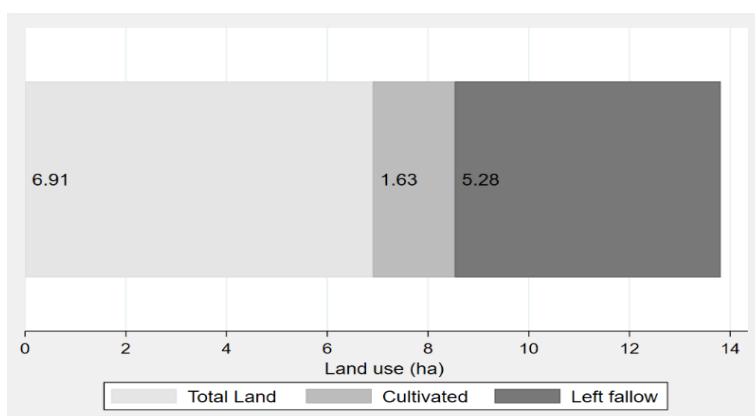


Figure 2. 5: Land use (hectares)

Households were asked to specify the soil type and level of soil fertility. On a scale of 1-5 with (1=very

poor, 2=poor, 3=average, 4=good, and 5=very good), the households were asked to rate the productivity of the cultivated land in terms of yield or production potential for the most common crops that the households grow. About 80% of the soils were reported to be sandy and the majority (80%) of the households rated the fertility level to be average in terms of yields or production. Note that average is below “good” in the scale that is specified in the survey. The remaining 17 percent rated the fertility to be “good”, whereas 3.1 percent of the households reported the fertility to be poor.

Table 2. 9: Soil type and fertility

<b>Type of soil</b>			
Type	Freq.	Percent	Cum.
sandy	52.00	81.25	81.25
clay	7.00	10.94	92.19
loam	5.00	7.81	100.00
<b>Total</b>	<b>64.00</b>	<b>100.00</b>	
<b>Fertility rate</b>			
Fertility	Freq.	Percent	Cum.
Poor	2.00	3.13	3.13
Average	51.00	79.69	82.81
Good	11.00	17.19	100.00
<b>Total</b>	<b>64.00</b>	<b>100.00</b>	

The survey questionnaire provided the respondents with a list of the most common crops (about 30 crops) to choose the crops that the household usually produces on the farm. We find that cassava, maize, and rice, and some vegetables and fruits including pepper, watermelon, and plantain were the most important crops, among others. However, cassava dominates the production portfolio as nearly 90% of the households reported growing cassava, 28 percent reported growing maize, and 26% reported growing rice with annual average production of about 1,240 kg, 102 kg, and 380 kg, respectively. It appears that majority of the households are mono-cropping, basically relying on the production of one of the three mentioned crops (cassava, rice, or maize).

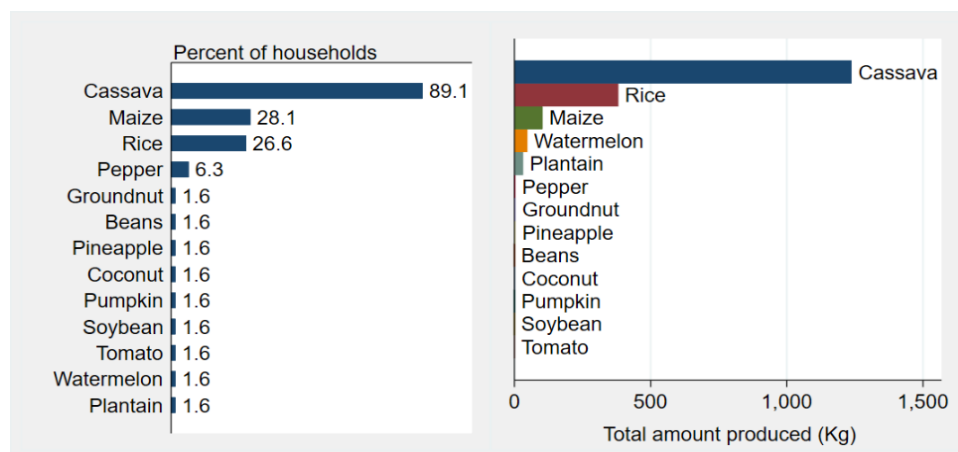


Figure 2. 6: Percent of households and quantity of crops produced

The survey also provides information on areas under individual crops. The data on land allocations show that majority of the land is allocated to cassava (1.55 hectares), followed by rice and maize. It is worth to note that the average cultivated land per household is about 1.63 hectares, this means nearly 95% of the households is occupied by cassava alone. While majority of the land is allocated to cassava, the yield data show that plantain, followed by cassava and rice gives the highest yield per unit of area. This may imply that there exist production inefficiency among the sample households simply due to the misallocation of farmland resources (e.g. majority of the land is allocated to low yielding crops such as maize).

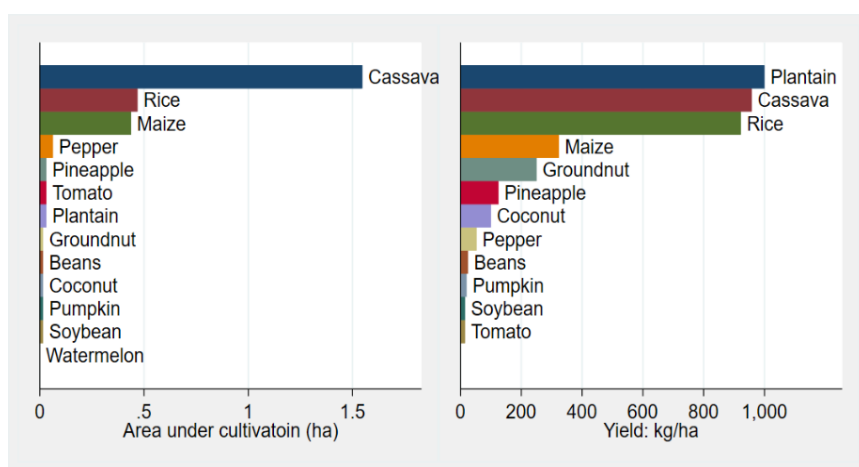


Figure 2. 7: Area occupied by crops and yields

Nearly half of the rice and about 16% of the cassava produced on the farm is consumed by the households. The data confirm post-harvest losses. On average, about 30 kg of cassava appears to be lost in the post-harvest stages (this is equivalent to about 2.4% of the total amount produced). The losses in maize and rice are not as significant.

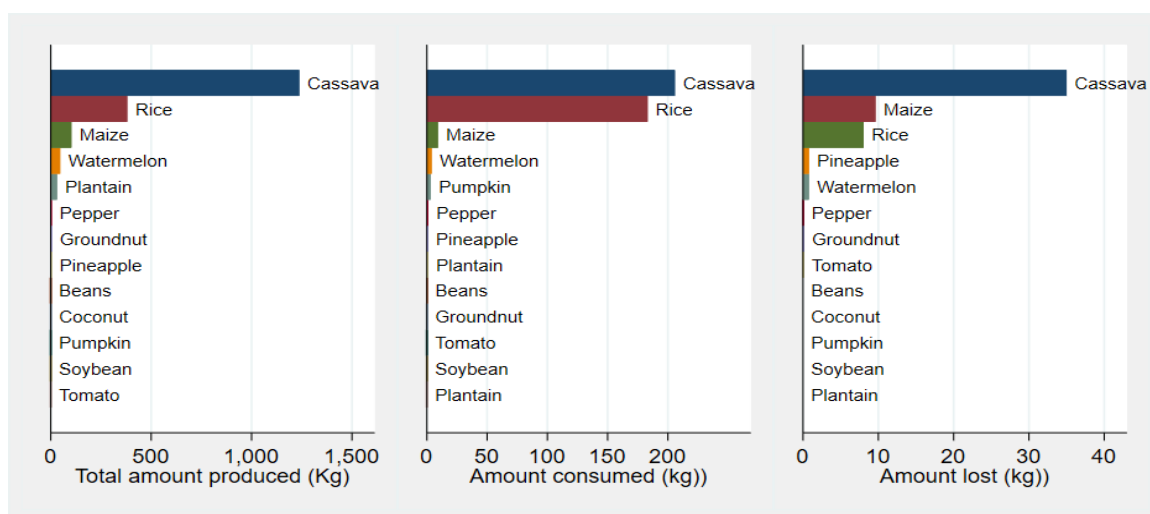


Figure 2. 8: Quantities produced, consumed, and lost

Cassava appears to be a market or cash crop as a major portion (about 80) of the total quantity produced is sold to the market. Similarly, majority of the vegetables and fruits produced by the households are sold to the market, whereas rice and maize appears to be produced mainly for the household consumption with small surpluses being sold to the market. Price data were collected in the local currency. The average prices of cassava, maize, and rice were reported to be 54, 14, and 11 Liberian dollars (1 Liberian dollar is equivalent to 0.005 US dollar).

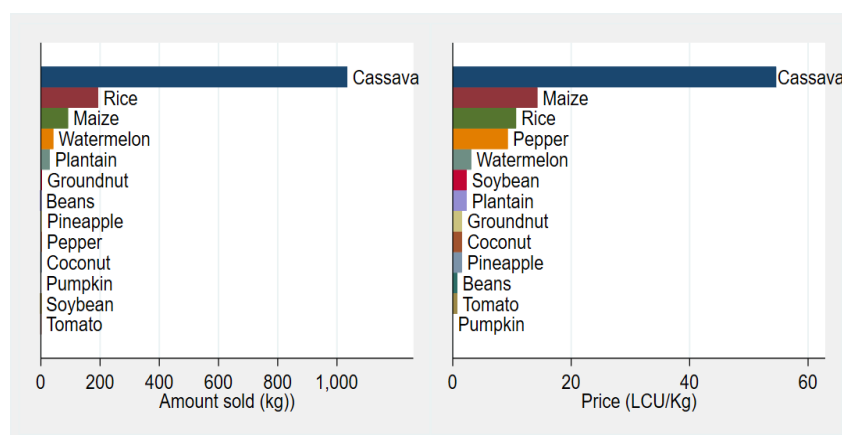


Figure 2. 9: quantifies sold at the farm gate or local markets and prices

Since the crop production, price, and cost of production data were collected for each crop separately, revenues as well as costs by crops were then aggregated to calculate total income from crop farming at the household level. The cost section of the survey provide data on inputs used at the farm including seed, land preparation, weeding, irrigation application, chemical and fertilizer use, compost/biochar, harvesting, threshing, winnowing drying and bagging, cash payments for storage, transportation, broker, fuel, machinery repairs direct taxes, and other miscellaneous costs. Data on fixed costs were also collected including one-off costs for purchasing machinery, land rental or lease, buildings and other farm structures, storage facility such as building or storage bins, and other costs.

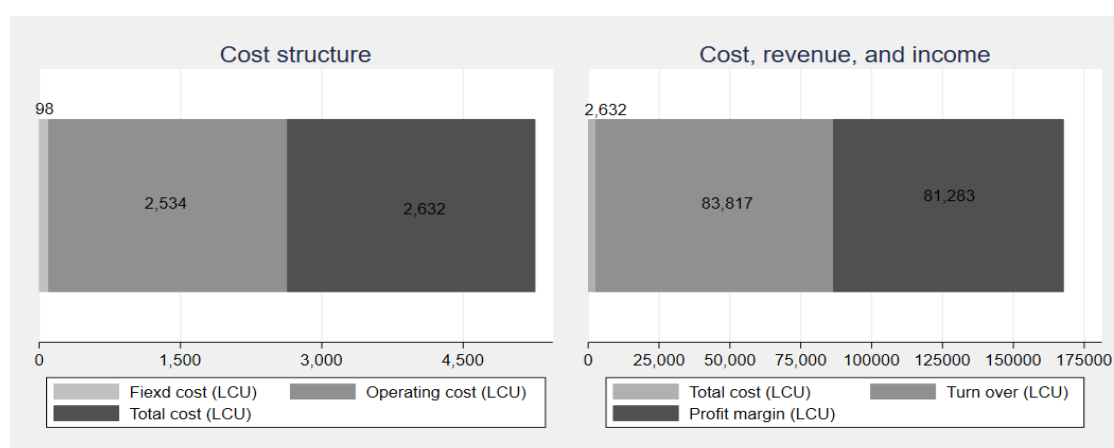


Figure 2. 10: Cost of production, crop revenues, and crop income

The average estimated variable cost is about 2,500 Liberian dollar per farm, whereas the average fixed cost is about 98 Liberian dollars (indicating that households perhaps do not build or own significant amount of fixed assets). Total production cost (i.e. the sum of the two costs) is 2,632. Average aggregated revenue is estimated to be about 83,000 Liberian dollars, the average operating profit is estimated at 81,000, and average net profit from crops is therefor 81,185 Liberian dollars. Note that operating profit is the subtraction of operating or variable costs from total revenues, whereas total profit is the subtraction of total cost (operating and fixed cost) from the revenues. The data presented on income in the previous section represent farmers estimations. However, the farm income figures presented in this section are calculated based on revenues from individual crops. Hence, for the farm income, the data presented in the section are likely to be more accurate.

Table 2. 10: Production costs, revenues, and income

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total farm variable cost [A]	64	2,534	2,433	20	12,695
Total farm fixed costs [B]	64	98	383	-	2,001
Total farm cost [A+B]	64	2,632	2,447	20	13,295
Total Farm revenue [C]	64	83,817	136,745	-	800,000
Operating profit (C-A)	64	81,283	135,635	(1,620)	787,305
Total profit [C-(A+B)]	64	81,185	135,601	(1,620)	786,705

The next section of the baseline survey was designed to collect information on the household's livestock ownership. A list of animals was provided in the survey form for households to choose which and how many animals they own. The data show that the majority of the households (94%) own poultry, whereas roughly 13% of the household reported to own goats and other animals. On average, the households reported that they own about 22 chickens and less than 5 goats and other animals.

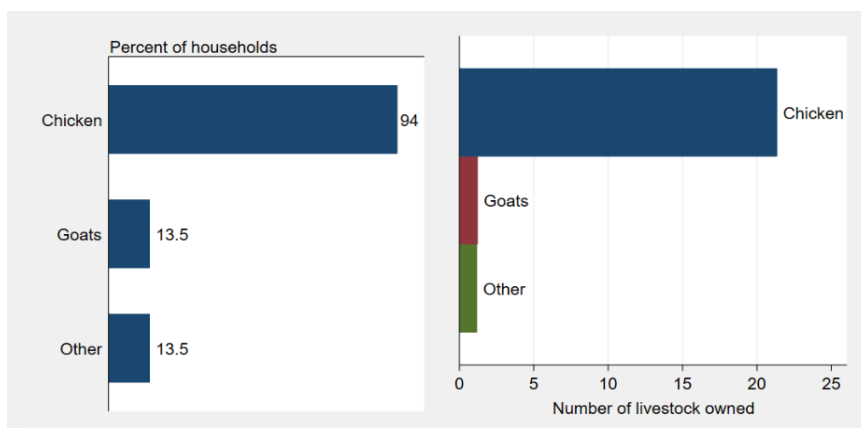


Figure 2. 11: Percent of households and number of livestock owned

#### 2.4. Farmers Organizations and access to Extension Services

In this section, data are gathered on whether farm households have memberships in the farmers organization (e.g. grower/producer organizations, cooperatives, trader organizations, supplier organizations, etc.) and to determine whether they have access to the extension services provided by the government or projects. Table 2.11 summarizes households’ access to extension services and the number of visits by the extension agents. Majority of the households (87.5% of the households) have reported no access to extension services, whereas about 12.5 confirmed that they have access to extension services. Households in the sample were then asked to specify the number of visits the extension agents paid to their farms based on a scale of 0-3 with 0= never, 1=rarely (once in three months), 2=sometimes (once or twice in a month), and 3= at least once in a week. For those households that reported to have access to extension services, nearly 37% specified “rarely”, 50% chose “sometimes” and 12.5% chose “at least once in a week”.

Table 2. 11: Access to extension services

Access to extension Services	Number of extension visits					Total
	Never	Rarely (once in 3 months)	Sometimes (once/twice in a month)	At least once in a week	Missing/ not reported	
Yes	0	3	4	1	0	8
	0.00	100.00	100.00	100.00	0.00	12.50
No	1	0	0	0	55	56
	100.00	0.00	0.00	0.00	100.00	87.50
Total	1	3	4	1	55	64
	100.00	100.00	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

About 87% of the household’s indicated no access or no memberships of farmers organizations and 12.5% indicated that they are members of different farmer organizations. Farmers organizations



usually provide key information on technical aspects of crop production, marketing, prices, and input supplies. Access to such information is critical for the farm households to increase production and incomes by helping them to identify appropriate production and marketing strategies.

**Table 2. 12: Membership of households in farmer organizations**

Is this household a member of any farmer organization?	Freq.	Percent	Cum.
Yes	8	12.5	12.5
No	56	87.5	100
Total	64	100	

## **2.5. Labour**

The labour section of the survey was designed to collect data on farm own as well as hired labour for different months in the year. Besides, the households were asked if any members of their households were involved in the off-farm activities. Data on wages were also collected from those households that have hired labour from the market. Labour data were segregated by gender to identify women involvement in on- and off-farm activities. Subsequently, averages for the number of labours used in the farm and monthly wages, as well as average daily hours and average workdays per week were calculated (Table 2.10). labour reported here include household members of the age of 15 or older. Members younger than 15 years of age were considered as child labour and is not included in the estimations. it is also worth noting that 5 out of 64 household did not report any labour (e.g. missing values).

On average, about 3.40 labours were reported to work on the farm activities. It appears that higher number of the household female members are involved in farming activities than male members. However, male members are reported to work longer hours and additional days in a week as compared to the female members. Average wage is estimated to be 162 Liberian Dollars with slightly higher wages for male compared to the female members. It is worth noting that the wage data reported here is based on the household's estimation (i.e. a counterfactual wages, for instance the wage that would have been paid to the household labour if they were employed by other household to carry out farm work).

Table 2. 13: Labor use at the farm

Gender	Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	Avg no. of labors (month)	59	1.97	1.995	0.00	11.40
	Avg. days worked (days/month)	59	5.34	4.179	0.00	18.00
	Avg hours worked (hrs/day)	59	10.15	38.489	0.00	30.00
	Wage (LCU/day)	59	204.98	132.985	0.00	650.00
Female	Avg no. of labors (month)	59	1.427	1.579	0.00	8.50
	Avg. days worked (days/month)	59	4.909	4.138	0.00	18.00
	Avg hours worked (hrs/day)	59	4.947	3.937	0.00	25.60
	Wage (LCU/day)	59	184.70	122.585	0.00	416.67
Total: both male & female	Avg no. of labors (month)	59	3.40	2.446	0.5	13
	Avg. days worked (days/month)	59	4.26	4.37	0.5	30
	Avg hours worked (hrs/day)	59	9.095	38.599	0.4	300
	Wage (LCU/day)	59	162.78	118.988	0	593.75

*Note: the wages reported in this table are only indicative and may not represent the market value of labour*

It appears that nearly all households in the sample have hired labour from the market at some point throughout the year. The average figure of number of labours shows that every month about 1.25 labours were hired from the market working for about 8 hours per day and 8 days in a week, on average. Average wage is estimated at 470 Liberian dollars, much higher than the estimated wages for the household own labour, perhaps because the hired labour is skilled labour which were hired to carry out specialized activities requiring technical skills that the household labour may not possess.

Table 2. 14: Labors hired by the households from the market

Variable	Obs.	Mean	Std. Dev.	Min	Max
Avg no. of labors (month)	64	1.253	1.22	0	5.5
Avg days worked (days/month)	64	8.484	11.525	0	8
Avg hours worked (hours/day)	64	8.641	8.634	0	24
Avg wage (LCU/day)	64	470.313	1721.058	0	14000

About 60% of the households indicated that some members of their households worked off-farm, whereas 37.5% of the households' members did not report working off-farm. Off-farm activities may include any non-farm activities undertaken by the household members including jobs in the service, manufacturing, and other industrial sectors.

Table 2. 15: Household involvement in off-farm activities

Off-farm work	Freq.	Percent	Cum.
Yes	38	59.38	59.38
No	24	37.5	96.88
Missing/not reported	2	3.13	100
Total	64	100	

## 2.6. Natural Disasters, Shocks, Climate Change, and Coping Strategies

Data on shocks and coping strategies were also collected as part of the baseline survey. Common shocks faced by the farmers were listed in the survey questionnaire and farmers were asked to report their occurrence and impact based on a scale of 1-3 with 1= low, 2=medium, 3=high. The results show that increase in food prices is the most common shock faced by the households throughout the last 12 months followed by decline in households’ income, pest and diseases outbreak, drought, and loss of assets. In general, shocks and natural disasters are quite common in the sampled region. Information on the shocks faced by the households are important to develop and implement risk management strategies throughout the project.

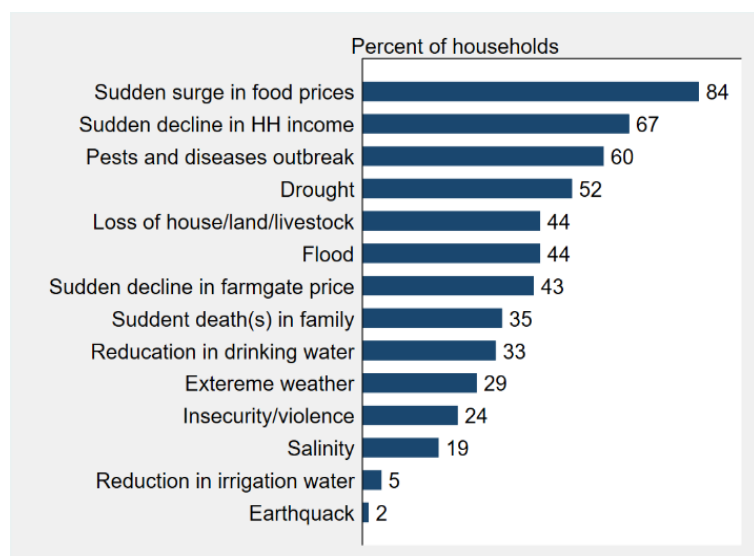


Figure 2. 12: Shocks faced by the households

We plotted the severity of the most common shocks faced by the households to visualize their potential impact for agriculture and the overall well-being of the households. Majority of the shocks appear to have medium to high impact. Note that “no impact” signifies either households that did not report a particular shock or households that actually reported a particular shock, but the impact was zero. Understanding the severity of the shocks faced by the farm households is important for the

project management team to ensure coping strategies are in place to mitigate the unprecedented impacts of potential risks and achieve the target impact.

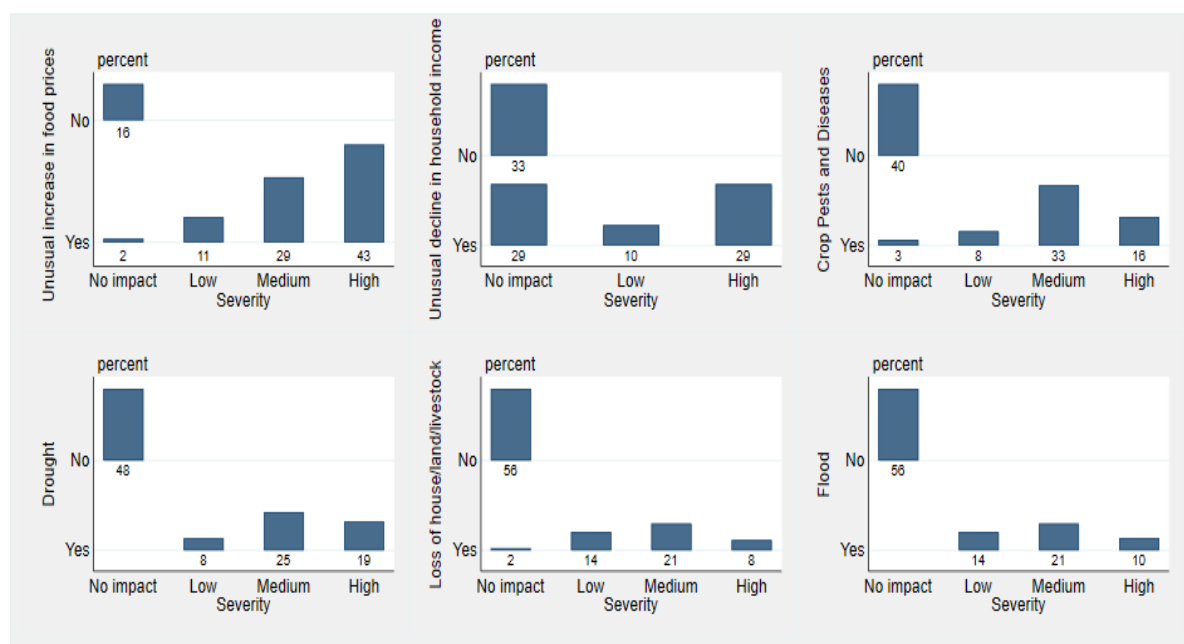


Figure 2. 13: Most common shocks faced by the household and severity levels

## 2.7. Salinity and Potential Interventions by the Households

Salinity is one of the major aspects of the current project. Therefore, data on different aspects of salinization were collected including data on the extent of salinity, its impact in terms of area being affected and in terms of losses in yields/production, and potential intervention strategies that households devised to cope with the salinity problems and whether these interventions have worked to mitigate the potential impacts of salinity. Nearly 97 percent of the households in the sample reported that salinity is a common problem in their village directly affecting agriculture production.

Table 2. 16: The extent of salinity among the sample households

Is salinity a problem in your village/area?	Freq.	Percent	Average land affected by salinity (ha)
No	2	3.13	6.85
Yes	62	96.88	
Total	64	100.00	

Households were asked about how they identify and recognize salinity and that their lands are affected by salt. Nearly 83% of the respondents in the sample indicated that they see white crust as a symptom of salinity, whereas some households also indicated soil compactness, low infiltration of water in the soil, and dark brown colour of soil as other signs of salinization.

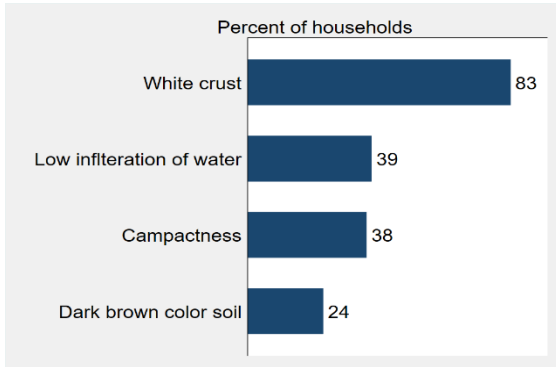


Figure 2. 14: Identification of salt-affected lands by the households

On average, 6.5 hectares of land is affected by salinity. This is nearly 99% of the average land operated by the households. However, the severity of impact of salinity varies: 3.5% of the households reported that their land is severely affected with a high impact leading to the loss of 10-50% in yields, majority (61.5%) of the households indicated medium severity leading to a loss of 5-50% in yields, and the remaining 35% of the households indicated a low severity leading to the loss of 5-25% of loss in the yields.



Figure 2. 15: Amount of land affected by salinity and its impact on yields

Households executed several intervention strategies to manage salinity including deep ploughing, crop diversification, crop rotation, soil amendment, and drainage. Crop diversification is by far the most common strategy to cope with salinity as about 52% of the households reported diversification as a coping strategy, followed by crop rotation and soil amendment. When the respondents were asked to provide information on whether the interventions they have implemented have actually worked, nearly 75% of the households reported the interventions were effective increasing yield by 70-80%.

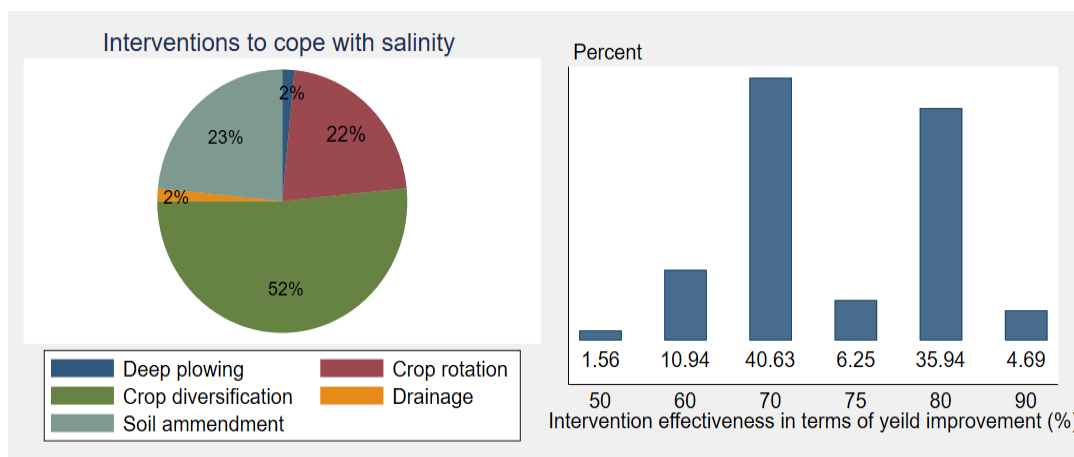


Figure 2. 16: Interventions by households and their effectiveness to cope with salinity

The households were asked if they have received training on salinity management. Majority of the households (about 95%) indicated that they have not received any training, whereas about 4% of the households received training (note that about 1% of the households did not report any training). Training on salinity management is not quite common in the sample area as only a small fraction of the respondents in the sample have indicated that they have participated in trainings and have received some information on salinity management.

Table 2. 17: Training on salinity management

Have you received training on salinity management?	Freq.	Percent	Cum.
No	61	95.31	95.31
Yes	2	3.13	98.44
Missing/not reported	1	1.56	100.00
Total	64	100	

## 2.8. Gender and Women Involvement in Agricultural Activities

The gender section of the survey was allocated to collecting information on the gender balance, particularly women involvement in agricultural activities and household decision making. Majority (85%) of the households reported that women are actively involved in farming activities, whereas women involvement in the livestock sector is considerably low as just 9% of the respondents reported women involvement in livestock. More than two-thirds of the respondents in the sample reported that women were involved in non-farm activities.

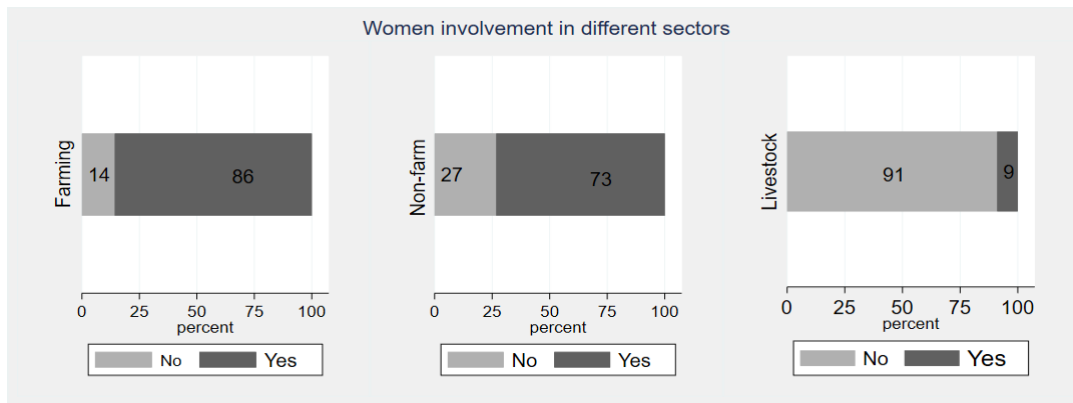


Figure 2. 17: women involvement in different sectors

When households were asked to specify if women are involved in any decision-making related to the household and farming, about 93% and 95% of the respondents responded that women were actively involved in decisions related to the household in general and farming, respectively.

Table 2. 18: Women involvement in decision making

Women involvement in decisions	Yes		No	
	Freq.	Percent	Freq.	Percent
Are women involved in any decisions related to the household?	60	93.75	4	6.25
Are women involved in any decisions related to farming	61	95.31	3	4.69

The specific decisions related to farming and women involvement in decisions are illustrated in the figure below. It appears that majority of the decisions related to land (rental, or cultivation), crop choices, purchase of farm tools and inputs, hiring labour from the market, and selling agricultural productions are jointly made by the women and men.

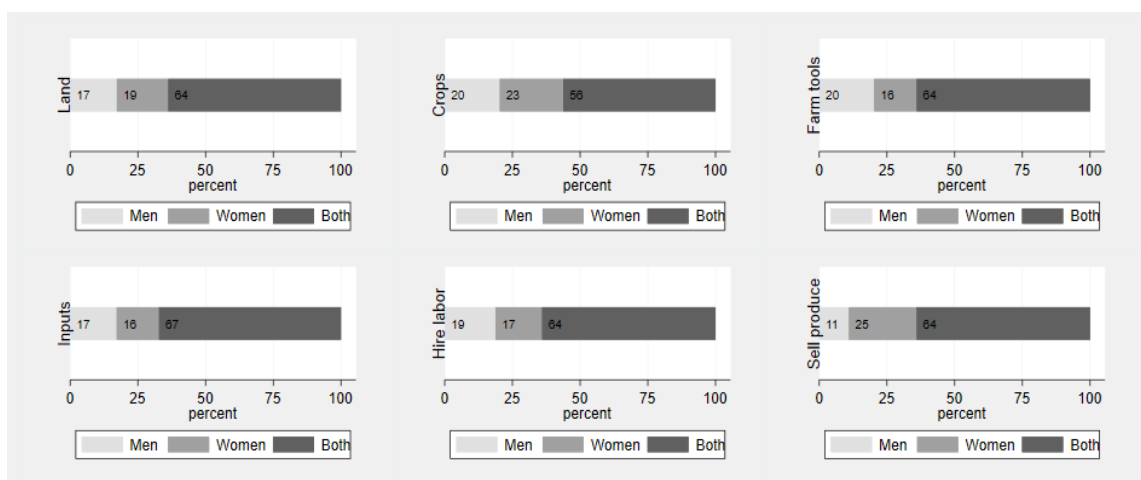


Figure 2. 18: Women involvement in decisions related to specific activities

Women are also play critical role in the household decisions related to the household’s expenditures on food- and non-food expenses. Through majority of the decisions are jointly made by men and women, women are slightly more involved in decision making related to food expenditures, whereas men are leading on the decisions related to non-food expenses.

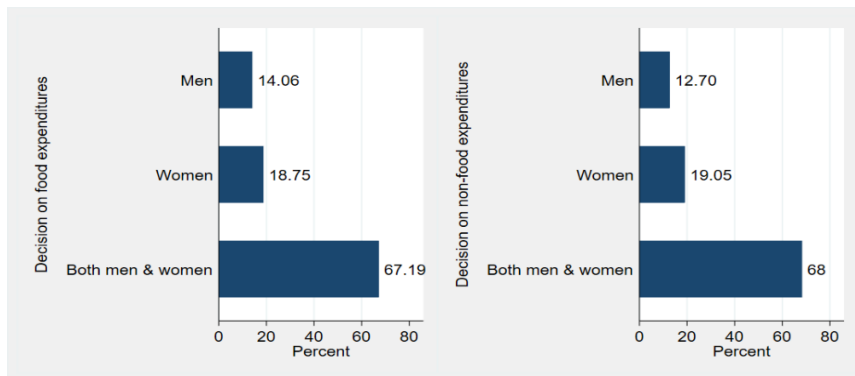


Figure 2. 19: Decisions on food- and non-food expenditures

### 2.9. Food Security and Nutrition

Food security of the target rural households is the ultimate objective of the current project. Considering this overarching goal, data on household food consumption and types of food that they consume were collected. The objective of this exercise is to identify key staple food crops, whether household have enough to consume throughout the year, and whether the household rely on market or their own production for consumption.

The households in the sample relied heavily on rice, dairy, and cassava which account for a major proportion of the household’s diet. This implies, that these three products are in the core of households’ diets and are therefore staple products that play a critical role in household’s food security. In terms of access, nearly 98% of the households responded that they had access to dairy products during the last 7 days, whereas 81% of the households reported access to cassava, 95% of the household had access to rice, and 81% percent of the households had access to cassava.

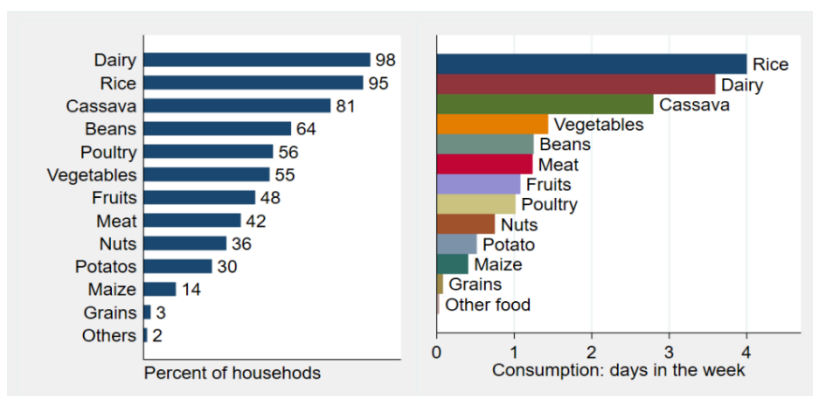


Figure 2. 20: Common foods and consumption by the households



The household demand for food consumption is largely met through local markets especially rice as 89% of the households responded that they meet their consumption demand for rice from the market. Meanwhile, households also rely heavily on markets for dairy products including butter and cooking oil as about 60% the household reported that they purchase dairy from local markets. Cassava, on the contrary, appears to be mainly sourced from household's own production.

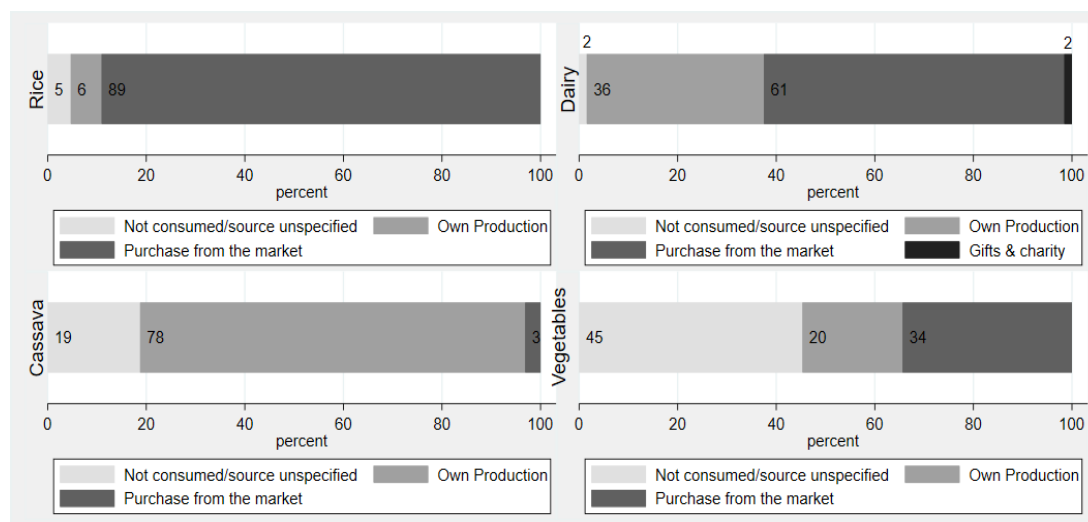


Figure 2. 21: Food sources for selected food items

## 2.10. Access to Infrastructure and Services

This section of the questionnaire provides information on the household's access to infrastructure and services including roads, local and regional markets, as well as basic services such as agricultural credit, health and education facilities, and water. The objective of this section is to provide an overall picture of the households' profile and their wellbeing.

Majority of the households (more than 95% of the sample) have reported that they have access to markets and all-season drivable roads. Access to markets is an important aspect of farming and plays critical role in improvement of agribusiness in the local communities. Better access to markets and roads implies improved market participation for outputs and inputs.

Table 2. 19: Household's access to roads and markets

Access	Yes		No		Missing/not reported	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Access to local markets	61	95.31	1	1.56	2	3.13
Access to roads	62	96.88	1	1.56	1	1.56

Majority of the households reported that markets are located within a radius of less than 60 minutes of their community, whereas only 1.56 percent of the households responded that market is not reachable with any means of transportation. 15.6 percent of the households reported that markets are located within their community. Majority of the households (nearly 85%) are able to reach market by bike or by walking.

Table 2. 20: Time taken to reach market by type of transportation means

Market reached by walking, car, bike, animal, or public transport	Time required to reach the nearest market					
	Market within the community (no travel needed)	Less than 60 minutes	Between 1-2 hours	Market not reachable	Missing/not reported	Total
by walking	10	0	2	0	0	12
	100.00	0.00	16.67	0.00	0.00	18.75
by car	0	5	2	0	0	7
	0.00	13.16	16.67	0.00	0.00	10.94
by bike	0	32	7	1	3	43
	0.00	84.21	58.33	100.00	100.00	67.19
by animal	0	1	0	0	0	1
	0.00	2.63	0.00	0.00	0.00	1.56
by public transport	0	0	1	0	0	1
	0.00	0.00	8.33	0.00	0.00	1.56
Total	10	38	12	1	3	64
	15.6	59.4	18.75	1.56	4.68	100.00
	100.00	100.00	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

Less than a third of the households have indicated that they had access to market information, whereas the rest of the household reported no access to any information related to prices and markets. Those who had access have declared that the information they obtained were useful in terms of marketing their production and sourcing agricultural inputs.

Table 2. 21: Access to market information

Access to market information	Were the information obtained useful?			
	No	Yes	Missing/ not reported	Total
No	2	0	42	44
	4.55	0.00	95.45	100.00
	66.67	0.00	97.67	68.75
Yes	1	18	1	20
	5.00	90.00	5.00	100.00
	33.33	100.00	2.33	31.25
Total	3	18	43	64
	4.69	28.13	67.19	100.00

First row has *frequencies*; second row has *row percentages* and third row has *column percentages*

Households were also asked to provide information on access to general services including access to credit, health and educational facilities, electricity, and drinking water. Over 90% of the households in the sample have indicated having access to educational facilities, 86% had confirmed access to health facilities, about 78% of the household have confirmed having access to clean drinking water, whereas about two-thirds of the households in the sample had acknowledged having access to transportation services. About 15% of the households have had access to credit indicating that unviability of credit can be a binding constraint for agriculture production.

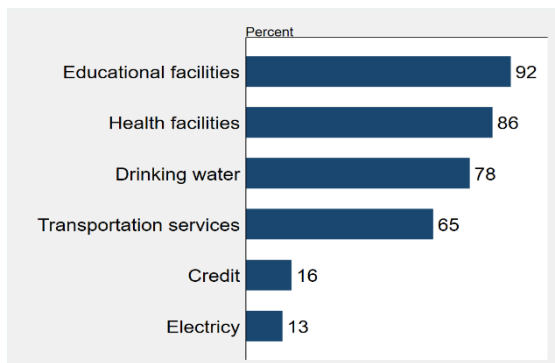


Figure 2. 22: Access to services public services

## Country: Sierra Leone

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Sierra Leone is located on the southwest coast of West Africa with a total area of area of 71,740 sq. km. With a population estimate of 7.82 billion in 2019, the country's economic growth was predicted at 5.51 in 2019. Agriculture sector plays an important role in the economy with about 60% contribution in the GDP. Although the economic growth is relatively steady and high, the country suffers gravely from poverty. The latest poverty headcount ration in 2011 showed that more than half of the population was living below the poverty line. This situation may have changed since 2011, however the it is highly likely that a significant fraction of the population is still living with extreme. Table 3.1 summarizes some of the macroeconomy indicators.

Table 3. 1: Country profile Sierra Leone

Indicator	Unit	Estimation
Population (2019 est.)	Millions	7.82
Agricultural Land (2016 est.)	Sq.km	39,490
Agricultural Land (2016 est.)	% of land area	54.71
GDP (in billions) (2019 est.)	Current US\$	3.94
GDP Per capita (2029 est.)	Current US\$	504.46
GDP Growth (2019 est.)	Annual %	5.51
Poverty headcount ratio (2011 est.)	% of population	52.9

*Source: World Bank Microdata-World Development Indicators (World Bank, 2020)*

Agriculture is the country's biggest sector that makes up almost 60 % of GDP that employs about 60% of the population (United Nations Economic Commission for Africa, 2017). Agriculture will be the key driver of growth in the medium-term, growing at 4.7 percent on average (2019 World Bank, 2019). Increased foreign direct investments in crop production and fisheries are expected to drive the performance of the agriculture sector. Given the importance of agriculture in the GDP and rural employment, the role of agriculture is critical in poverty reduction and households food security, especially in the rural areas where majority of the poor live.

### 3.1. General Information and Household Demography

This first section of the survey collects information on respondents' characteristics, geographical coverage and distribution of the sample, household demography and characteristics. A total of 82 surveys were conducted in the northern region of Kambia district. Surveys were distributed fairly equally throughout five villages that were covered by the survey team.

Table 3. 2: Villages covered by the baseline survey

Village	Freq.	Percent
Makatic	22	26.83
Robat	21	25.61
Robumbeh	20	24.39
Rokupr	19	23.17
Total	82	100

About 68% of the survey respondents in the sample were male and 32% were female. Though the average age of the respondents slightly varies by gender, the overall average age of the respondent was estimated to be 36.8 years.

Table 3. 3: Respondent information

Respondent	Freq.	Percentage	Mean age (years)
Male	56	68	40.32
Female	26	32	37.56
Total sample	82	100	36.81

The average size of the household is about 7.21 persons with a standard deviation of 7.72. The estimated size ranges from a minimum of 2 persons per household to a maximum of 16 persons per household. The prime age-gender demographic group (e.g. members of age of 15-64) dominates the composition of the households, whereas the elderly age-sex group (e.g. household members with age of 65 and above) accounts for the lowest fraction in the household composition. Children and minors (e.g. members of household aged 14 or less) comprise the second highest demographic proportion in the household composition.

Table 3. 4: Household size by age and sex groups

Household size, age, and sex groups	Mean	Min	Max	Median	Std. Dev.
Household Size (persons)	7.21	2.00	16.00	7.00	2.72
No. of male (14 years & less)	1.61	0.00	6.00	1.00	1.33
No. of female (14 years & less)	1.29	0.00	7.00	1.00	1.40
No of male (15 – 64 years)	2.09	0.00	5.00	2.00	1.11
No. female (15 – 64 years)	2.00	0.00	6.00	2.00	1.37
No. of males (65 years & above)	0.06	0.00	1.00	0.00	0.24
No. of females (65 years & above)	0.16	0.00	2.00	0.00	0.40

A large number (about 57 out of 82) of the households are headed by male, whereas 9 out of 82 households are headed by female heads. Data on gender and marital status for 16 out of the total 82 households in the sample were missing or not reported. Majority of the household heads (53 out of 82) are reportedly married, whereas 9 out of 82 are single.

Table 3. 5: Household head gender and marital status

Household Head Marital Status	Gender			Total
	Male	Female	Missing/ not reported	
Married	48	5	0	53
Single	6	2	1	9
Divorced/Separated	1	1	0	2
Widowed	0	1	0	1
Missing/not reported	2	0	15	17
<b>Total</b>	<b>57</b>	<b>9</b>	<b>16</b>	<b>82</b>

While nearly 26 percent of the household heads can read and write, about 37% are illiterate (e.g. cannot read and write), and the data for about 38% of the household were missing. Nearly 15% of the Households heads who are literate and obtained formal schooling degrees are primary and secondary school graduates, whereas about 10% of the household head obtained high school and university diplomas.

Table 3. 6: Household head literacy and education

<b>Literacy rate</b>		
Literacy	Freq.	Percent
Literate (can read & write)	21.00	25.61
Illiterate (cannot read & write)	30.00	36.59
Missing/not responded	31.00	37.80
<b>Total</b>	<b>82.00</b>	<b>100.00</b>
<b>Formal Education</b>		
Highest degree obtained	Freq.	Percent
Primary School	4.00	4.88
Secondary School	8.00	9.76
High School	6.00	7.32
Diploma	1.00	1.22
Other	1.00	1.22
Illiterate ( <i>did not go to school</i> )	62.00	75.61
<b>Total</b>	<b>82.00</b>	<b>100.00</b>
Average schooling years	3.00	

### 3.2. Household Socioeconomic Profile

The first part of the socioeconomic profile covers information on household income and sources, and the second part collects data on and households' asset ownership. As for the household income, the average income per household is estimated at about 4.8 million Sierra Leonean Leone (equivalent to 4,900 \$US) with relatively higher contribution by women than men. It is worth to be noticed that income values for some observations were missing and are therefore excluded from the calculation.

Table 3. 7: Household income, total, and by gender

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total income	74	4,827,672	8,985,614	196,000	75,000,000
Amount earned men	74	1,046,926	1,498,344	0	8,000,000
Amount earned women	74	1,290,460	2,667,630	0	10,200,000
Amount earned both	74	2,313,665	9,149,552	0	75,000,000

Major source of the household’s income is farming with 40% contribution to the total household income, followed by trade (25%), livestock (15%), and remittances (13%). Permanent and temporary employment comprise the small proportion of the household income. It is also worth to note that the contribution of aid by the government and other projects is significantly small and negligible.

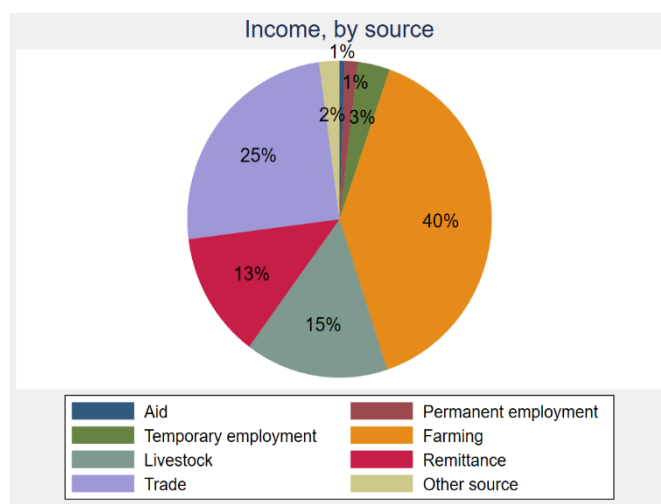


Figure 3. 1: Sources of the household income

The data on household expenditures show that majority (about 72%) of the household expenditures are related to food expenses, whereas 28% of the spendings are related to non-food items.

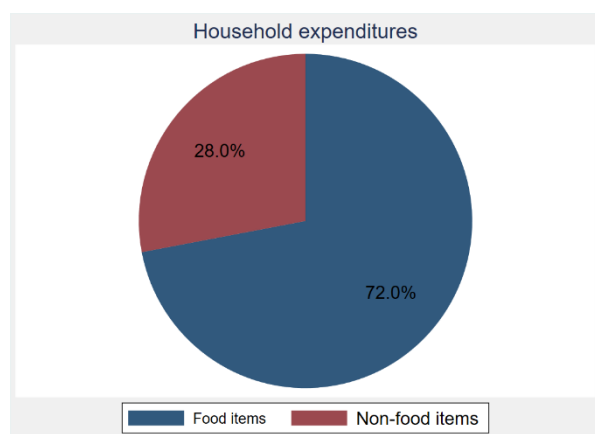


Figure 3. 2 Household expenditures (food and non-food items)

Most common assets owned by the households are kitchenware, farm tools, mobile phones, house, and communication equipment including TV, radio, and internet. Nearly 80% of the households indicated they own on average about 8 farm tools.

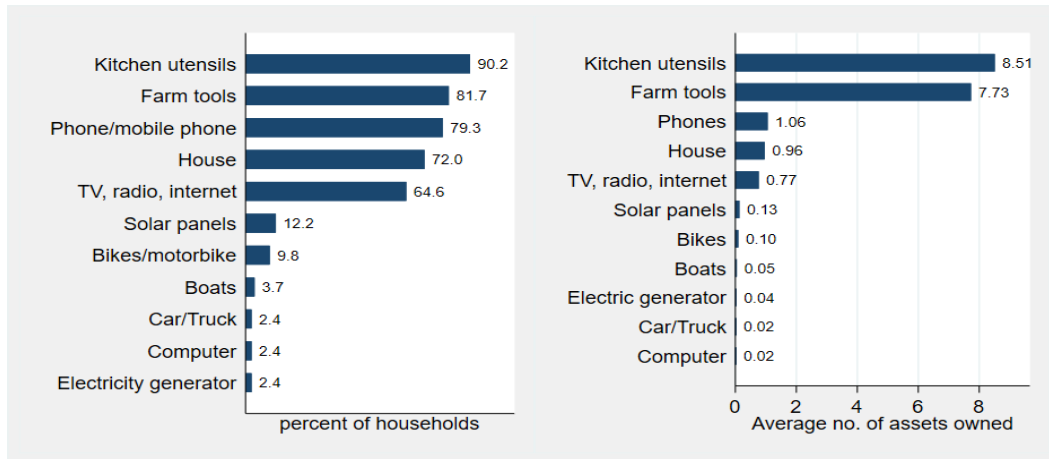


Figure 3.3: Household asset ownership

The ownership of assets by women and men depends on the type of the asset. Although majority of the assets are co-owned by both genders, women have reported higher ownership of the household items such as kitchenware, whereas men reportedly have higher ownership of the farm tools and mobile phones.

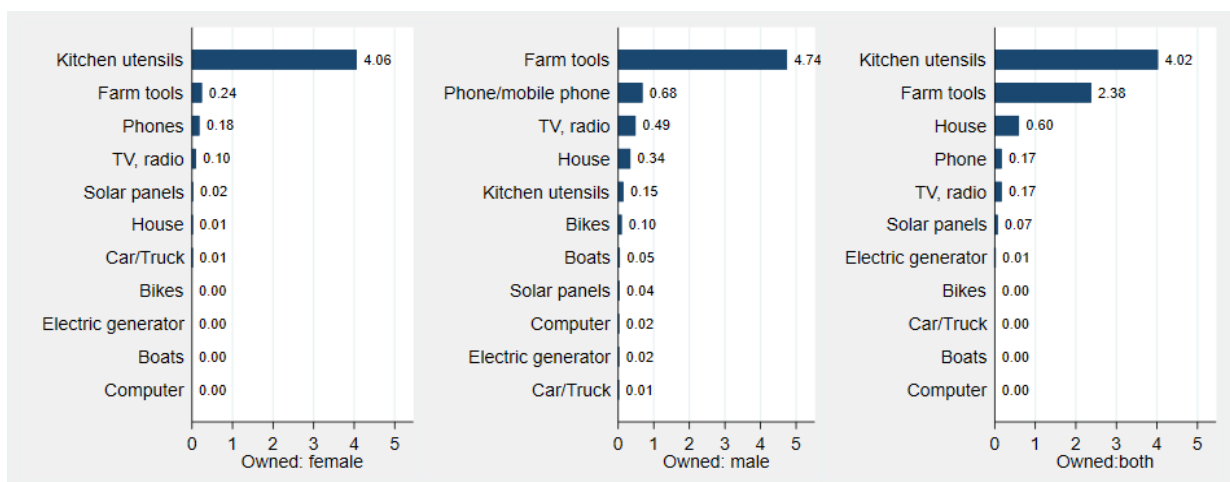


Figure 3.4: Household assets ownership segregated by gender

### 3.3. Landholding and Agriculture Production

In this section, the household survey provides information on landholding, crop production, livestock ownership, and farm costs and revenues from crops. As for the agricultural holdings, over half of the agricultural land is owned by the households, whereas nearly another half is leased in by the households. Sharecropping is not quite common among the households in the sample.



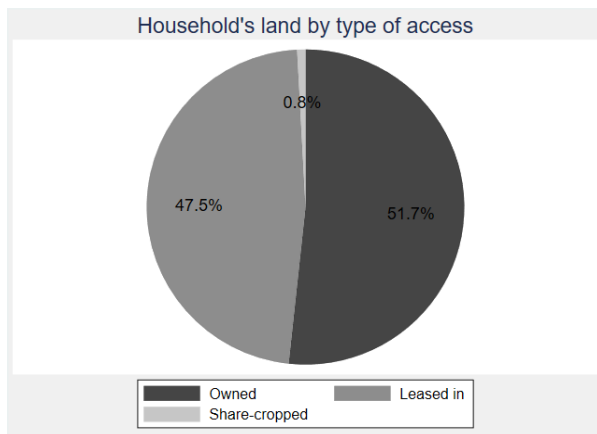


Figure 3. 5: Household's access to land

The average landholding (including both household's own and leased land) is estimated to be 2.57 hectares, out of which about 91% is cultivated and the rest is left fallow. Meanwhile, majority (85%) of the land that household own or sharecrop is rainfed; irrigated land accounts for about 13% of the total land. The graph below illustrates total land owned by households by use (in cultivation vs fallow) and type of land (i.e. irrigated vs rainfed).

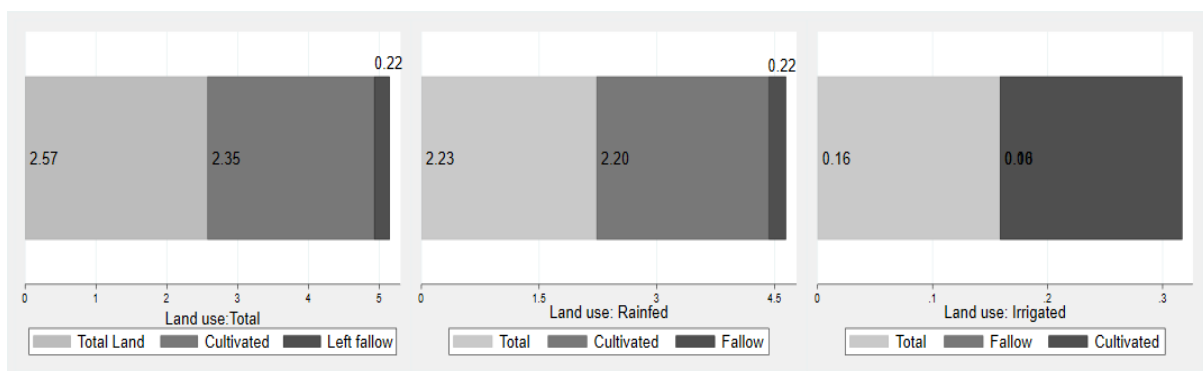


Figure 3. 6: Agricultural holdings by type of land

Households were asked to specify the type of soil and rate the productivity of their lands in terms of its potential of crop yields. About 70% of the households have reported their soil type is clay, 30% indicated the soil type to be loam, whereas no households indicated the land type to be sandy. Households in the sample rated the productivity of the land based on a scaling from 1 to 5 with 1=very poor, 2= poor, 3=average, 4=good, 5=very good. 70% % of the respondent choose "average" and "good" whereas about 20 reported high productivity potential. Only a small fraction (less than 2%) of the households reported very poor productivity level.

Table 3. 8: Soil type and soil productivity rating by the household

<b>Type of soil</b>			
Type	Freq.	Percent	Cum.
sandy	0.00	0.00	0.00
clay	58.00	70.73	70.73
loam	24.00	29.27	100
<b>Total</b>	<b>82</b>	<b>100</b>	
<b>Fertility</b>			
Fertility rating	Freq.	Percent	Cum.
very poor	1.00	1.22	1.22
average	23.00	28.05	29.27
good	43.00	52.44	81.71
very good	15.00	18.29	100
<b>Total</b>	<b>82</b>	<b>100</b>	

Nearly 1.92 hectares out of the estimated average of landholding of 2.57 (presented earlier) is occupied by rice alone. This is equivalent to about 75% of the total land operated by the households. The remaining land is allocated to cassava and pearl millet. This clearly implies that households in the sample heavily rely on mono-cropping, especially rice. Notices that data were inspected for outliers. Outliers in the data for area under rice cultivation were excluded in calculation of average land allocated to rice. While majority of the land is allocated to rice, the yield data show higher per unit production for pearl millet. This may imply production inefficiency among the sample households simply due to allocating majority of the land resources low yielding crops (e.g. rice).

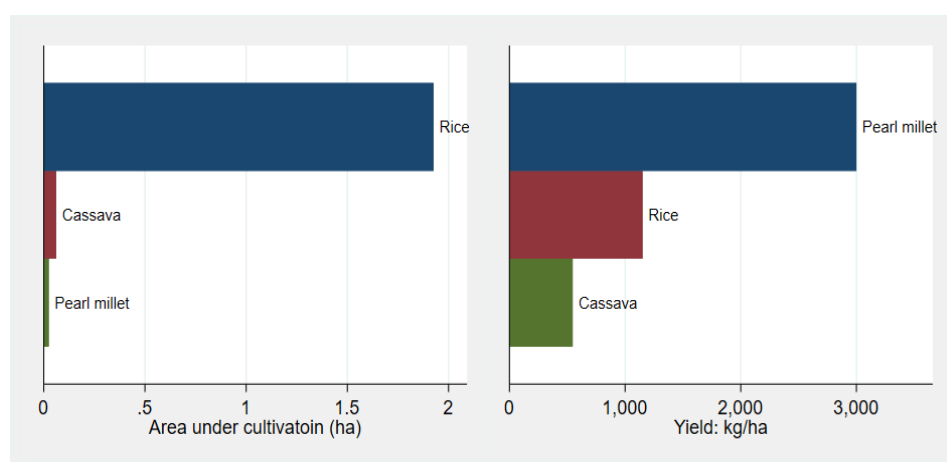


Figure 3. 7: Yield and area allocated to different crops

Rice dominates the household crop production portfolio, as nearly 99% of the households in the sample indicated that they produce rice, whereas 13% of the household reported growing cassava.

Other crops are not quite common among the sample households. Rice is produced in larger quantities, followed by pearl millet and cassava.

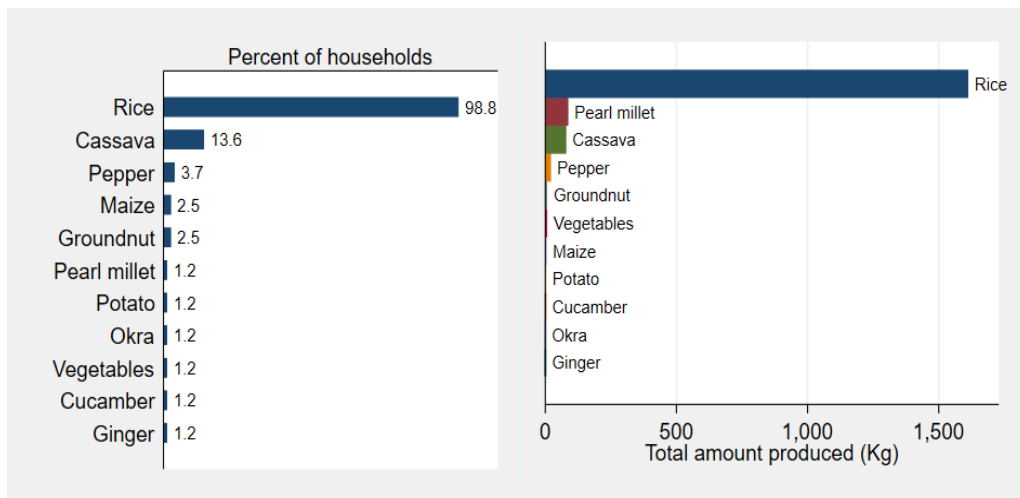


Figure 3. 8: Percent of households and quantities of production

We have plotted the production quantities along with consumption and losses. Majority of the rice produced by the household is consumed by the households throughout the years. This implies rice is a crucial part of the household consumption. Losses were also reported, possibly at the post-harvest stage, however these figures are not as significant given the large quantities that are produced by the households.

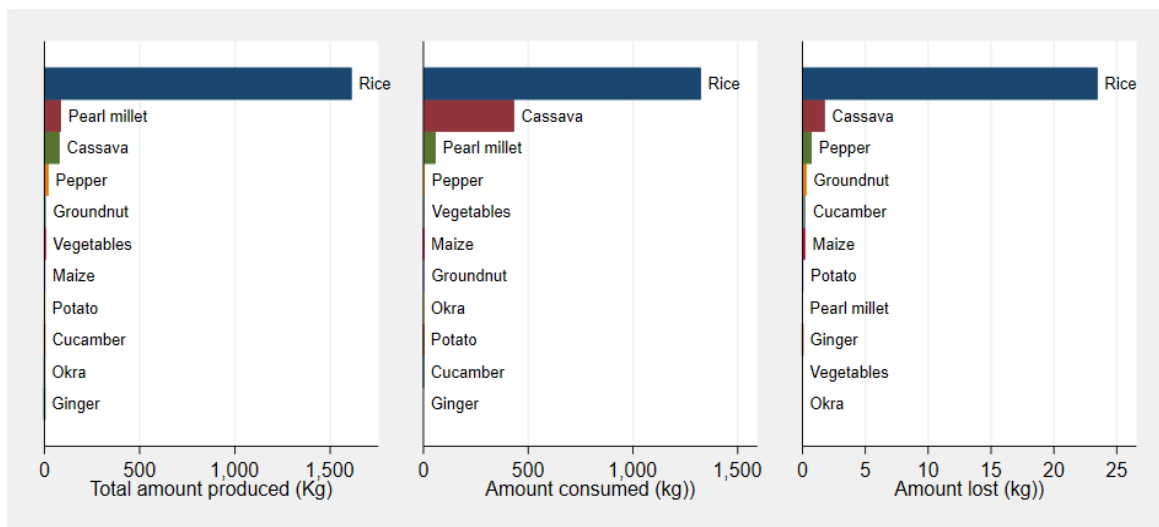


Figure 3. 9: Production quantities, consumption, and losses

While two-third of the rice produced by the households are consumed throughout the year, nearly one third of the rice are sold to the market. Rice also appears to be the most expensive crop. Prices and quantities sold to the market are given in the figure below.

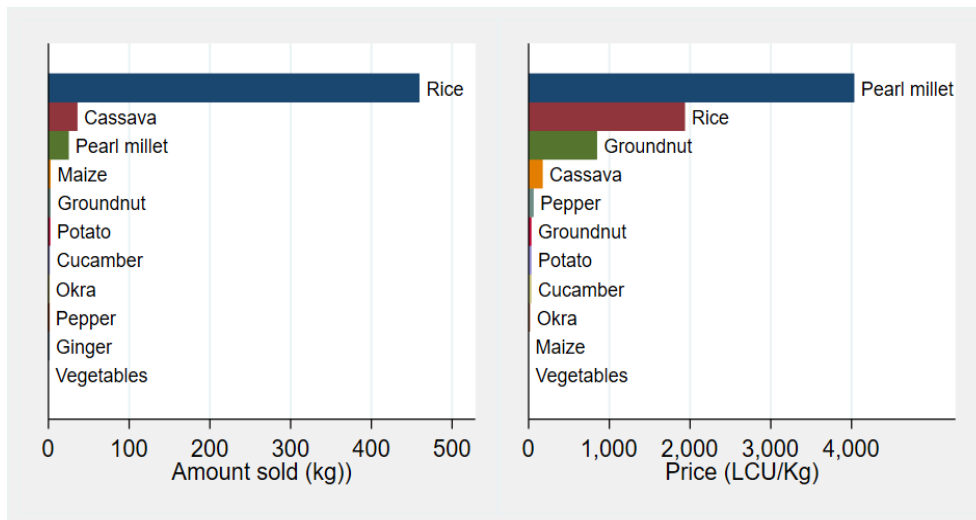


Figure 3. 10: Amounts of crops sold and prices

The cost and production data for individual crops were aggregated to calculate crop revenues and income. Cost consist of fixed costs (e.g. one-off payments for machinery equipment, land lease, storage facility, etc) and variable costs for inputs. Production quantities for individual crops were multiplied by their respective prices to estimate revenues. The sum of the fixed and variable costs was subtracted to arrive to an estimate of net income for crop farming. The figures are calculated in local currency (1 Sierra Leonian Leone =0.00010 USD). The estimated average net income from crops is about 69 million Sierra Leonian Leone (equivalent to about 7,000 US dollars). Note that data were inspected for outliers and a number of outliers in production quantities as well as prices for a number of observations were trimmed and excluded from the estimation.

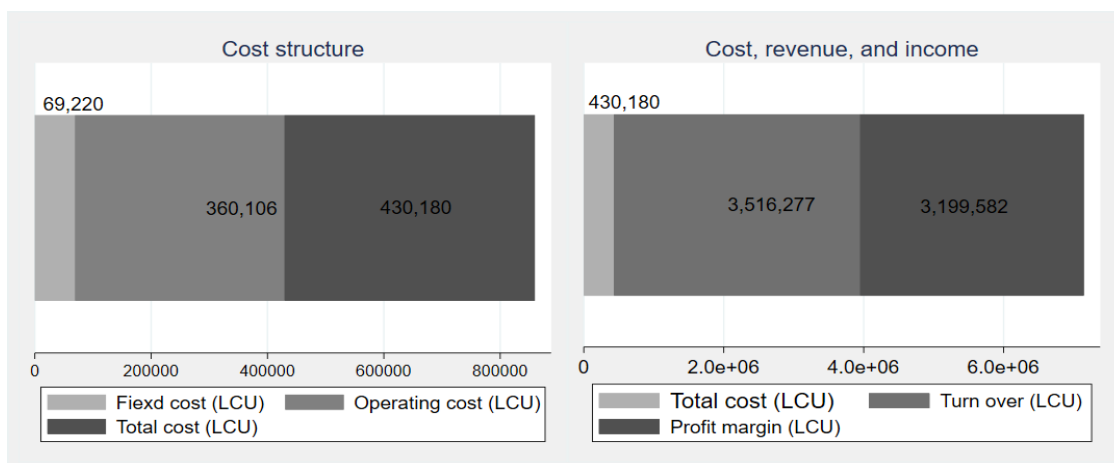


Figure 3. 11: Farm costs and revenues

Data on household's livestock ownership show that poultry is widely common among the sample households. Goats and sheep are also common as about 62 and 52 percent of the household's own goats and sheep, respectively. The graph below illustrates the percent of households and the number of animals that they own.

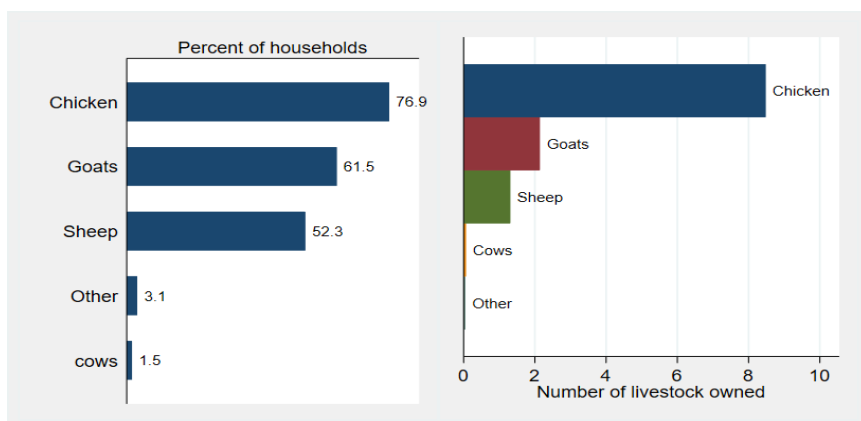


Figure 3.12: Household livestock ownership

### 3.4. Farmer organizations and Extension Services

In this section, data are gathered on whether farm households have memberships in the farmers organizations (e.g. grower/producer organizations, cooperatives, trader organizations, supplier organizations, etc.) and to determine whether they have access to the extension services provided by the government or projects.

Table 3.9 summarizes households' access to extension services and the number of visits by the extension agents. Data on number of visits for majority of the households (67%) were missing or not reported. Nearly a quarter of the household confirmed that they have access to extension services. Households in the sample were then asked to specify the number of visits the extension agents paid to their farms based on a scale of 0-3 with 0= never, 1=rarely (once in three months), 2=sometimes (once or twice in a month), and 3= at least once in a week. For those households who had access to extension services, nearly 33% specified "rarely", 29% chose "sometimes" and about 10% chose "at least once in a week".

Table 3.9: Access to extension services

Access to extension services	Number of extension visits				Total
	Rarely (once in a month)	Sometimes (once/twice in a month)	At least once in a week	Missing/ not reported	
Yes	7	6	2	6	21
	100.00	100.00	100.00	8.96	25.61
No	0	0	0	61	61
	0.00	0.00	0.00	91.04	74.39
Total	7	6	2	67	82
	100.00	100.00	100.00	100.00	100.00

First row has frequencies and second row has column percentages

About 73% of the household's indicated no access or no memberships of farmers organizations and a little over one-fourth of the households in the sample indicated that they are members of different farmer organizations. Farmers organizations usually provide key information on technical aspects of crop production, marketing, prices, and input supplies. Access to such information is critical for the farm households to increase production and incomes by helping them to identify appropriate marketing strategies.

**Table 3. 10: Membership of households in farmer organizations**

Is this household a member of any farmer organization?	Freq.	Percent	Cum.
Yes	22	26.83	26.83
No	60	73.17	100.00
Total	82	100.00	

### 3.5. Labour

Labour data on the household own as well as hired labour were collected from the sampled households to assess the amount of labor used in farming. In addition, data on whether the household's labor work off-farm were also collected. On average, nearly three labors worked on the farm with an average of about 5 days per week and about 3 hours per day. Though the labor application seems to be gender balanced in general, these estimates slightly vary by gender, as men tend to work longer hours and days than women. The overall average wage was estimated to be a little over 2,000 Sierra Leonean Leone with significantly higher average for the male laborers compared to the female laborers.

**Table 3. 11: Labor use at the farm**

Gender	Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	Avg no. of labors (month)	65	2.25	1.42	0.00	7.00
	Avg. days worked (days/month)	65	7.97	5.85	0.00	29.60
	Avg hours worked (hrs/day)	65	4.73	1.83	0.00	8.00
	Wage (LCU/day)	65	3787.20	7828.64	0.00	45000.00
Female	Avg no. of labors (month)	65	0.67	0.97	0.00	7.00
	Avg. days worked (days/month)	65	2.88	3.73	0.00	17.50
	Avg hours worked (hrs/day)	65	1.72	1.53	0.00	7.00
	Wage (LCU/day)	65	1225.64	3330.65	0.00	15000.00
Total: both male & female	Avg no. of labors (month)	65	2.92	1.98	1.00	14.00
	Avg. days worked (days/month)	65	5.14	5.44	0.46	24.13
	Avg hours worked (hrs/day)	65	3.08	2.06	0.29	8.00
	Wage (LCU/day)	65	2,208.67	3,986.64	0.00	150,00.00

The data on hired labor reveal that majority (more than 95%) of households have hired labour from the market at some point throughout the year to carry out farm work. The average number of labourers shows that every month about 3.55 labours were hired from the market working for 2 days in a week, on average. Average wage is estimated at 12,00 Sierra Leonian Leone, similar to the estimated wages for the household female labour, paraphs majority of the hired labours were women.

Table 3. 12: Labor hired from the market by the households

Variable	Obs.	Mean	Std. Dev.	Min	Max
Avg no. of labors (month)	79	3.552	2.714	.5	13.5
Avg. days worked (month)	79	1.617	1.252	.25	6.667
Avg. wage (daily)	79	1,196	1,981	0	12,866

About 2/3 of the households indicated that any members of their households worked off-farm. Off-farm activities may include any non-farm activities undertaken by the household members including jobs in the service, manufacturing, and other industrial sectors.

Table 3. 13: Household involvement in off-farm work

Does the household labor work off-farm?	Freq.	Percent	Cum.
Yes	29	35.37	35.37
No	53	64.63	100.00
Total	82	100.00	

### 3.6. Natural Disasters, Shocks, Climate Change, and Coping Strategies

Data on natural disasters and shocks faced by the farm households in the sample as well as coping strategies devised by the household were also collected as part of the baseline survey. Common shocks faced by the farm household were listed in the survey questionnaire and the respondents were asked to report the occurrence and impact of the shocks based on a scale of 1-3 with 1= low, 2=medium, 3=high. Production and market related shocks including sudden increase in food prices and diseases and pest outbreak were found to be the most common shocks faced by the households. Other shocks reported by the household with a higher frequency of occurrence include deaths in the family, sudden decline in household income, flooding, and loss of assets (e.g. land, livestock, or house).

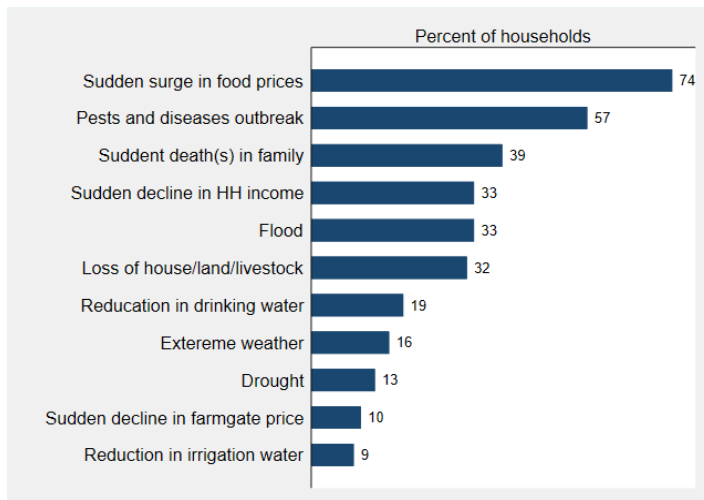


Figure 1: Natural disasters and shocks faced by the farm household

The severity of the probable shocks is plotted to illustrate their impact on agriculture production and households' wellbeing. For those households that reported the occurrence of shocks, majority of them indicated the severity of the shocks to fall in the range of low to medium, whereas a small percentage of the households reported the severity of these shocks was high. It is worth mentioning that the respondent were asked to rate the impact of each shock based on a scale of 0 to 3 with 0=no shock, 1= low impact, 2=medium impact, and 3=high impact.

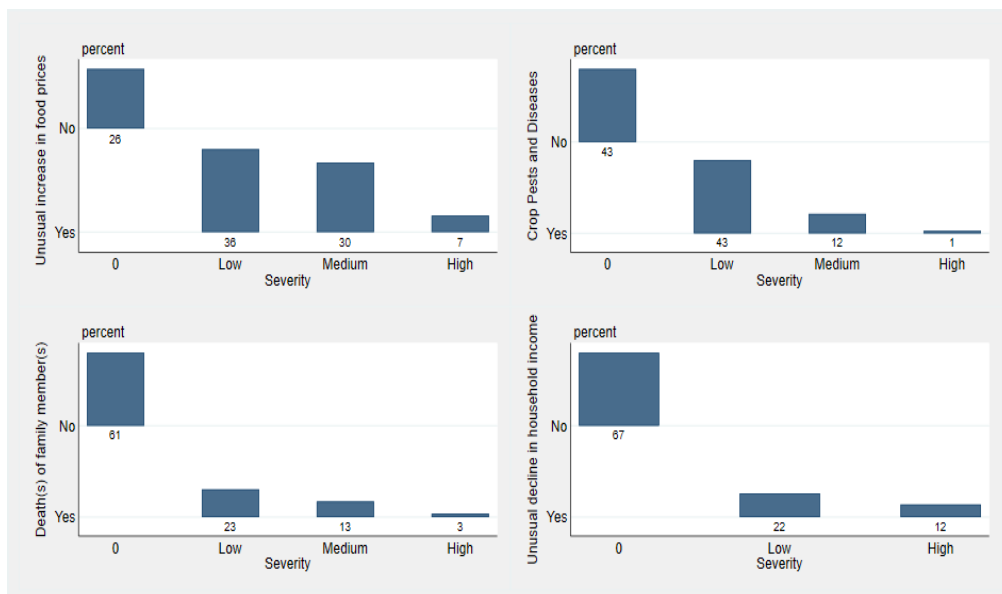


Figure 3. 13: Severity and impact of the selected shocks reported by the households

### 3.7. Salinity and potential managing strategies

Data were collected on the extent of salinity, its impact in terms of area being affected and in terms of losses in yields/production, and potential intervention strategies that households devised to cope



with the salinity problems and whether these interventions have worked to mitigate the potential impacts of salinity. Nearly 97 percent of the households in the sample reported that salinity is a common problem in their village directly affecting agriculture production.

Table 3. 14: The extent of salinity among the sample households

Is salinity a problem in your village/area?	Freq.	Percent	Cum.	Average land affected by salinity (ha)
No	1	1.22	1.22	1.42
Yes	81	98.78	100.00	
Total	82	100.00		

Based on the descriptive statistics, white crust on the surface of soil and a change in the soil colour were reported by the households in the sample as the most common symptoms to identify salt-affected soil.

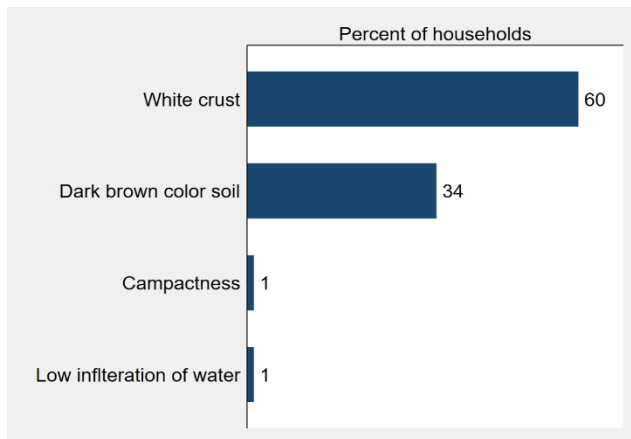


Figure 3. 14: Identification of salt-affected areas

On average, 1.42 hectares of land is reportedly affected by salinity. This is nearly 60% of the average land (recall that the average land size was estimated to be 2.33 hectares) operated by the households. However, the severity of impact of salinity varies among the sample: 3% of the households reported that their land is severely affected with a high impact on crop production leading to the loss of 50-100% in yields, 42% of the households indicated medium severity leading to a loss of 25-50% in crop yields, and the remaining 55% of the of the households indicated a low severity leading to the last of 5-25% of loss in the yields.

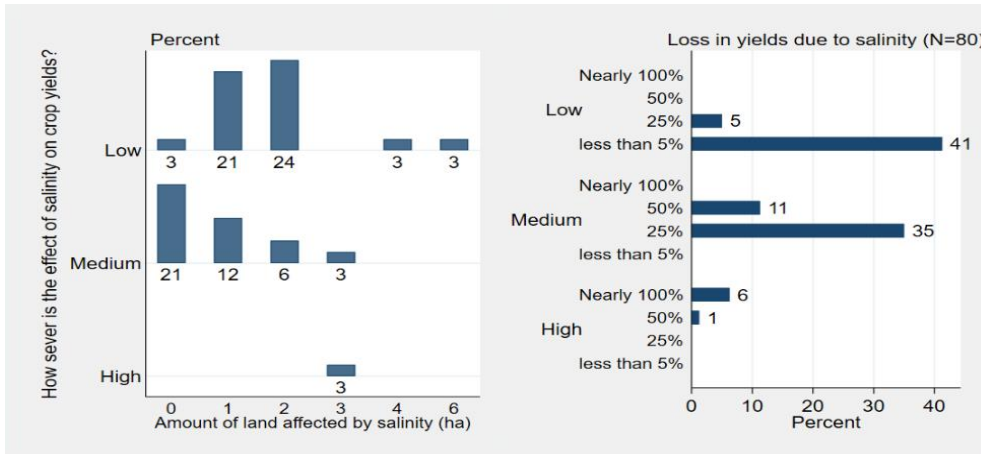


Figure 3. 15: The severity and impact of salinity

The data collected on the underlying potential causes of salinity from the households in the sample show that more than half of the farm households indicated that salinity is the outcome of natural factors (e.g. parent materials), nearly 62% indicated that salinity is associated with climate change, 15% of the respondents reported that lack of drainage systems was the main driver of salinization, and 6% of the households mentioned that salinity is the outcome of inappropriate irrigation methods and practices. Less than 5% of the households in the sample reported other causes including land levelling, parent materials (natural causes), and high concentration of salt in the irrigation water as the causes of salinization.

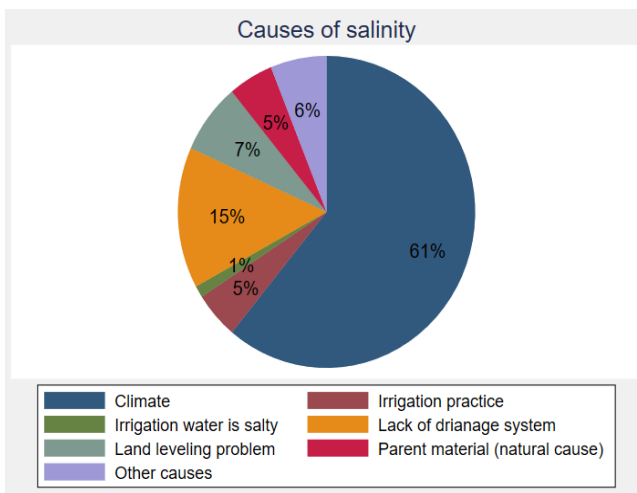


Figure 3. 16: Potential Causes of salinization

Households executed several intervention strategies aiming to manage salinity including deep ploughing, crop diversification, crop rotation, soil amendment, drainage, and other intervention strategies. Based on the responses, “other intervention” is by far the most famous option followed by soil amendment and crop rotation. Unfortunately, “other interventions” were not specified by the households in the survey data. When the respondents were asked to provide information on whether

the interventions they have implemented have actually worked, nearly 65% of the households reported the interventions were effective increasing yield by 5-50%.

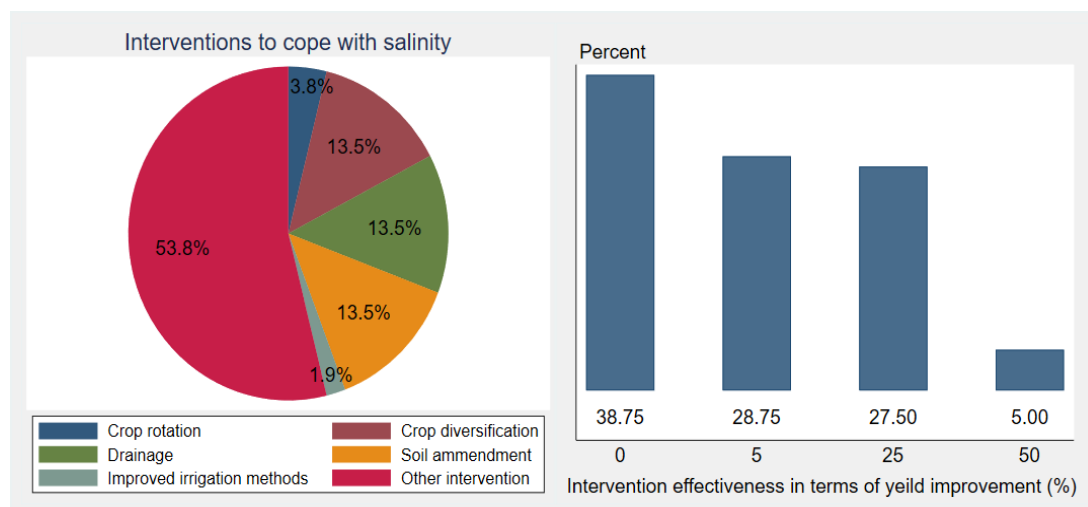


Figure 3. 17: Interventions strategies by the household to manage losses due to salinity

Training on salinity management is an important aspect of farming in the context of biosaline agriculture to improve the household’s capacity to be able to identify salinity and design appropriate and effective coping strategies. However, based on the descriptive statistics, absolute majority (nearly 99%) of the household reported that they had no opportunity to receive training on salinity management.

Table 3. 15: Training on salinity management

Have you received training on salinity management?	Freq.	Percent	Cum.
No	81	98.78	98.78
Yes	1	1.22	100.00
Total	82	100.00	

### 3.8. Gender: Women involvement in Agriculture

The gender section of the survey was allocated to collecting information on the gender balance, particularly women involvement in agricultural activities and household decision-making. Majority (95%) of the households reported that women are actively involved in farming activities, whereas women involvement in the livestock sector is considerably low as just 7% of the respondents reported women involvement in livestock. Nearly half of the households in the sample responded that women are involved in non-farm activities.

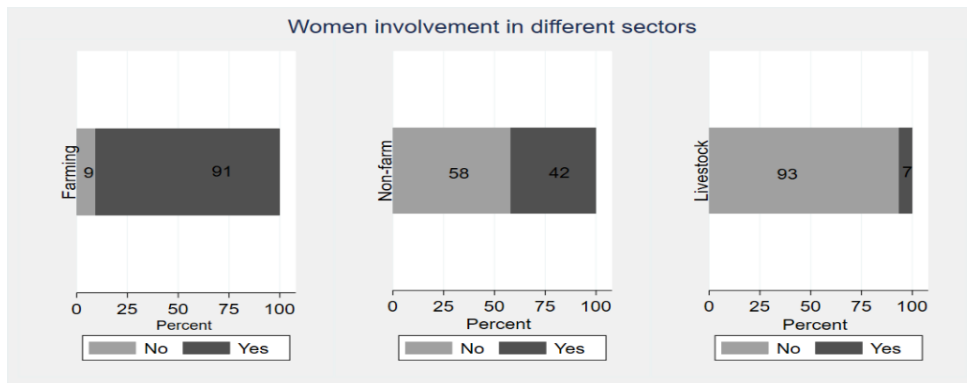


Figure 3. 18: Women Involvement in farm and non-farm sectors

When households were asked to specify if women are involved in any decision-making related to the household and farming, about 93% and 95% of the respondents responded that women were actively involved in the household decisions and farming, respectively.

Table 3. 16: Women involvement in decision making

Women involvement in decisions	Yes		No	
	Freq.	Percent	Freq.	Percent
Are women involved in any decisions related to the household?	78	95.12	4	4.88
Are women involved in any decisions related to farming	80	97.56	2	2.44

The specific decisions related to farming and women involvement in decisions are illustrated in the figure below. It appears that majority of the decisions related to land (rental, or cultivation), crop choices, purchase of farm tools and inputs, hiring labour from the market, and selling agricultural productions are jointly made by the women and men. These decisions appear to be gender balanced and women have stronger participation in decision making.

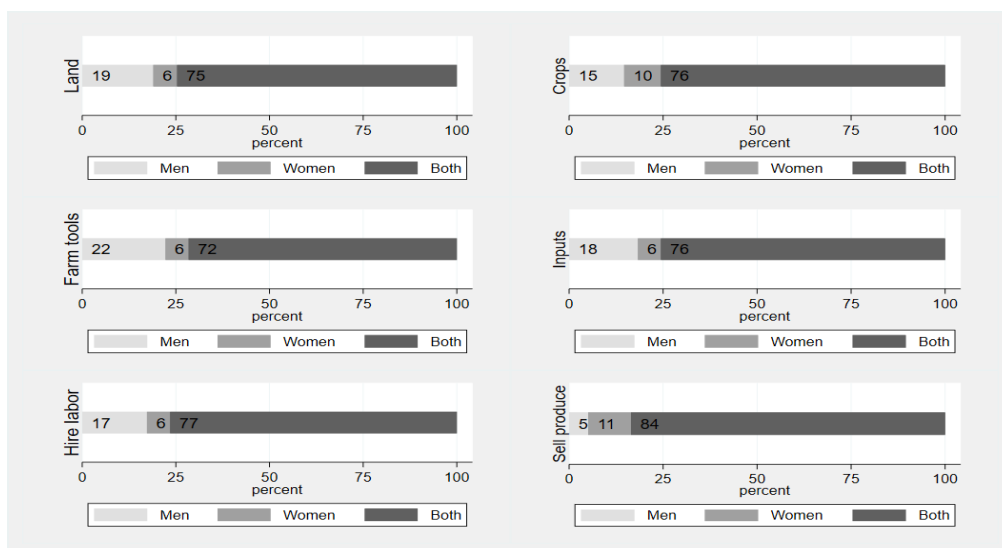


Figure 3. 19: Women involvement decision making related to selected aspects of farming

Women are also critical part of the household decisions related to the household expenditures, both of on food- and non-food expenses. Though majority of the decisions related to the household expenditures are jointly made by men and women, men appears to lead decisions when households reported data on decisions separately for men and women.

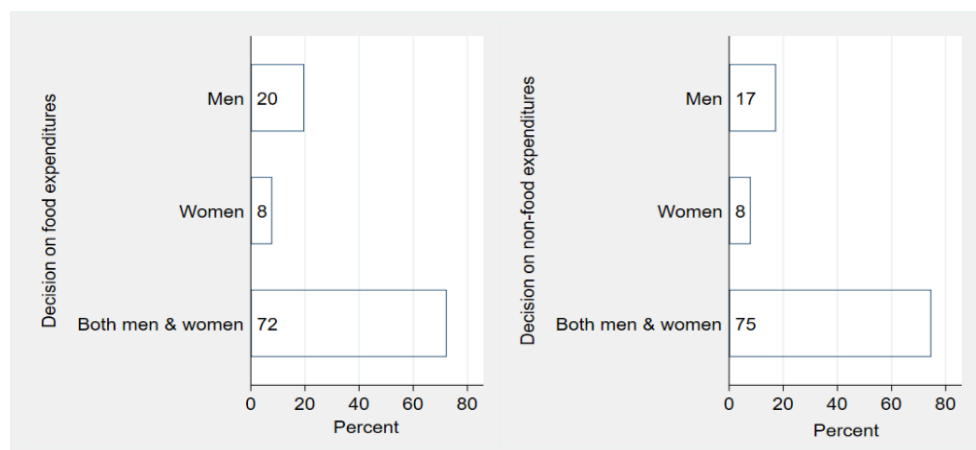


Figure 3. 20: Women involvement in decisions related to the household expenditures

### 3.9. Food Security and Nutrition

Food security of the target rural households is the ultimate objective of the current project. Considering this overarching goal, data on household food consumption and type of food that they consume were collected. The objective of this exercise is to identify key staple food crops, whether household have enough to consume throughout the year, and whether the household rely on market or their own production for consumption.

The households in the sample relied heavily on rice, vegetables, dairy products (including butter and cooking oil), and potato which appear to be consumed more compared to other food items. Among other crops, rice seems to be the staple product with greater importance for the household food security. In terms of access, all the households in the sample indicated they had access to rice. In terms of consumption, households in the sample responded that they had consumed rice for about 6 days during the last 7 days. Nearly 83% of the households reported access to vegetables for consumption, 68% of the household had access to dairy products, and a little over 50% percent of the households had indicated having access to potatoes to consume.

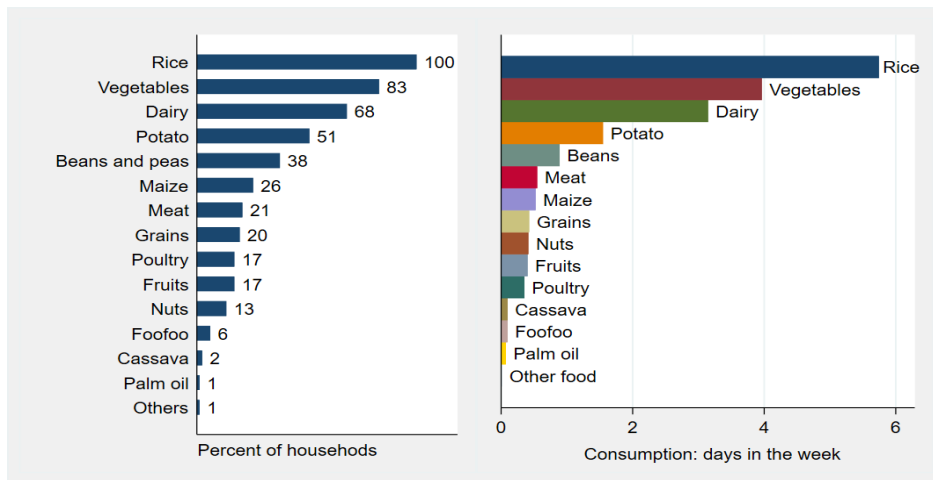


Figure 3. 21: Common foods consumed by households throughout the last 7 days

The household demand for food consumption is met through own production and local markets, especially for rice and vegetable consumption as nearly half of the households indicated that they consumed rice and vegetables being produced at their own farm whereas the other half of the respondents in the sample indicated that they purchased rice and vegetables from the local market. Meanwhile, households also rely heavily on markets for dairy products including butter and cooking oil as about 55% the household reported that they purchase dairy from local markets. Potatoes, on the other hand, appears to be mainly sourced from household's own production

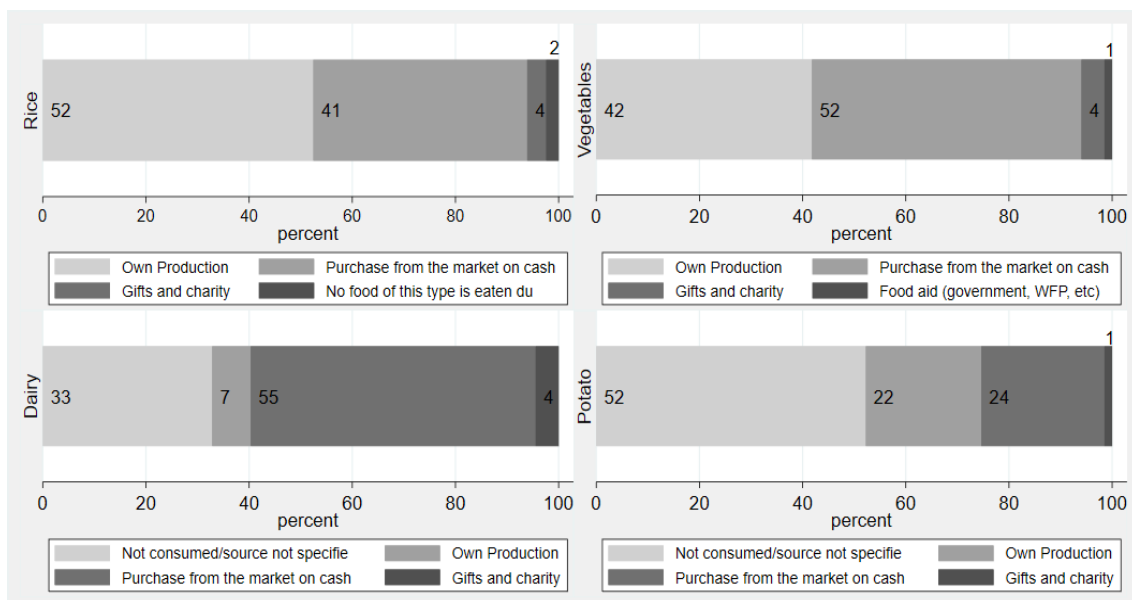


Figure 3. 22: Sources of food for selected food items

### 3.10. Access to Infrastructure and Services

This section of the survey collects information on the household's access to infrastructure and services including roads, local and regional markets, as well as basic services such as agricultural credit, health,

and education facilities, transportation services and drinking water. The objective of this section is to provide an overall picture of the households' profile and their wellbeing.

Majority of households in the sample (more than 87% of the sample) have reported having access to local markets, and about 99% of the respondents confirmed having access to all-season drivable roads. Access to roads and market infrastructure is an important aspect of farming that plays a critical role in the improvement of agribusiness services in the local communities. Better access to markets and roads implies improved market participation for outputs and inputs.

Table 3. 17: Household's access to market and roads

Access	Yes		No		Missing/not reported	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Access to local markets	72	87.8	8	9.76	2	2.44
Access to roads	81	98.78	1	1.22	0	0

Majority of the households reported that markets are located within a radius of less than 60 minutes of their community, whereas only 2.4 percent of the households responded that market is not reachable with any means of transportation. Nearly 22 percent of the households reported markets are located within their community. Majority of the households (nearly 69%) in the sample are reportedly able to reach market by bike or by walking.

Table 3. 18: Access to markets and time taken to reach local markets

Market reached by: walking, car, bike, animal, or public transport	Time required to reach the nearest market				
	Market within the community (no travel needed)	Less than 60 minutes	Between 1-2 hours	Missing/Not reported	Total
by walking	15	16	1	0	32
	83.33	27.12	50.00	0.00	39.02
by car	0	11	0	0	11
	0.00	18.64	0.00	0.00	13.41
by bike	2	32	1	1	36
	11.11	54.24	50.00	33.33	43.90
by public transport	1	0	0	0	1
	5.56	0.00	0.00	0.00	1.22
Missing/not reported	0	0	0	2	2
	0.00	0.00	0.00	66.67	2.44
Total	18	59	2	3	82
	21.9	71.9	2.4	3.60	100.00
	100.00	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

Less than 10% of the households have indicated that they had access to market information, whereas the rest of the household reported no access to any information related to prices and markets. Access to information on prices and other information related to market supply and demand is useful in terms of marketing their production and sourcing agricultural inputs.

Table 3. 19: Access to market information

Access to market information	Freq.	Percent
No	6	7.32
Yes	75	91.46
Missing/not reported	1	1.22

Households were also asked to provide data on whether they have access to public services including access to credit, health and educational facilities, electricity, and drinking water. Over 90% of the households in the sample have access to educational facility and over 74% of the household have access to health facilities. Fewer number of households (only 5%) have indicated having access to credit indicating that unviability of credit can be a binding constraint for agriculture production.

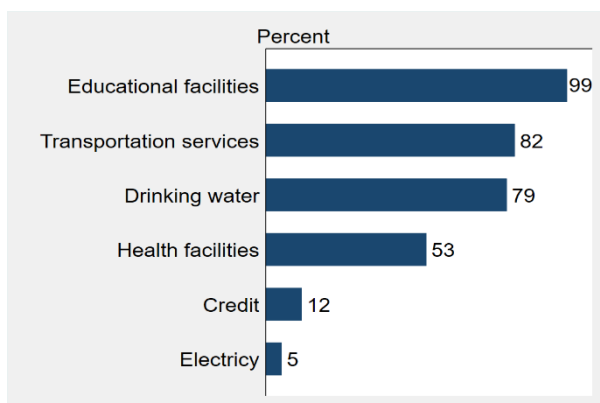


Figure 3. 23: Households' access to selected serveries



## Country: Mozambique

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Mozambique is located in Southern Africa bordered by the Indian Ocean to the east, Tanzania to the north, Malawi and Zambia to the northwest, Zimbabwe to the west, and Eswatini (Swaziland) and South Africa to the southwest. Mozambique has a total area of 801,590 square km. Unlike Liberia and Sierra Leone, Mozambique has more population with slow economic growth. The GDP per capita is also slightly lower. As per the latest estimate on poverty headcount in 2014, nearly half of the population of Mozambique lived below the poverty line. This figure may have changed since 2014, however given the sluggish growth in economy, significant improvements in the in the poverty headcount ratios are unlikely. Table 4.1 provides a general profile of the country.

Table 4. 1: Country profile – Mozambique

Indicator	Unit	Estimation
Population (2019 est.)	Millions	30.37
Agricultural Land (2016 est.)	Sq.km	499,500
Agricultural Land (2016 est.)	% of land area	63.52
GDP (in billions) (2019 est.)	Current US\$	14.94
GDP Per capita (2029 est.)	Current US\$	491.80
GDP Growth (2019 est.)	Annual %	2.22
Poverty headcount ratio (2014 est.)	% of population	46.1

*Source: World Bank Microdata-World Development Indicators (World Bank, 2020)*

More than 60% of the land in Mozambique is covered by agriculture. This implies the importance of agriculture sector in the national economy, with significant implications for the livelihood, food security and poverty in the rural areas where agriculture is more common. Agriculture as the largest sector of Mozambique's economy makes up to about a quarter of the national GDP (FAO, 2016) and is therefore the key source of overall growth. Approximately 80 percent of households are involved in the sector(Santos, 2018).

### 4.1. General Information and Household Demography

This first section of the survey collects information on respondents' characteristics, geographical coverage and distribution of the sample, household demography and characteristics. A total of 51 surveys in eight villages were conducted in two regions of the Moamba district. Nearly 2/3 of the surveys were carried out in the south region, and a about a third of the surveys were conducted in the

Sul region. Although slightly higher number were conducted in two villages, Central and Matadouro, the remaining surveys were distributed fairly equally throughout 6 villages.

Table 4. 2: Distribution and geographical coverage

Village	Region		
	South	Sul	Total
Bairro de Abril	0	1	1
Bairro Central	1	1	2
Central	15	4	19
Cimento	0	2	2
Condene	1	0	1
Madinguir	0	3	3
Matadouro	15	4	19
Ndlavela	1	1	2
Missing value/not reported	0	1	2
Row Total	33	17	51

About 37 % of the survey respondents were male and 57% were female. Though the average age of the respondent slightly varies by gender, the overall average age of the respondent was estimated to be 49 years with the male heads being older by about 2 years on average. Data on respondent gender/age for about 4% of the households were not reported (e.g. missing).

Table 4. 3: Respondent information

Gender	Respondent age (years)		
	Mean	Freq.	Percent
Male	50.00	19	37%
Female	48.55	29	57%
Missing/not reported	.	2	4%
Row total	49.06	51	

The average size of the household is about 5 persons with a standard deviation of 3.23. The estimated household size ranges from a minimum of 1 person per household to a maximum of 15 persons per household. The prime age-sex demographic group (e.g. members of age of 15-64) dominates the composition of the households, whereas the elderly age-sex group (e.g. household members with age of 65 and above) accounts for the lowest fraction in the household composition. Children and minors (e.g. members of household aged 14 or less) comprise the second highest demographic proportion in the household.

Table 4. 4: Household size, gender and age groups

Household size, age, and sex groups	Mean	Min	Max	Median	Std. Dev.
Household Size (persons)	4.90	1.00	15.00	5.00	3.23
No. of male (14 years & less)	0.80	0.00	5.00	0.00	1.11
No. of female (14 years & less)	0.84	0.00	5.00	0.00	1.17
No of male (15 – 65 years)	1.48	0.00	5.00	1.00	1.31
No. female (15 – 65 years)	1.52	0.00	5.00	1.00	1.11
No. of males (65 years & above)	0.16	0.00	1.00	0.00	0.37
No. of females (64 years & above)	0.10	0.00	1.00	0.00	0.3

Nearly two-third of the households are headed by male, whereas one-third of the households are headed by female heads. The average age of the household head is estimated to be about 53 years with male heads slightly more aged than female heads.

Table 4. 5: Household head age and gender

Household head	Freq.	Percentage	Mean age (years)
Male	30	59%	54.83
Female	20	39%	51.5
Missing/not reported	1		
Total sample	51	100%	53.36

20 percent of the household heads are reportedly married, 32% engaged, and 22% of the household heads are widowed. The marital status of the households slightly vary from men to women, as majority of the male heads are engaged, whereas majority of the female heads are widowed.

Table 4. 6: Household marital status by gender

Household head marital status	Gender of the household head					
	Male		Female		Total	
	Count	percent	Count	Percent	Count	Percent
Married	7	23%	3	15%	10	20%
Single	3	10%	3	15%	6	12%
Engaged	16	53%	0	0%	16	32%
Divorced/Separated	2	7%	4	20%	6	12%
Widowed	2	7%	9	45%	11	22%
Missing/not reported	0	0%	1	5%	2	4%
Total	30		20		50	

Data on the household educational profile show that more than half of household heads in the sample are able to read and write, about 40% are illiterate (e.g. cannot read and write), and the data on literacy for about 6% of the household were missing or information on their literacy were not reported. For the households who reported enrolment in the formal education, nearly 40 of the them completed either primary or secondary school. About 10 percent of the households head reportedly

graduated from high school and university obtaining high school diploma, bachelors or master's degrees.

Table 4. 7: Household head literacy and formal education

<b>Literacy rate</b>		
Literacy	Freq.	Percent
Literate (can read & write)	27	52.94
Illiterate (cannot read & write)	21	41.18
Missing/not responded	3	5.88
Total	51.00	100.00
<b>Formal Education</b>		
Highest degree obtained	Freq.	Percent
Primary School	18	35.29
Secondary School	8	15.69
High School	3	5.88
Bachelors	2	3.92
Masters	1	1.96
Illiterate ( <i>did not go to school</i> )	19	37.00
Total	51.00	100.00
Average schooling years	4.82	

#### 4.2. Household Socioeconomic Profile

The data on the socioeconomic profile covers information on household income, income sources, and households' asset ownership. As for the household income, the average income per household is estimated at about 34,000 Mozambiquan Metical with significantly higher contribution from both genders. Converting the Mozambique Metical to the USD dollar at the exchange rate of (1 USD=0.014 Mozambiquan Metical), the average household income is about 483 \$ US. However, when reported separately by gender, women contribution in the household income is considerably low compared to the men. Note that not all the household reported information on income separately by gender (e.g. missing values), therefore the average contribution in income by men and women may not sum up to the total average.

Table 4. 8: Household Income (LCU) by gender

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total income	50	33,806	46,937	0	221,000
Amount earned men	50	1,833	6,277	0	32,501
Amount earned women	50	100	504	0	3,000
Amount earned both	50	6,906	26,409	0	125,000

With a contribution of about 50%, farming is by far the major source of income of the total household income, followed by livestock (14%), other sources (10%), and temporary (13%). The rest of the household's income come from other sources including permanent and temporary employment, trade, and aid that comprise a small proportion of the household income. It is also worth to note that the contribution of aid by the government and other projects is negligible (about 3% of the household total income).

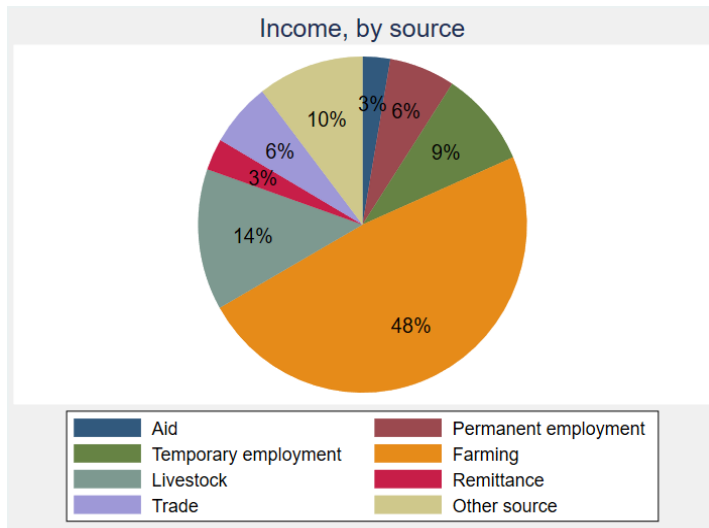


Figure 4. 1 Household income by sources

The data on household expenditures show that more than half (about 63%) of the household expenditures are related to food expenses, whereas 37% of the spendings are related to non-food items.

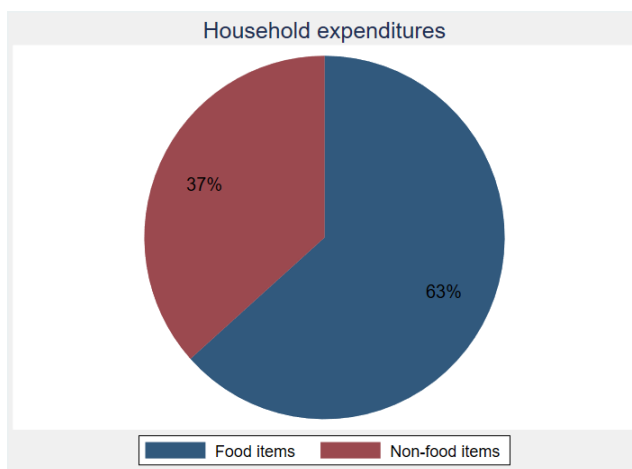


Figure 4. 2: Household expenditures for food and non-food items

Most common assets owned by the households are house, farm tools, mobile phones, kitchenware, and farm tools. Asset ownership of the households as an indicator of household wealth is one of the project indicators to be measured at the baseline stage. Nearly 76% of the household reported owning about 4 farming tools, on average.

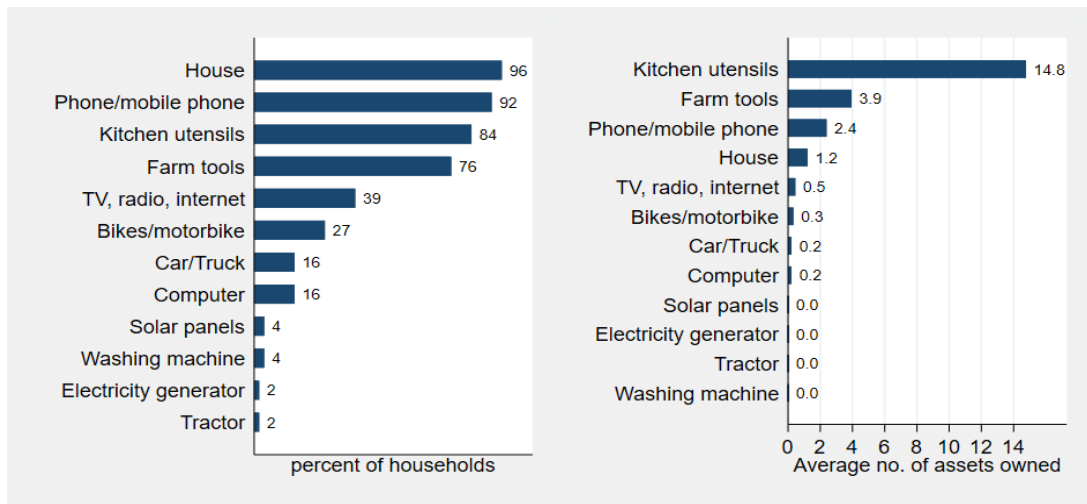


Figure 4. 3: Household ownership of assets

The ownership of assets by women and men depend on the type of the asset. Although majority of the assets are owned by both genders, women have reported higher ownership of the household items such as kitchenware, whereas men reportedly have slightly higher ownership of the computers and other IT assets.

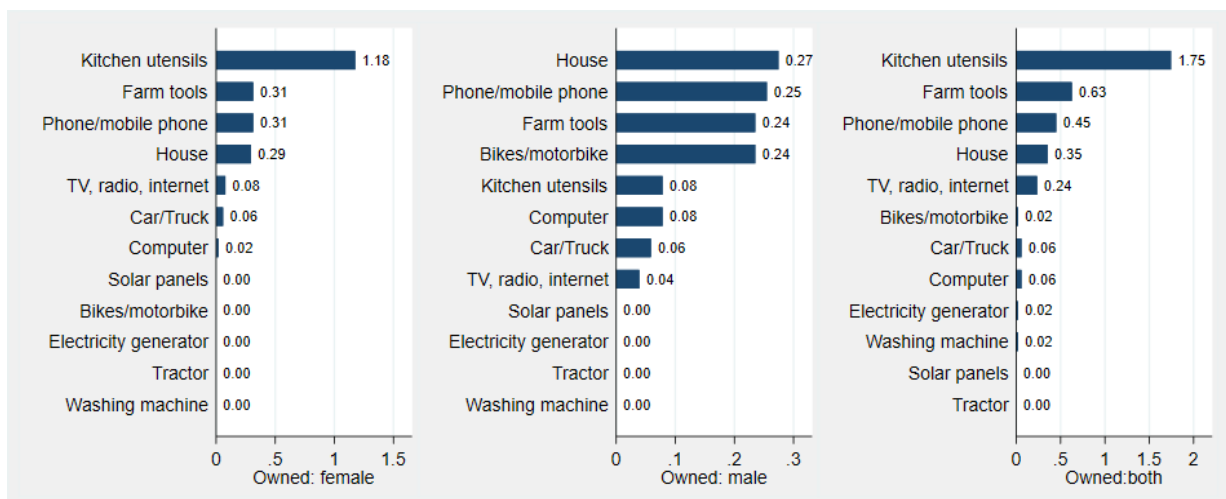


Figure 4. 4: Asset ownership segregated by gender

### 4.3. Land Holding and Agriculture Production Portfolio

In this section, the baseline survey provides information on the household landholdings, crop production, livestock ownership, and farm costs and revenues from crop production. As for the agricultural holdings, over half (about 53%) of the agricultural land is owned by the households, whereas nearly another 46% is leased in by the households. Sharecropping is not quite common among the sample as only about 1.5% of the household have reportedly did sharecropping.

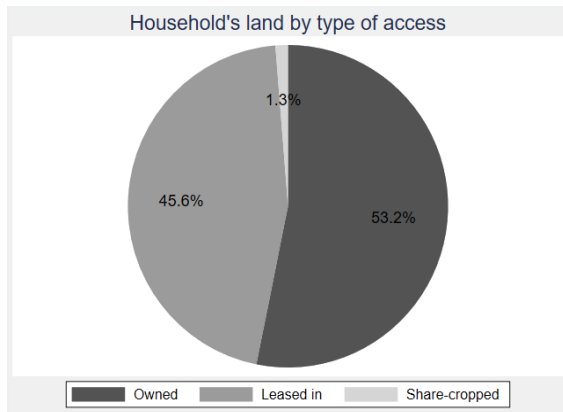


Figure 4. 5: Household landholding by type of access

The average landholding (including household's own, sharecropped, and leased land) is estimated to be 3.67 hectares, out of which about 65 % is cultivated and the rest is left fallow. Meanwhile, over half of the total land (57%) is irrigated, whereas rainfed land accounts for about 43 % of the total land. The graph below illustrates total land owned by households by use (in cultivation vs fallow) and type of land (i.e. irrigated vs rainfed).

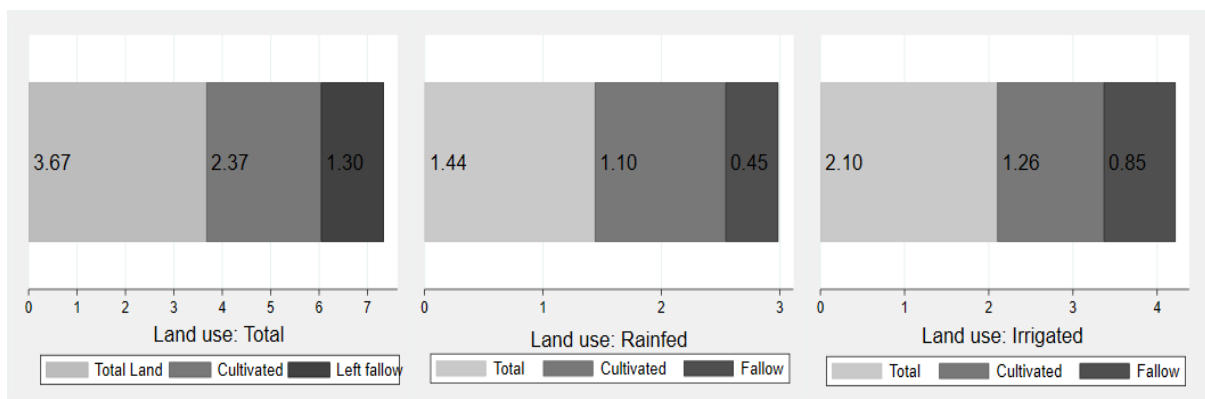


Figure 4. 6: Landholding by type of land and use

Households were asked to specify the type of soil and rate the productivity of their lands in terms of its potential of crop yields. About 92% of the households have reported their soil type is clay, 2% indicated the soil type to be loam, whereas nearly 4% of the households indicated the land type to be

sandy. Households in the sample rated the productivity of the land based on a scaling from 1 to 5 with 1=very poor, 2= poor, 3=average, 4=good, 5=very good. Majority (about 88%) of the respondents choose “average” and “good”, whereas about 10 reported high productivity potential. Data on the productivity potential for a small fraction (less than 2%) of the households were not reported or missing.

Table 4. 9: Type of soli and soil productivity

Type	Freq.	Percent	Cum.
sandy	2	3.92	3.92
clay	47	92.16	96.08
loam	1	1.96	98.04
Missing/not reported	1	1.96	100
Total	51	100	
<b>Fertility rate</b>			
Fertility rating	Freq.	Percent	Cum.
very poor	0	0	0
average	18	35.29	35.29
good	27	52.94	88.24
Very good	5	9.80	98.04
Missing/not reported	1	1.96	100
Total	51	100	

Most of the households’ land is allocated to maize and vegetable production. Nearly 1.25 hectares out of the estimated average of landholding of 3.67 (presented earlier) is occupied by maize alone. This is equivalent to about 35% of the total land operated by the households. Majority of the remaining land is allocated to vegetables including cabbage, tomato beans, pepper, onion, and potatoes, and other crops such as groundnut, rubber. Based on the land allocation data, it seems that households in the sample specialize in maize production. Data on the cultivated land and yields for individual crops were inspected for potential outliers. The outliers (especially in rubber production) were identified and excluded. While majority of the land is allocated to maize, the yield data show higher per unit production for potatoes. This may imply production inefficiency among the sample households simply due to the misallocation of farmland resources (e.g. majority of the land is allocated to low yielding crops such as maize).



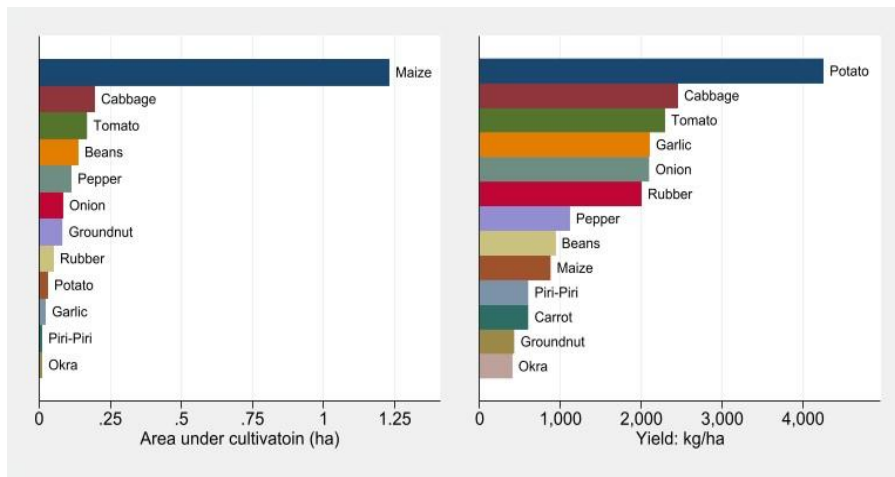


Figure 4. 7: Area by crop and yields

Maize dominates the household production portfolio, as nearly 90% of the respondents in the sample indicated that they produce maize, whereas less than 40 of the households reported growing other crops. While nearly two-thirds of the households reported growing onion, cabbage, and paper, other crops are not quite common among the sample households. Maize is produced in larger quantities, followed by cabbage, rubber and tomato.

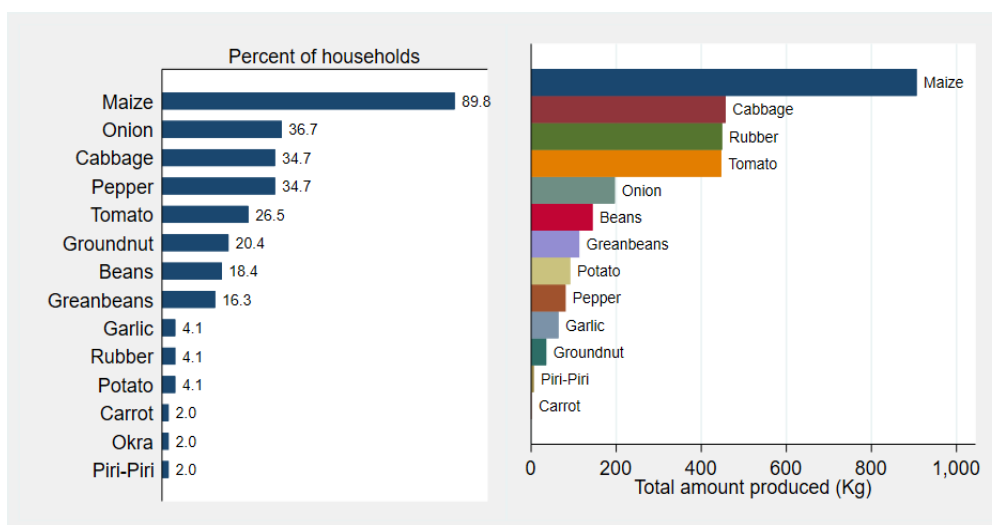


Figure 4. 8: Most common crops grown by the households in the sample

Data on the quantities produced along with consumption and losses are plotted in the following figure. A small proportion of the total production are consumed by the households. Among other crops, maize is the most crucial part of the household consumption. Losses were also reported, possibly at the post-harvest stage, however these figures are not as significant given the large quantities that are produced by the households.

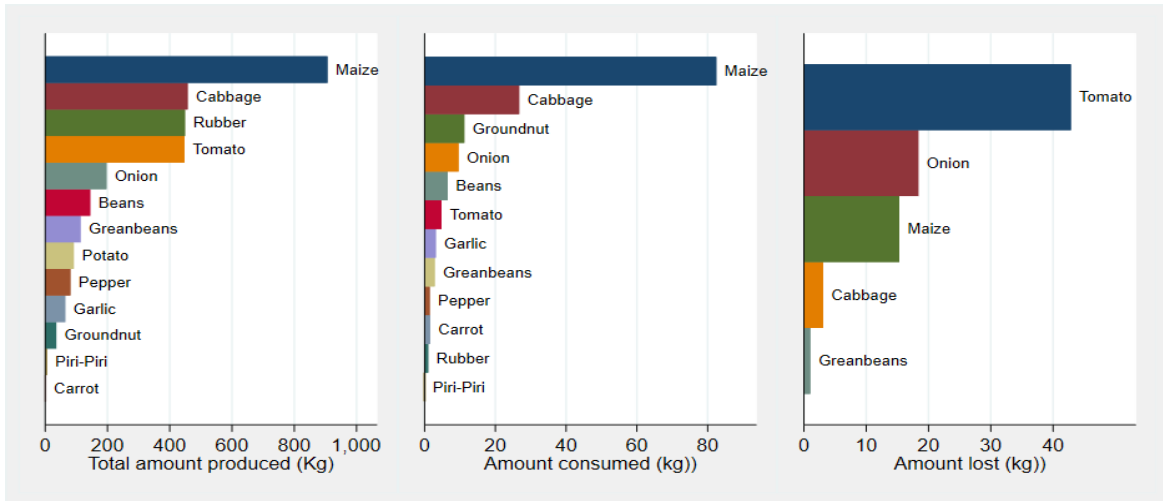


Figure 4. 9: quantity of production, consumption, and losses

While small quantities of the crops produced are consumed by the households, nearly 90% of the output was sold to the market for some crops. Tomato appears to be the most expensive crop among others, followed by maize and beans. Prices and quantities sold to the market are given in the figure below.

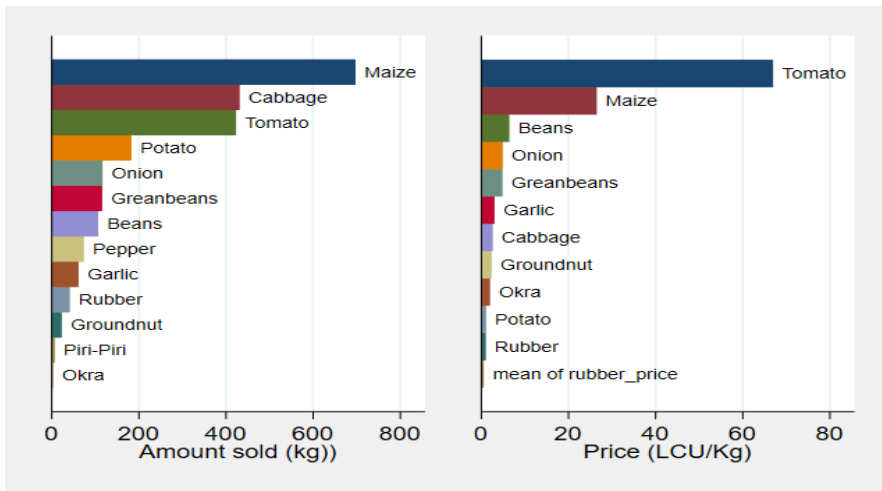


Figure 4. 10: Amount of output sold to market and prices

The cost and production data for individual crops were aggregated to calculate crop revenues and income. Cost consist of fixed costs (e.g. one-off payments for machinery equipment, land lease, storage facility, etc) and operational costs for production inputs. Production quantities for individual crops were multiplied by their respective prices to estimate revenues. The sum of the fixed and variable costs was subtracted to arrive to an estimate of net crop income. The figures are calculated in local currency (1 Mozambican metical =0.014 USD). The estimated average net income from crops is about 28,000 Mozambican Meticals (equivalent to about 388 US dollars). Note that outliers in

production quantities as well as prices for a number of observations were trimmed and excluded from the revenue estimation.

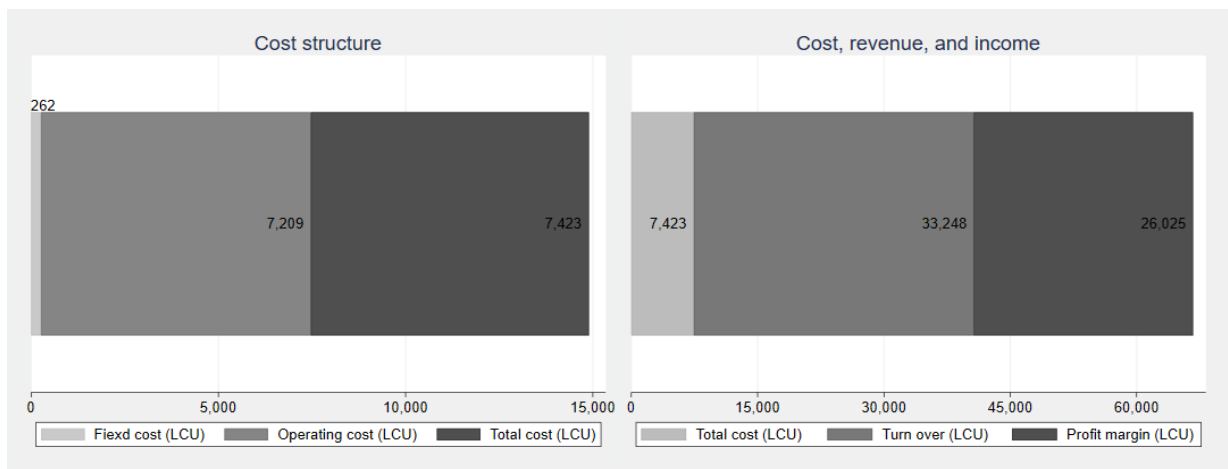


Figure 4. 11: Production costs, revenues, and crop income

Data on households' livestock ownership show that poultry is widely common among the sample households as nearly 80 households reportedly own chickens. Other animals (unspecified in the data), goats and oxen are also common as about 67, 59, and 51 percent of the households reportedly own "other animals), goats and oxen, respectively. The graph below illustrated the percent of households and the number of animals that they own.

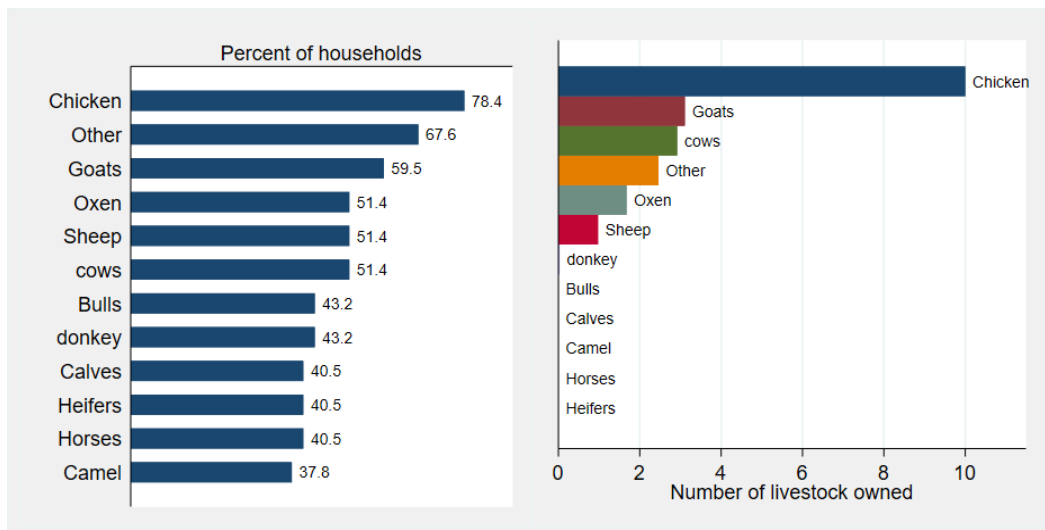


Figure 4. 12: Household's livestock ownership

#### 4.4. Farmer Organizations and Extension Services

In this section, data are gathered on whether farm households have memberships in the farmers organization (e.g. grower/producer organizations, cooperatives, trader organizations, supplier organizations, etc.) and to determine whether they have access to the extension services provided by the government or projects.

Table 4.11 summarizes households' access to extension services and the number of visits by the extension agents. Data on the number of extension visits for about 22% of households were missing or not reported. Nearly 75% of the households confirmed that they have access to extension services. Households in the sample were then asked to specify the number of visits the extension agents paid to their farms based on a scale of 0-3 with 0= never, 1=rarely (once in three months), 2=sometimes (once or twice in a month), and 3= at least once in a week. For the households in the sample, nearly 10% specified "rarely", 20% chose "sometimes" and about 43% chose "at least once in a week".

Table 4. 10: Access to extension services and number of extension visits

Access to extension service	Number of extension visits					Total
	Never	Rarely (once in a month)	Sometimes (once/twice in a month)	At least once in a week	Missing/Not reported	
Yes	1 33.33	5 100.00	10 100.00	22 100.00	0 0.00	38 74.51
No	2 66.67	0 0.00	0 0.00	0 0.00	10 90.91	12 23.53
Missing/not reported	0 0.00	0 0.00	0 0.00	0 0.00	1 9.09	1 1.96
Total	3 5.88	5 9.80	10 19.61	22 43.14	11 21.57	51 100.00

First row has *frequencies* and second row has *column percentages*

About 32% of the respondents in the sample indicated no access or no memberships of farmers organizations and a about 60% of the households in the sample indicated that they are members of different farmer organizations, whereas about 8 of the household did not report data on membership. Farmers organizations usually provide key information on technical aspects of crop production, marketing, prices, and input supplies. Access to such information is critical for the farm households to increase production and incomes by helping them to identify appropriate marketing strategies.

Table 4. 11: Membership in farmer organizations

Is this household a member of any farmer organization?	Freq.	Percent	Cum.
Yes	31	60.78	60.78
No	16	31.37	92.16
Missing/Not reported	4	7.84	100.00
Total	51	100.00	

#### 4.5. Labour

Labour data on the household own as well as hired labour were collected from the sampled households to assess the amount of labor used in farming. In addition, data on whether the household's labor work off-farm were also collected. On average, nearly three labors worked on the farm with an average of about 5 days per week and about 3 hours per day. The average number of labor, days worked, and wages appear to slightly vary by gender, as men tend to work longer hours and days than women. On the contrary the number of women involved in farming is higher compared to the average estimate for male laborers. The overall average wage was estimated to be a little over 190 Mozambican meticals with much higher average for the male laborers compared to the female laborers.

Table 4. 12: Household labor applied in the farming activities

Gender	Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	Avg no. of labors (month)	33	1.72	5.48	0.00	30
	Avg. days worked (days/month)	33	6.80	11.34	0.00	30
	Avg hours worked (hours/day)	33	108.34	608.87	0.00	3,500
	Wage (LCU/day)	33	171.69	623.37	0.00	3,500
Female	Avg no. of labors (month)	33	0.33	0.92	0.00	4
	Avg. days worked (days/month)	33	3.27	8.98	0.00	30
	Avg hours worked (hrs/day)	33	0.97	2.47	0.00	8
	Wage (LCU/day)	33	19.06	46.94	0.00	163
Total: both male & female	Avg no. of labors (month)	33	2.03	5.58	0.00	30
	Avg. days worked (days/month)	33	10.06	17.05	0.00	60
	Avg hours worked (hrs/day)	33	109.30	608.71	0.00	3,500
	Wage (LCU/day)	33	190.75	623.17	0.00	3,500

Nearly 58% of the respondents in the sample have hired labour from the market at some point throughout the year to carry out farm work. The average figure of number of labours shows that every month about 79.26 labours were hired from the market working for 2 days in a week, on average. Average wage paid to hired labour is estimated at 351 Mozambican Metical, slightly higher compared to the wages estimates for the household own labor, paraps because the laborers that are hired from the market are skilled and therefore more expensive.

Table 4. 13: Labour hired from the market for farming activities

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total hired labor (persons/month)	50	9.26	42.222	0	300
hired labor days (day/week)	50	2.3	2.971	0	10
hired labor hours (hours/day)	50	3.32	3.359	0	8
hired labor wage (LCU)	50	351.1	701.697	0	4000

Less than half of the respondent households indicated that any members of their households worked off-farm. Note that about 6% of the households did not report data on off-farm work (e.g. missing values). Off-farm activities may include any non-farm activities undertaken by the household members including jobs in the service, manufacturing, and other industrial activities.

Table 4. 14: Household labor off-farm work

Off-farm working	Freq.	Percent
Yes	21	41.18
No	27	52.94
Missing/not reported	3	5.88

#### 4.6. Natural Disasters, Shocks, and Coping Strategies

Data on natural disasters and shocks faced by the households in the sample as well as coping strategies devised by the household were collected as part of the baseline survey. Common shocks faced by the farmers were listed in the survey questionnaire and the respondents were asked to report the occurrence and the impact of the shocks based on a scale of 1-3 with 1= low, 2=medium, 3=high. Majority of the households indicated deaths in the family and flooding were among the most common shocks during the past 12 months. Market related shocks including sudden increase in food prices and diseases and loss of assets (such as house, lands, farm animals, etc) were also found to be the most common shocks faced by the households. Other shocks reported by the household with a higher frequency of occurrence include drought, sudden decline in farm gate prices, and reduction in the drinking and irrigation water.

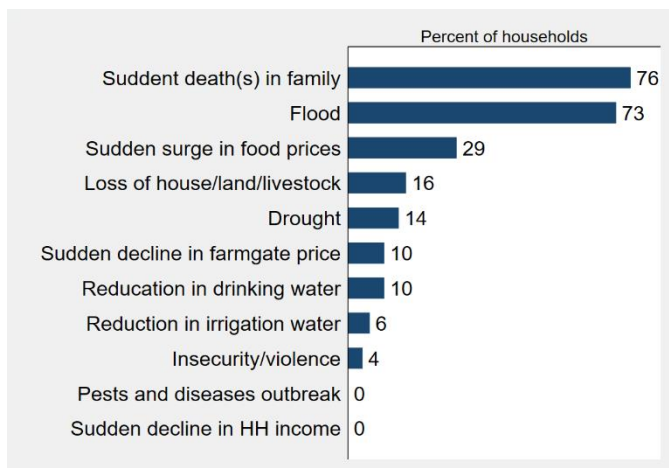


Figure 4. 84: Shocks faced by the household

The severity of the most common shocks is plotted to illustrate their impact on the households' wellbeing. For those households that reported the occurrence of shocks, all of them indicated the severity of the shocks from medium to high. It is worth noting that the respondent were asked to rate the impact of each shock based on a scale of 0 to 3 with 0=no shock, 1= low impact, 2=medium impact, and 3=high impact.

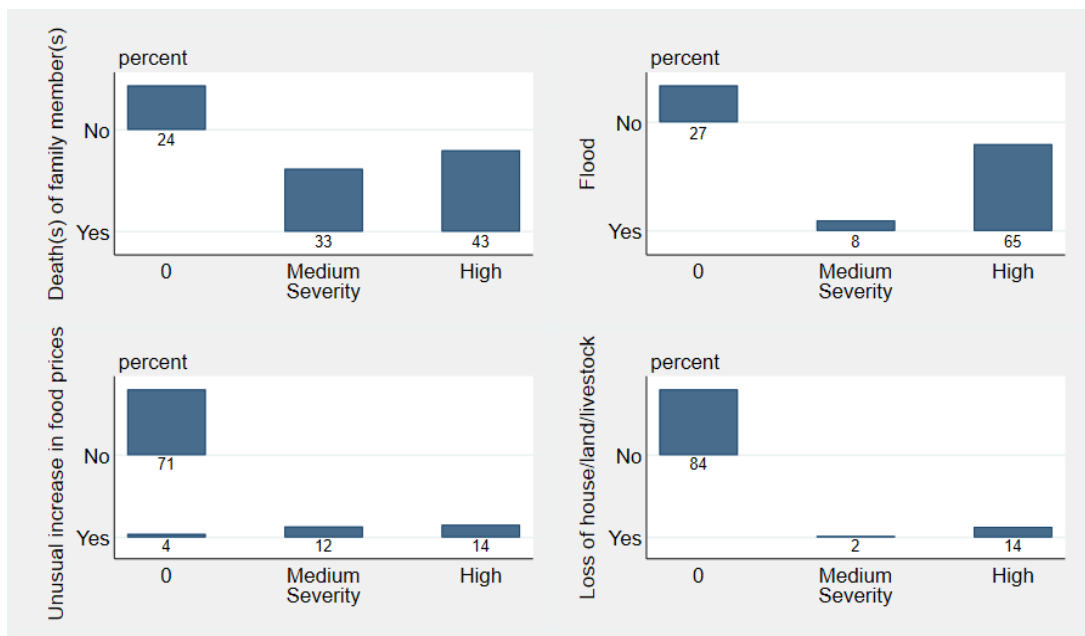


Figure 4. 95: Severity and impact of selected shocks

#### 4.7. Salinity and Proposed Interventions

Data were collected on the extent of salinity, its impact in terms of area being affected and in terms of losses in yields/production, and potential intervention strategies that households devised to cope with the salinity problems and whether these interventions have worked to mitigate the potential

impacts of salinity. Nearly 90 percent of the households in the sample reported that salinity is a common problem in their village and directly affected agriculture production. On average, about 0.40 ha of land per farm was reportedly affected by salinity. Given the average farm size of 3.67, the land affected by salinity is equivalent to about 11% of the total land representing the lowest salt affected area for Mozambique compared to other countries in the survey.

Table 4. 156: Salinity problems in the community

Is salinity a problem in your village/area?	Freq.	Percent	Average land affected by salinity (ha)
No	4	7.84	0.38
Yes	46	90.2	
Missing/not reported	1	1.95	
Total	51	100	

When households were asked to choose the most common symptoms of salinity identification, majority, nearly 90%, indicated white crust is the most common symptom, following by low infiltration of water and soil compactness.

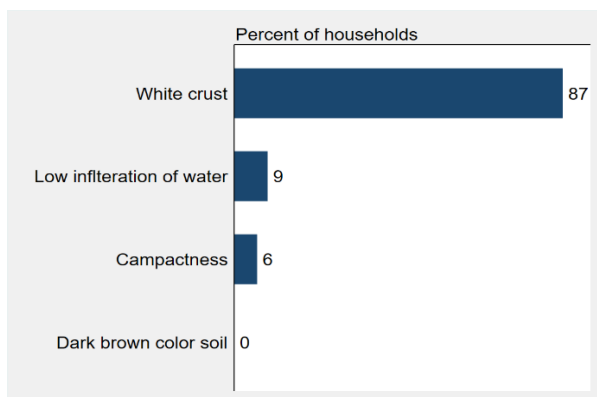


Figure 4. 107: Salt identification

The severity of the impact of salinity varies among the sample: Over 15% of the households reported that their land is severely affected with a high impact leading to the losses in the range of 25-100% in yields, nearly 60% of the households indicated medium severity leading to a loss of 10-50% in crop yields, and the remaining 25% of the of the households indicated salinity with low severity leading to the last of 5-10% of loss in the yields.



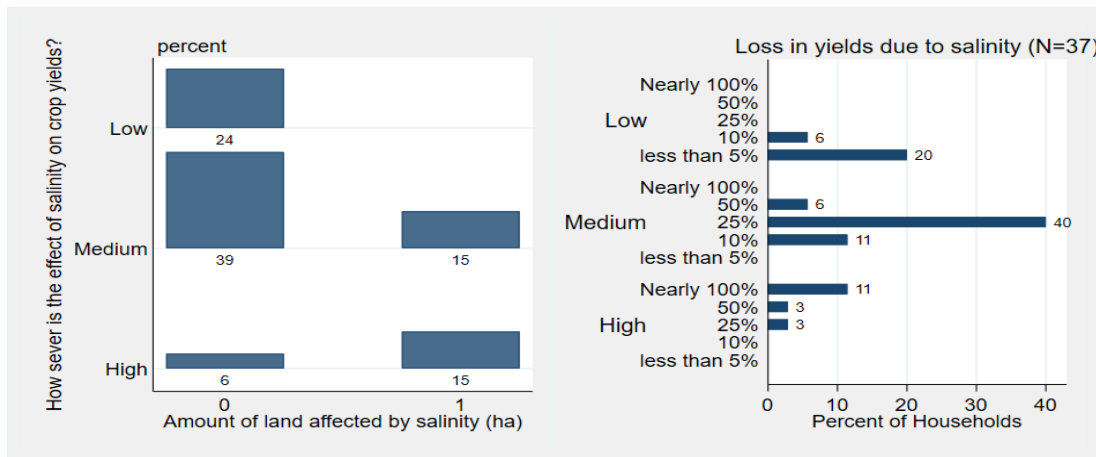


Figure 4.118: Extent of salt affected area and potential losses in yields due to salinity

The data collected on the potential causes of salinity from the households in the sample show that 20% of the respondents chose “lack of drainage”, 20% indicated high concentration in salt water, 30% of the respondents reported that inappropriate irrigation methods and practices were the main drivers of salinization. Less than 20% of the households in the sample reported other causes including climatic condition, parent materials, irrigation methods and practices, and land levelling as the causes of salinization.

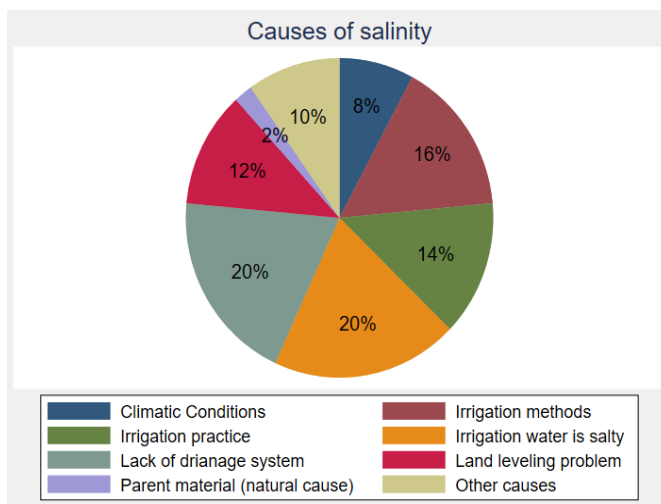


Figure 4.129: Potential causes of salinity

Households executed different intervention strategies aiming to manage losses due to salinity including deep ploughing, crop diversification, crop rotation, soil amendment, drainage, and other intervention strategies. Based on the responses, crop rotation, “other interventions” and soil amendments are by far the most famous options followed by improved irrigation methods, crop diversifications and drainage. Unfortunately, “other intervention” was not specified by the households in the data. When the respondents were asked to provide information on whether the interventions

that they have implemented have actually worked, nearly 20% of the households reported the interventions were effective increasing yield by 50-10%, whereas the rest of the respondents reported no improvement in yields despite the interventions.

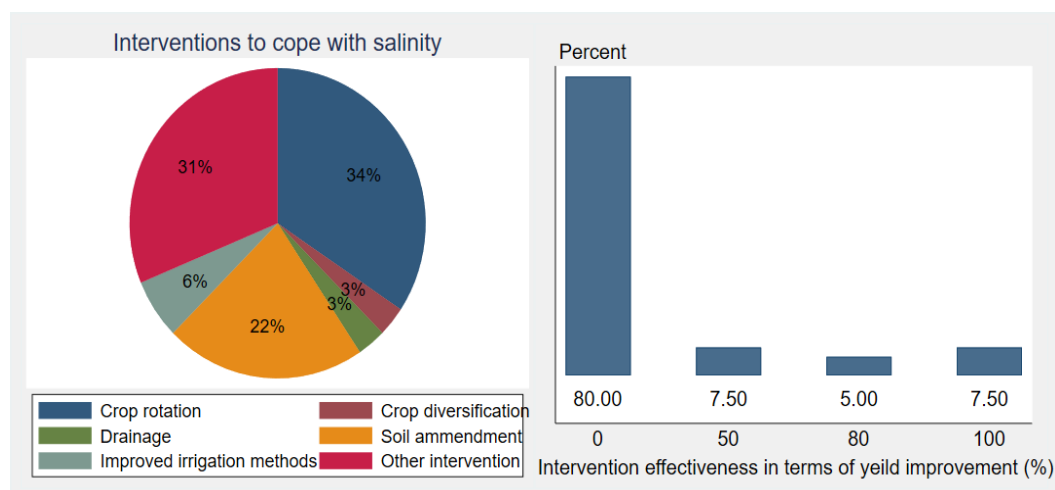


Figure 4.20: Intervention strategies and intervention effectiveness

Training on salinity management is an important aspect of farming in the context of biosaline agriculture to improve the household’s capacity to be able to identify salinity and design appropriate and effective coping strategies. When households were asked if they have received any training on salinity management, nearly 80% of the households in the sample indicated that they have not received any training, about 18% indicated that they have received training, whereas data for about 4% of the household were missing.

Table 4. 16: Training on salinity management

Training on Salinity	Freq.	Percent	Cum.
No	40	78.43	78.43
Yes	9	17.65	96.08
Missing/not reported	2	3.92	100.00
Total	51	100.00	

#### 4.8. Gender and Women Involvement in Agriculture

The gender section of the survey was allocated to collecting information on the gender balance, particularly women involvement in agricultural activities and household decision making. Majority (93%) of the households reported that women are actively involved in farming activities, whereas women involvement in the livestock sector is considerably low as just 13% of the respondents reported women involvement in livestock. More than half of the households in the sample responded that women are involved in non-farm activities.

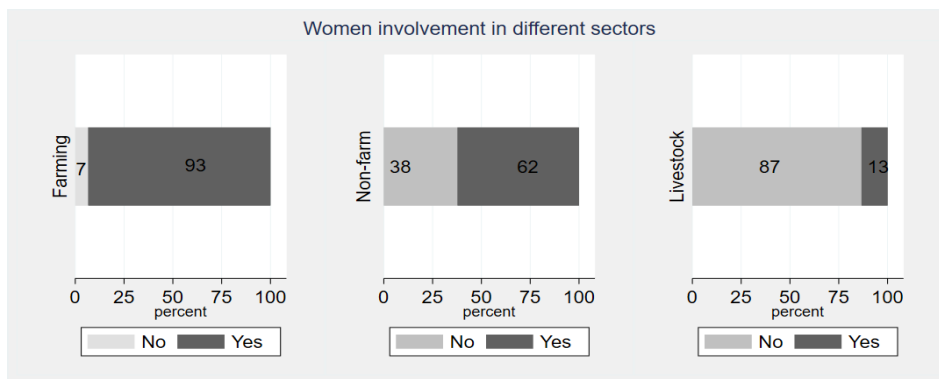


Figure 4. 213: Women Involvement in various sectors

When households were asked to specify if women are involved in any decision-making related to the household in general and farming in particular, about 82% and 92% of the respondents responded that women were actively involved in the household decisions and farming, respectively.

Table 4. 17: Women involvement in the household's decision making

Women involvement in decisions	Yes		No		missing/Not reported	
	Freq.	Percent	Freq.	Percent		
Are women involved in any decisions related to the household?	42	82.4%	8	15.7%	1	1.96%
Are women involved in any decisions related to farming	47	92.2%	3	5.9%	1	1.96%

The specific decisions related to farming and women involvement in decisions are illustrated in the figure below. It appears that majority of the decisions related to land (rental, or cultivation), crop choices, purchase of farm tools and inputs, hiring labour from the market, and selling agricultural productions are jointly made by both the women and men or women alone. These decisions appear to be gender balanced and signify that women have stronger participation in decision making.

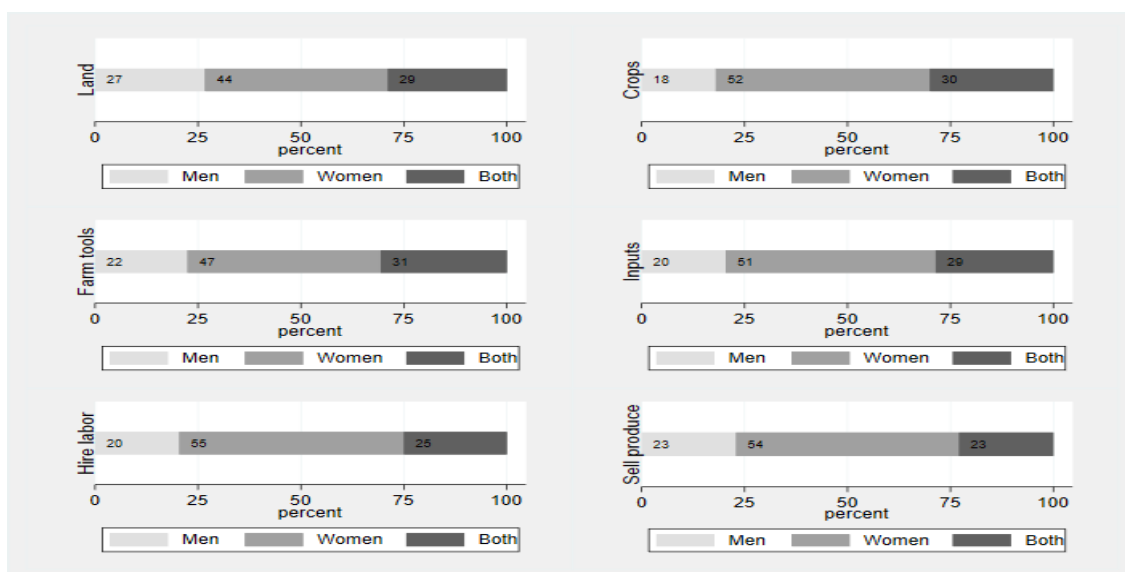


Figure 4. 14: Women participation in decision making related to selected farming activities

Women also play critical role in the household decisions related to the household expenditures, both of on food- and non-food expenses. Though women actively participate in both decisions related to food- and non-food items, they are slightly more involved in decision making related to food expenditures, whereas men are slightly more involved in decisions related to non-food expenses.

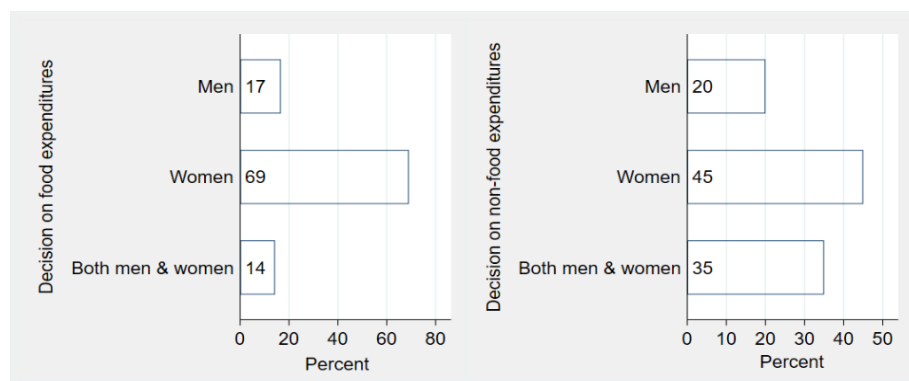


Figure 4. 153: Decisions on food- and non-food items

#### 4.9. Food Security and Nutrition

Food security of the target rural households is the ultimate objective of the current project. Considering this overarching goal, data on household food consumption and type of food that they consume were collected. The objective of this exercise is to identify key staple food crops, whether household have enough to consume throughout the year, and whether the household rely on market or their own production for consumption.

The households in the sample relied heavily on maize vegetables, rice, and beans and peas which appear to be consumed more compared to other food items. Maize and vegetables appear to be the staple product in the households' diet with greater importance for the household food security. In terms of access, all the households in the sample indicated that they had access to rice. In terms of consumption, nearly all the households in the sample responded that they had consumed maize and vegetables for about 4 days during last 7 days. Nearly 88% of the households reported access the rice, 71% of the household had access to beans and peas, while less than 50% of the respondents have reportedly indicated that they have had access to other foods listed in the survey.

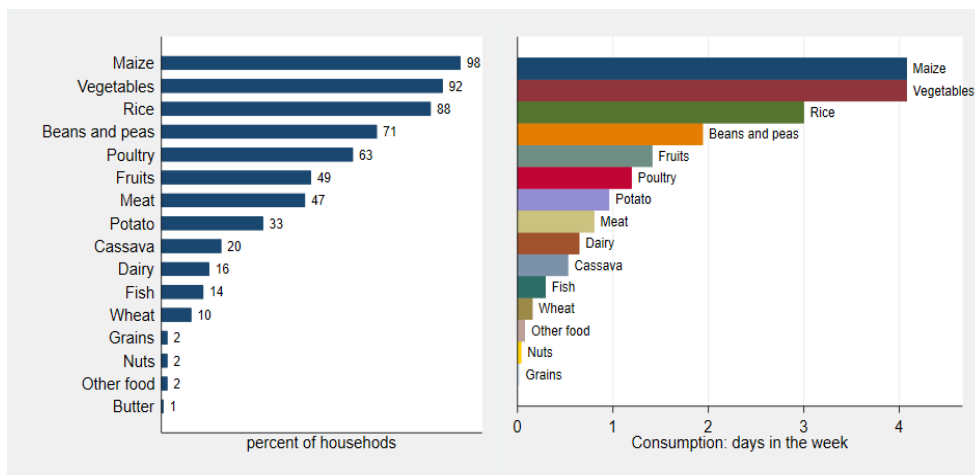


Figure 4. 164: Common foods consumed by the households

The household demand for food consumption is met through own production and local markets, especially for maize and vegetables as nearly 60% of the households indicated that the primary source for maize and vegetables was own production, whereas about 35% of the respondents in the sample relied on the market. Households who reported consumption of beans indicated that nearly 35% of their demand is met through markets. Rice, on the contrary, appears to be mainly sourced from the markets while a small percent (less than 5%) of the rice consumed by the households is from the household's own production.

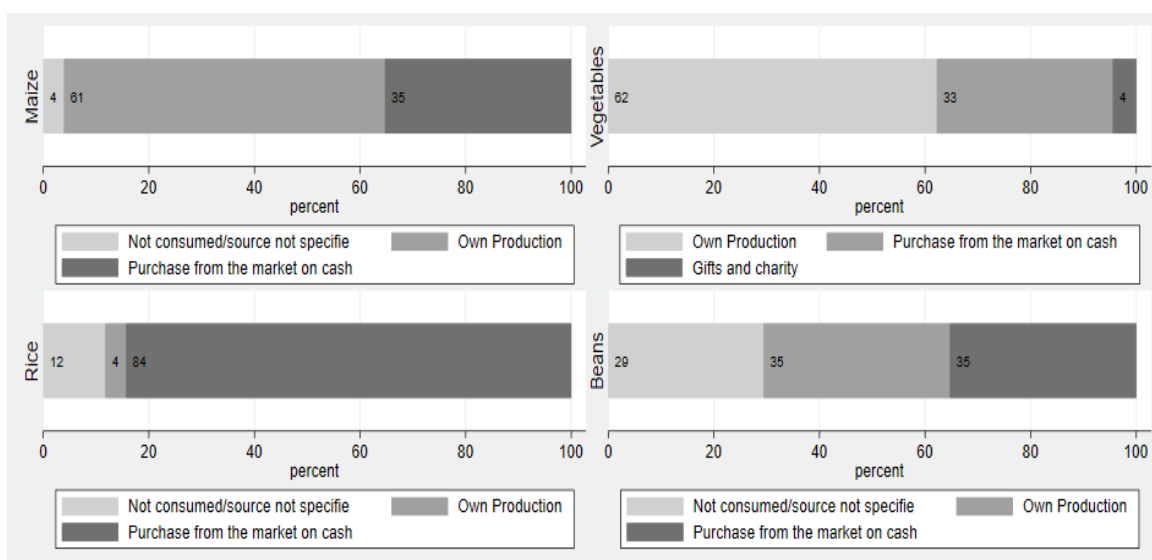


Figure 4. 175: Sources of selected food items

#### 4.10. Access to Infrastructure and Services

This section of the survey collects information on the household's access to infrastructure and services including roads, local and regional markets, as well as basic services such as agricultural credit, health

and education facilities, and drinking water. The objective of this section is to provide an overall picture of the households' profile and their wellbeing.

Majority of households in the sample (more than 98%) have reported having access to local markets, and about 96% of all-season drivable roads. Access to markets and roads is an important aspect of farming and improvement of agribusiness in the local communities. Better access to markets and roads implies improved market participation for outputs and inputs.

Table 4. 18: Household's access to market and roads

Access	Yes		No	
	Freq.	Percent	Freq.	Percent
Access to local markets	50	98.03	1	1.96
Access to roads	49	96.07	2	3.92

Majority of the households (84% of the total sample) reported that markets are located within a radius of less than 60 minutes of their community. Nearly 6 percent of the households reported markets are located within their community. Majority of the households (nearly 86%) of the households are reportedly able to reach market by bike or by walking. Data on time taken to reach market for about 4% of the households were missing.

Table 4. 19: Access to markets and time taken to reach local markets

Market reached by: walking, car, bike, animal, or public transport	Time required to reach the nearest market					Total
	Market within the community (no travel needed)	Less than 60 minutes	Between 1-2 hours	Between 2-4 hours	Missing/not reported	
by walking	3	35	2	1	0	41
	100.00	81.40	100.00	100.00	0.00	80.39
by car	0	4	0	0	0	4
	0.00	9.30	0.00	0.00	0.00	7.84
by bike	0	2	0	0	1	3
	0.00	4.65	0.00	0.00	50.00	5.88
by animal	0	1	0	0	0	1
	0.00	2.33	0.00	0.00	0.00	1.96
Missing/not reported	0	1	0	0	1	2
	0.00	2.33	0.00	0.00	50.00	3.92
Total	3	43	2	1	2	51
	5.88	84.31	3.92	1.96	3.92	100.00
	100.00	100.00	100.00	100.00	100.00	100.00

First row has frequencies and second row has column percentages

About two-third of the households have indicated that they had access to market information, whereas a third of the households in the sample reported no access to any information related to

prices and markets. About 70% of those who had access have declared that they information they obtained were useful in terms of marketing their production and sourcing agricultural inputs.

Table 4. 20: Access to market information

Access to market information	Were the information obtained useful?			
	No	Yes	Missing/ not reported	Total
No	6	4	5	15
	100.00	11.11	55.56	29.41
Yes	0	32	3	35
	0.00	88.89	33.33	68.63
Missing/not reported	0	0	1	1
	0.00	0.00	11.11	1.96
Total	6	36	9	51
	11.76	70.85	17.6	100.00
	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

Households were also asked to provide data on whether they have access to general services including access to credit, health and educational facilities, electricity, and drinking water. Over 90% of the households in the sample have indicated having access to health facilities and electricity, between 80-89% of the household have access to educational facilities and drinking water, whereas less than two-thirds of the households confirmed access to transportation services. Less than 5% of the households out of the total households in the sample indicated having access microfinance and credit services indicating that credit can be a binding constraint for agriculture production.

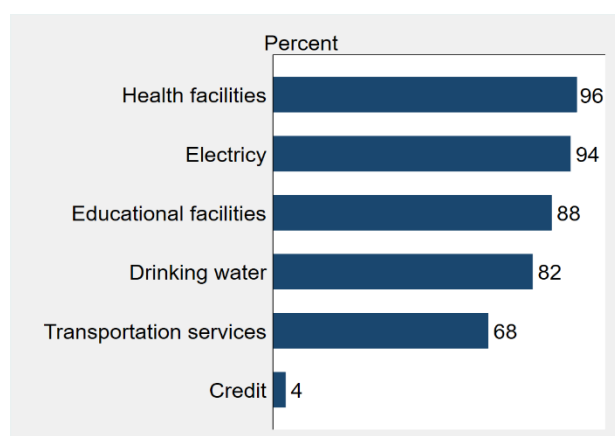


Figure 4. 18: Access to services

## Country: The Gambia

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The Gambia is located in the west Africa surrounded by Senegal and Atlantic Ocean. With an area of 11,295 square km, The Gambia the smallest country in mainland Africa. Based on the World Bank's estimates, the population of The Gambia was estimated to be 2.35 million people. The Gambia is considered to be of the most densely populated countries in Africa. Among the countries targeted by the RESADE project, The Gambia has one of the highest GDP growth rate (about 6%). However, according to the World Bank's poverty estimates in 2015 (the most recent update available), nearly half of the Gambia's population was living under the poverty line.

Table 5. 1: Country profile-The Gambia

Indicator	Unit	Estimation
Population (2019 est.)	Millions	2.35
Agricultural Land (2016 est.)	Sq.km	6,050
Agricultural Land (2016 est.)	% of land area	59.78
GDP (in billions) (2019 est.)	Current US\$	1.76
GDP Per capita (2029 est.)	Current US\$	751.30
GDP Growth (2019 est.)	Annual %	5.98
Poverty headcount ratio (2015 est.)	% of population	48.6

*Source: World Bank Microdata-World Development Indicators (World Bank, 2020)*

At the national level, a significant amount of land (about 60% of the total land) is occupied by agriculture. Agriculture employs nearly half (about 46 percent) of the labour force and is the source of livelihood for 80 percent of the rural population. The sector accounts for about 17 percent of the national GDP and 30–40 percent of all foreign exchange earnings from exports. From an agricultural economic prospective, the agriculture sector counts as an important pillar of the national economy, but its performance has been weak and volatile over the past decade that has steadily undermined economic and social welfare (World Bank, 2019).

### 5.1. General Information and Household Demography

A total of 60 households were surveyed in 10 villages in the regions of Central River Region North and Central River Region in the district of Lower Saloum. Despite the high concentration in two villages (Balagarr Njoke and Jahurr Mandinka), the remaining surveys were fairly equally distributed among the villages covered by the survey team.



Table 5. 2: Geographical coverage and distributing of the respondents

	Freq.	Percent
Balagharr Mbentenki	3	5
Balagarr Njog	3	5
Balagarr Njoke	12	20
Balangarr Mbentenke	8	13.33
Ballangarr	3	5
Jahurr Mandinka	12	20
Jahaour Tukolor	8	13.33
Jahaurr	4	6.67
Jahour Saloum	1	1.67
Jahurr Fula	4	6.67
Missing/not reported	2	3.33
	60	100

Data on the respondents' gender and age show that majority (about 82%) of the respondents of the survey were male with an average age of 52 years, whereas 18% of the respondents were females with an average age of about 45 years.

Table 5. 3: Respondents' information

Gender	Respondent age (years)		
	Mean	Freq.	Percent
Male	52.1	49	82%
Female	44.54	11	18%
Row total	49.06	60	

Nearly 97% of the households are headed by the males, whereas only 3% of the household heads were reportedly female. The average age of the households' head is estimated to be about 53 years, but varies by gender as the average age of the female household heads is about 65 years, whereas the average age of the male household heads is estimated to be 52 years.

Table 5. 4: Household head gender and age

Household head	Freq.	Percentage	Mean age (years)
Male	58	97%	52.36
Female	2	3%	65
Total sample	60	100%	53.36

About 95 of the households' heads (male and female) were reportedly married, 3.34% single, and data for about 1.67% (one household) were missing or not reported.

Table 5. 5: Household head marital status

Head Marital Status	Male	Female	Total	
	Freq.	Freq.	Freq	Percent
Married	56	1	57	95.00
Single	2	0	2	3.34
Widowed	0	1	1	1.67
Row Total	58	2	60	

The average size of the household is estimated to be about 12 persons with a standard deviation of 4.20. The household size ranges from a minimum of 4 persons per household to a maximum of 25 persons per household. The prime age-sex group demographic (e.g. members of age of 15-64) dominates the composition of the households, whereas the elderly age-sex group (e.g. household members with age of 65 and above) accounts for the lowest fraction in the household composition. Children and minors (e.g. members of household aged 14 or less) comprise the second highest demographic proportion in the household.

Table 5. 6: Household size and gender-age demographic groups

Household size, age, and sex groups	Mean	Min	Max	Median	Std. Dev.
Household Size (persons)	11.77	4.00	25.00	11.00	4.20
No. of male (14 years & less)	2.50	-	10.00	2.00	1.98
No. of female (14 years & less)	2.32	-	7.00	2.00	1.76
No of male (15 – 65 years)	3.00	1.00	7.00	2.50	1.54
No. female (15 – 65 years)	3.45	1.00	7.00	3.00	1.52
No. of males (65 years & above)	0.28	-	1.00	-	0.45
No. of females (64 years & above)	0.22	-	1.00	-	0.42

Data on the household educational profile show that only about 13% of the household heads in the sample are able to read and write, while more than 75% of the household heads are reportedly illiterate (e.g. cannot read and write). Data on literacy for about 10% of the household are missing or not reported. For the household who reported enrolment in the formal education, nearly 7% completed secondary school, whereas about 3.33% reported that they obtained “other degree”.

Table 5. 7: Household Literacy and Formal Education

Literacy rate		
Literacy	Freq.	Percent
Literate (can read & write)	8	13.33
Illiterate (cannot read & write)	46	76.67
Missing/not responded	6	10
Total	60	100

Formal Education		
Highest degree obtained	Freq.	Percent
Primary School	0	0.00
Secondary School	4	6.67
High School	0	0.00
Bachelors	0	0.00
Masters	0	0.00
Other	2	3.33
Illiterate ( <i>did not go to school</i> )	54	90.00
Total	60	100.00
Average schooling years	7.33	

## 5.2. Socioeconomic Profile

The purpose of this section of the baseline survey is to present information on the socioeconomic profile that covers information on household income and sources and households' asset ownership. As for the household income, the average income per household is estimated at about 62,000 Gambian Dalasi with significantly higher contribution by both women than men. However, when reported separately by gender, women contribution in the household income is considerably low compared to the men. Converting the Gambian Dalasi to the USD dollar at the exchange rate of (1 USD=0.019 Gambian Dalasi), the average household income is about 1,200 \$ US.

Table 5. 8: Household income segregated by gender

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total income	60	61,926.92	70,401.26	0	415,650
Amount earned men	60	18,690.33	25,429.32	0	100,000
Amount earned women	60	1,986.00	54,57.85	0	30,000
Amount earned both	60	42,100.43	63,726.95	0	36,5650

With a contribution of about 36% to the total household income, farming is by far the major source of the household income, followed by livestock (21%), permanent employment (21%), remittances (8%), and temporary employment (7%). A relatively minor fraction of the total household income come from other sources including, trade, aid, and other sources. It is also worth to note that the share of aid by the government and other projects is considerably small and negligible (about 1% of the total household's income).

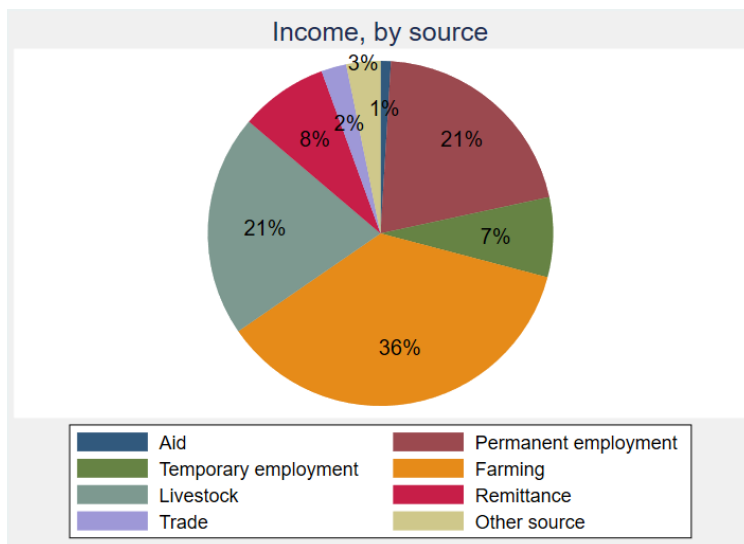


Figure 5. 1: Household income sources

The data on household expenditures show that more than half (about 64%) of the household expenditures are related to food expenses, whereas 36% of the spendings are related to non-food items.

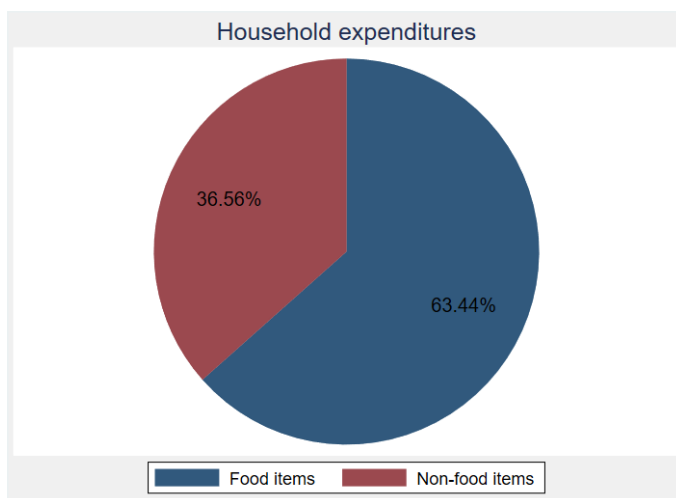


Figure 5. 2: Household expenditures

Data on the household's asset ownership show that the most common assets owned by the households are house, farm tools, mobile phones, kitchenware, and farm tools. Asset ownership of the households as an indicator of household wealth is one of the project indicators to be measured at the baseline stage. Nearly 90% of the households in the sample reported owning about 2.6 farm tools, on average.

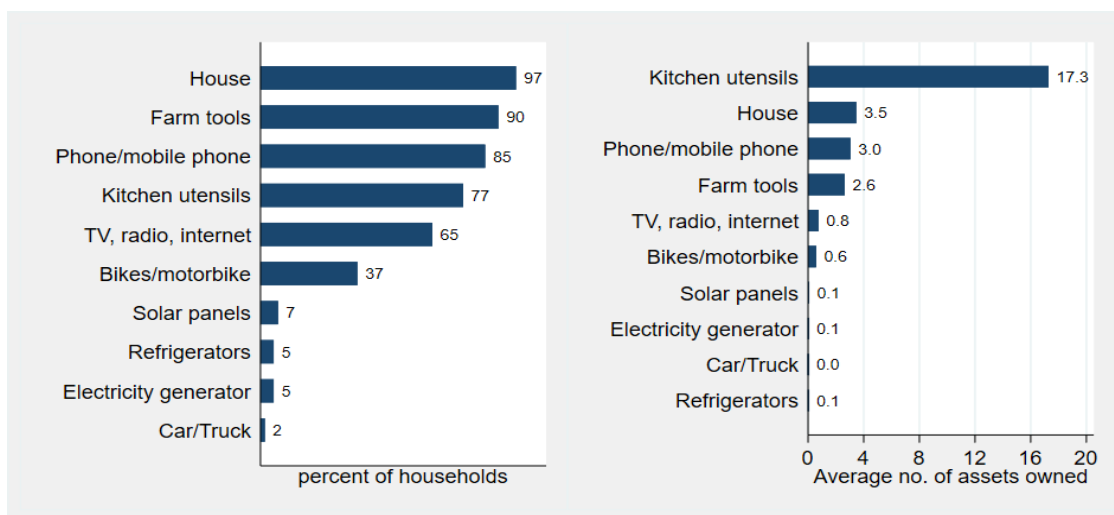


Figure 5. 3: Household's asset ownership

The ownership of assets by women and men depend on the type of the asset. Although majority of the assets are co-owned jointly by both genders, women have reported higher ownership of the household items such as kitchenware, whereas men reportedly have higher ownership of the house, farm tools, and mobile phones.

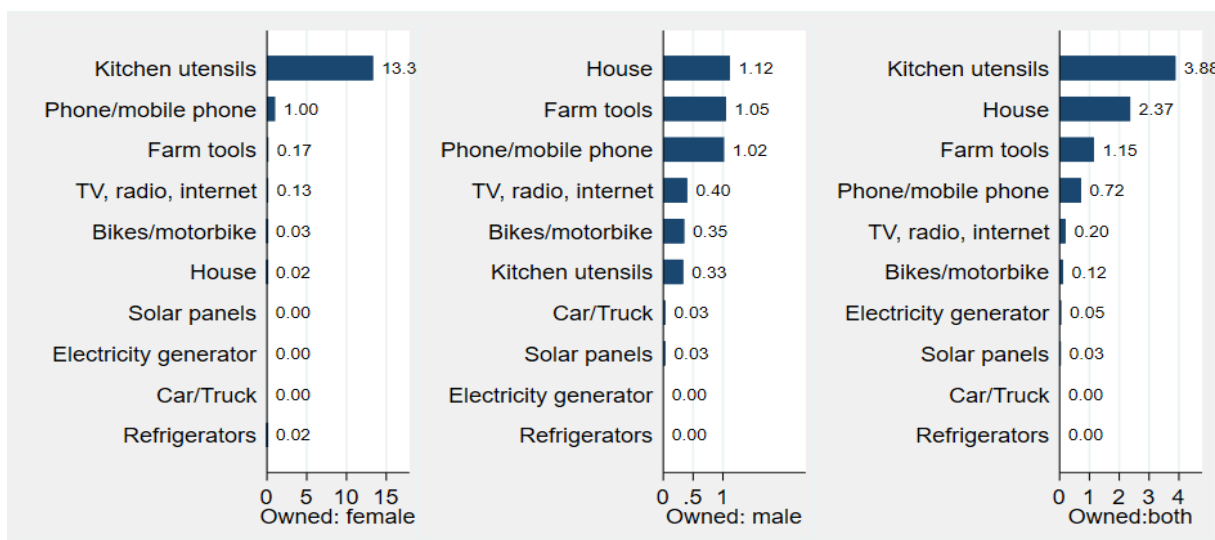


Figure 5. 4: Asset ownership segregated by gender

### 5.3. Landholding and Agriculture Production Portfolio

This section of the household survey asks whether households have access to own, leased or share-crop farmland. In addition, data on agriculture production, most common crops grown by the households, yields, and area allocated to individual crops are collected and analysed in this section. Data on the access show that nearly 93% of the agricultural lands operated by the household is owned by the households. The remaining portion of the land operated by the household is sharecropped.

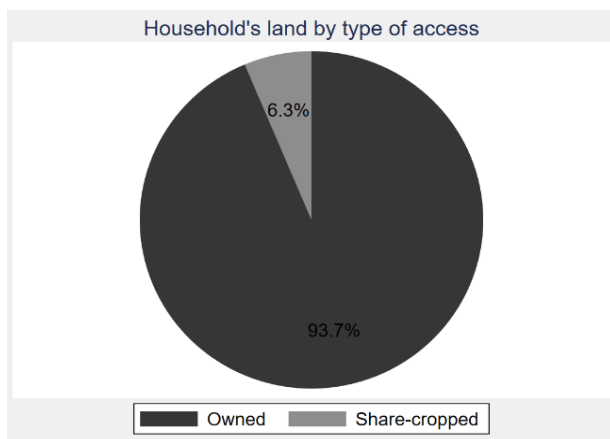


Figure 5. 5: Agricultural holding by type of access

The average size of the total land holding (including own, leased in and/or sharecropped) is about 3.83 hectares, out of which 3.09 ha is cultivated and 0.74 hectares is left fallow (Figure 5.7). majority of the land operated by the household was reported to be rainfed, whereas irrigated land comprise a small fraction of the total land. The land rental rate was reported to be about 1,619 in local currency.

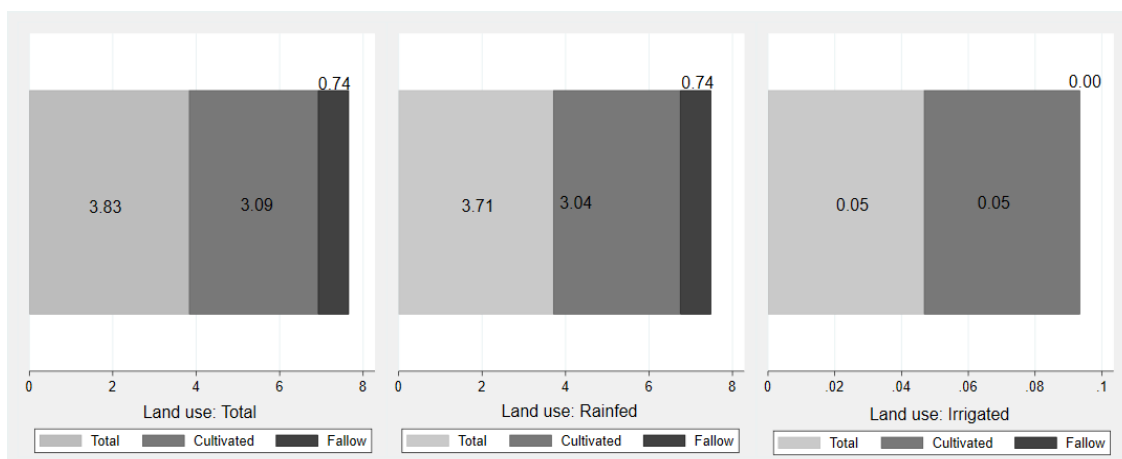


Figure 5. 6: Agricultural holding by type and use

Households were asked to specify the soil type and rate soil fertility. On a scale of 1-5 with (1=very poor, 2=poor, 3=average, 4=good, and 5=very good), the households were asked to rate the productivity of the cultivated land in terms of yield or production potential for the most common crops that the households grow. Nearly 55% of the soils were reported to be loam and the majority (about 85%) of the households rated the fertility level to be in the range of poor to average in terms of yields or production. Note that average is below "good" in the scale that is specified in the survey. The remaining 10 percent of the household rated the fertility of their land to be very poor, whereas a small fraction (less than 5%) of the land was rated to be good or very good.

Table 5. 9: Soil type and fertility

Type	Freq.	Percent	Cum.
sandy	13	21.67	21.67
clay	14	23.33	45
loam	33	55	100
Total	60	100	
<b>Fertility rate</b>			
very poor	6	10	10
poor	25	41.67	51.67
average	26	43.33	95
good	1	1.67	96.67
very good	2	3.33	100
Total	60	100	

The survey questionnaire provided the respondents with a list of the most common crops (about 30 crops) to choose the crops that the household usually produces on the farm. We find that groundnut, pearl millet, maize, onion, cabbage, and sorghum are the most important crops, among others. However, groundnut and pearl millet dominate the production portfolio as nearly 95% and 85% of the households in the sample reported growing groundnut and pearl millet, respectively. Average production value for groundnut is estimated to be around 900 kg and 488 kg for pearl millets. About 38 percent reported growing maize, 32% reported growing onion, and 25% reported cabbage with annual average production of about 88 kg, 33 kg, and 24 kg, respectively. It appears that majority of are relying on the production of one of the two dominant crops (e.g. groundnut and pearl millet).

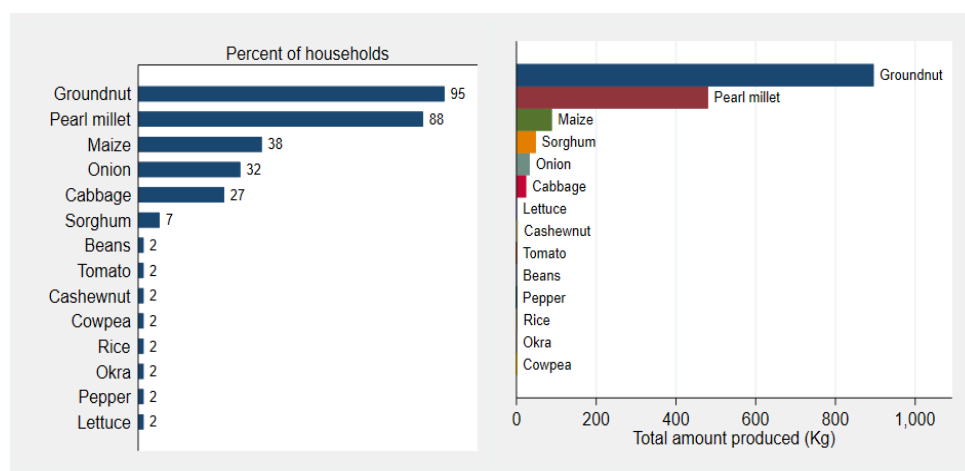


Figure 5. 7: Common crops grown by the households

Most of the households' land is allocated to groundnut, pearl millet, and maize occupying almost 75% of the land. Nearly 1.25 hectares out of the estimated average of landholding of 3.83 (presented earlier) is occupied by groundnut alone. This is equivalent to about 33% of the total allocated to rice.

About 29% of the land is allocated to pearl millet, and nearly 12.5% of the land is allocated maize. This implies that households in the sample specialize in maize production. Notice that there were some outliers identified the data for area under onion cultivation and yields of rubber. The outliers were identified and excluded in calculation of average land allocated to crops. While majority of the land is allocated to maize, the yield data show higher per unit production for okra. This may imply that there exists production inefficiency among the sample households due to the misallocation of farmland resources (e.g. majority of the land is allocated to low-yielding crops such as maize).

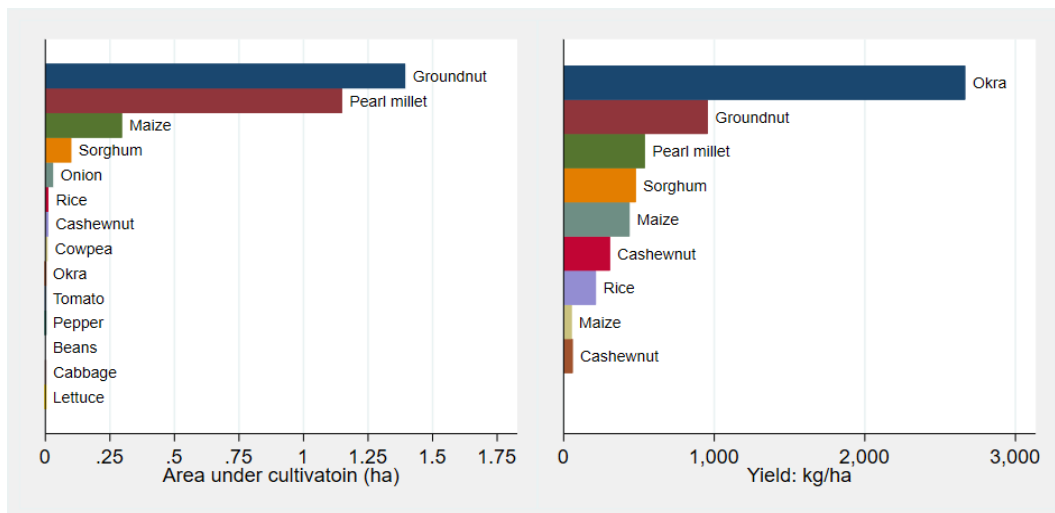


Figure 5. 8: Land allocated to individual crops and yields

Nearly all the pearl millet produced at the farm are consumed by the households throughout the year. Groundnut and maize are the other two major crops that households consume. The data confirm post-harvest losses. On average, about 10 kg of groundnuts produced at the farm were reportedly lost in the post-harvest stages. The post-harvest losses in pearl millet and maize are not as significant.

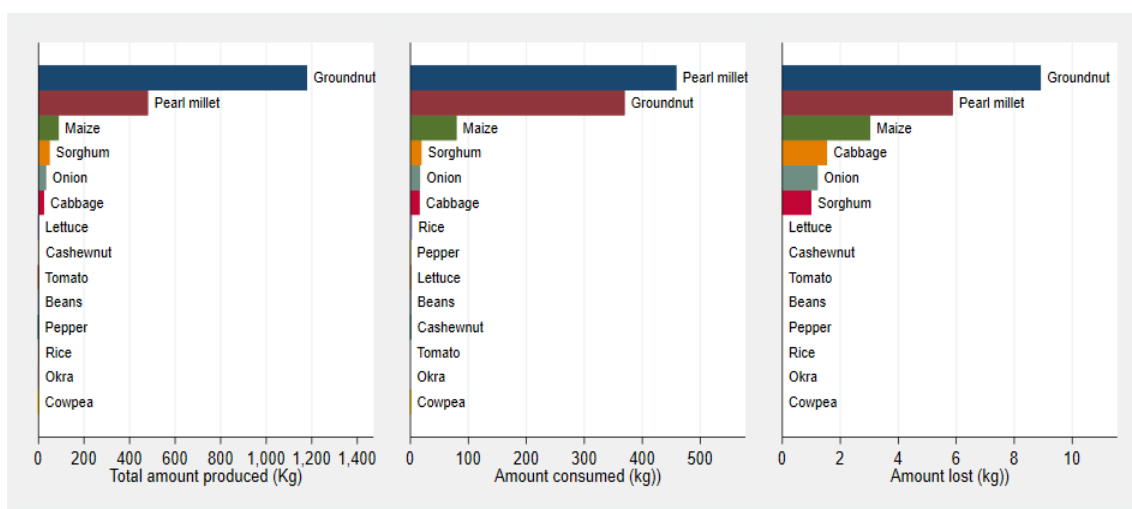


Figure 5. 9: Amounts produced, consumed by the household, and lost



Groundnut appears to be a market or cash crop as a major portion (about 75%) of the total quantity produced by the households is sold to the market. A small fraction of the pearl millet, sorghum, cabbage, onion, and maize are also sold to the market. Price data were collected in the local currency. Groundnut, pearl millet, and onion are the most expensive crops, among others. The average prices of groundnut, pearl millet, and onion were reported to be 18, 15, and 10 Gambian Dalasi (1 Gambian Dalasi is equivalent to 0.019US dollar).

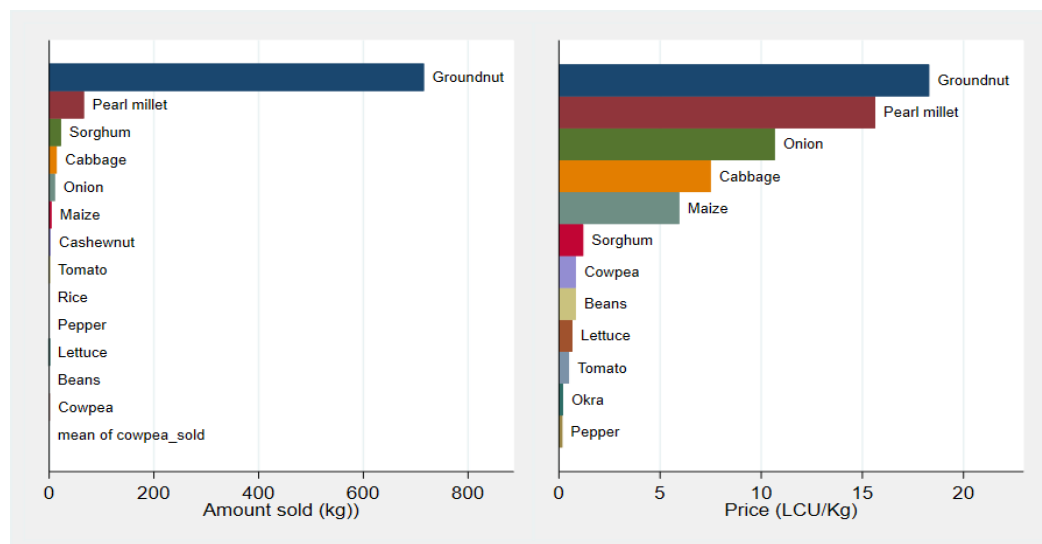


Figure 5. 10: Amounts sold to the market and price of individual commodity

Since the crop production, price, and cost of production data were collected for each crop separately, revenues as well as costs by crops were then aggregated to calculate total income from crop farming at the household level. The cost section of the survey provides data on inputs used at the farm including seed, land preparation, weeding, irrigation application, chemical and fertilizer use, compost/biochar, harvesting, threshing, winnowing drying and bagging, cash payments for storage, transportation, broker, fuel, machinery repairs direct taxes, and other miscellaneous costs. Data on fixed costs were also collected including one-off costs for purchasing machinery, land rental or lease, buildings and other farm structures, storage facility such as building or storage bins, and other costs.

The average estimated variable cost is about 1,146 Gambian Dalasi per farm, whereas the average fixed cost is about 971 Gambian Dalasi. Total production cost (i.e. the sum of the two costs) is 2.117. Average aggregated revenue is estimated to be about 30,345 Gambian Dalasi, and the average net profit from crops is estimated to be 29,199 Gambian Dalasi.

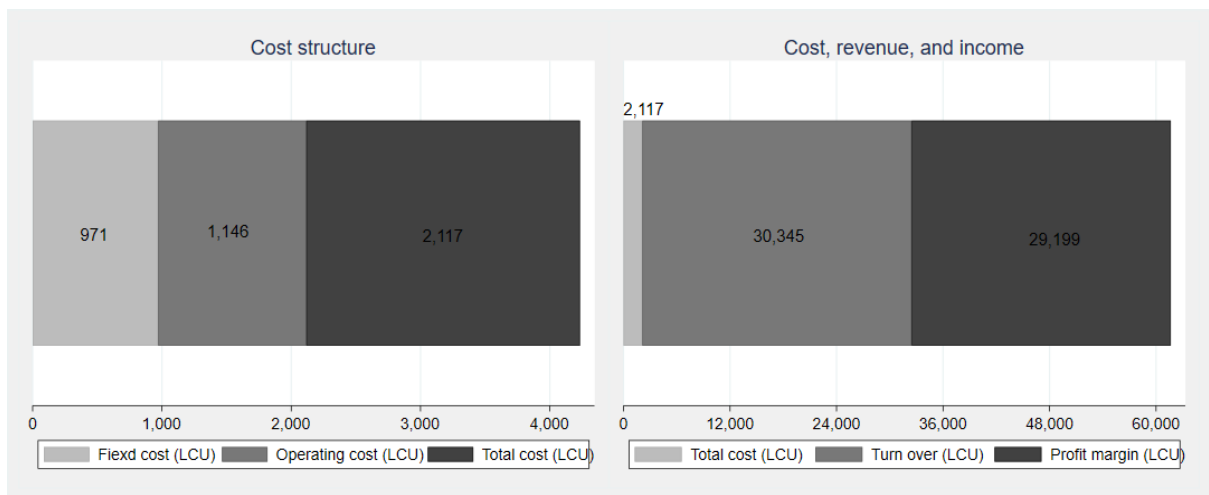


Figure 5. 11: Costs, revenues, and crop income

The next section of the baseline survey was designed to collect information on the household's livestock ownership. A list of animals was provided in the survey form for households to choose which and how many animals they own. The data show that majority of the households (79%) own goats, whereas roughly 70% of the households reported to own poultry, 62% reported that they own donkeys, and 57% reported that they own sheep. Less than 50% of the households indicated that they own other animals including oxen cows, bulls, horses, calves, heifer. On average, the households reported that they own about 22 chickens and less than 5 goats and other animals.

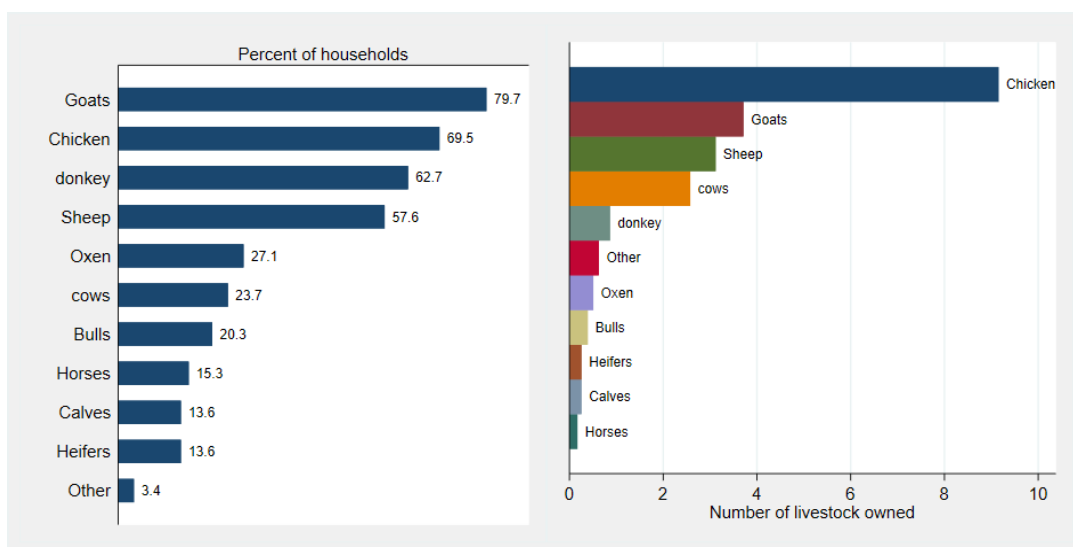


Figure 5. 12: Livestock ownership by the household

#### 5.4. Farmer Organizations and Access to Extension Services

In this section, data are gathered on whether farm households have memberships in the farmers organizations (e.g. grower/producer organizations, cooperatives, trader organizations, supplier

organizations, etc.) and to determine whether they have access to the extension services provided by the government or development projects. Table 5.10 summarizes households' access to extension services and the number of visits by the extension agents. Nearly a quarter of the households in the sample have reported no access to extension services, about 75% confirmed that they have access to extension services. Households in the sample were asked to specify the number of visits the extension agents paid to their farms based on a scale of 0-3 with 0= never, 1=rarely (once in three months), 2=sometimes (once or twice in a month), and 3= at least once in a week. For those households that reported to have access to extension services, nearly 12% % specified "rarely", 53% chose "sometimes" and 8% chose "at least once in a week". Data on the number of extension visits were missing or not reported for nearly 22% of the household

Table 5. 10: Access to extension services

Access to extension service?	Number of extension visits					Total
	Never	Rarely (once in a month)	Sometimes (once/twice in a month)	At least once in a week	Missing/ Not reported	
Yes	0	7	32	5	0	44
	0.00	15.91	72.73	11.36	0.00	100.00
	0.00	100.00	100.00	100.00	0.00	73.33
No	3	0	0	0	13	16
	18.75	0.00	0.00	0.00	81.25	100.00
	100.00	0.00	0.00	0.00	100.00	26.67
Total	3	7	32	5	13	60
	5.00	11.67	53.33	8.33	21.67	100.00
	100.00	100.00	100.00	100.00	100.00	100.00

First row has frequencies; second row has row percentages and third row has column percentages

About 80% of the household's indicated no access or no memberships in the farmers organizations and 13% indicated that they are members of different farmer organizations. Farmers organizations usually provide key information on technical aspects of crop production, marketing, prices, and input supplies. Access to such information is critical for the farm households to increase production and incomes by helping them to identify appropriate marketing strategies.

Table 5. 11: Membership in farmer organizations

Is this household a member of any farmer organization?	Freq.	Percent	Cum.
Yes	8	13.33	13.33
No	48	80.00	93.33
Missing/Not reported	4	6.67	100.00
Total	60	100	

## 5.5. Labour

The labour section of the survey was designed to collect data on farm own as well as hired labour for different months in the year. Besides, the households were asked if any members of their households were involved in the off-farm activities. Data on wages were also collected from those households that have reported to hire labour from the market. Labour data were segregated by gender to identify women involvement in on- and off-farm activities. Subsequently, averages for the number of labourers used in the farm and monthly wages, as well as average daily hours and average workdays per week were calculated (Table 5.12). Labour reported here include household members of the age of 15 or older. Members younger than 15 years of age were considered as child labour and is not included in the estimations.

On average, about 4 labours were reported to work on the farm activities. It appears that higher number of the household male members are involved in farming activities than female members, with male members working longer hours and days as compared the female members. Average wage is estimated to be 42 Gambian dalasi with slightly higher wages for male compared to the female members. It is worth noting that the wage data reported here is based on the household's assessment (i.e. a counterfactual wages, for instance the wage that would have been paid to the households if they were employed by other households to carry out farm work).

Table 5. 12: Household labour application on farm

Gender	Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	Avg no. of labors (month)	60	2.60	1.13	0.57	5.00
	Avg. days worked (days/week)	60	4.31	2.15	1.50	16.50
	Avg hours worked (hrs/day)	60	6.50	12.30	2.86	100.00
	Wage (LCU/day)	60	93.56	19.81	0.00	100.00
Female	Avg no. of labors (month)	58	1.46	1.19	0.00	5.00
	Avg. days worked (days/month)	58	2.49	1.73	0.00	7.00
	Avg hours worked (hrs/day)	58	3.21	2.03	0.00	6.00
	Wage (LCU/day)	58	61.28	39.49	0.00	100.00
Total: both male & female	Avg no. of labors (month)	60	3.97	1.49	1.00	9.00
	Avg. days worked (days/month)	60	1.98	1.39	0.50	7.00
	Avg hours worked (hours/day)	60	2.58	3.04	1.00	25.00
	Wage (LCU/day)	60	42.13	17.27	0.00	100.00

It appears that very few households in the sample (less than 10%) have hired labour from the market at some point throughout the year, 90 reportedly did not hired labor, whereas data on hired labour

for about 2% of the households in the sample were not reported. Data on the number of laborers hired from the market and wages were missing or not reported in the survey, therefore information on the number of hired labours and wages are not reported here.

**Table 1: Labor hired by the household for farm activities**

Does this household hire labor?	Freq.	Percent	Cum.
Yes	5	8.33	8.33
No	54	90.00	98.33
Missing/not reported	1	1.67	100.00
Total	60	100.00	

About 2/3 of the households indicated that any members of their households worked off-farm. Off-farm activities may include any non-farm activities undertaken by the household members including jobs in the service, manufacturing, and other industrial activities

**Table 5. 13: Household involvement in off-farm activities**

Does the household labor work off-farm?	Freq.	Percent	Cum.
Yes	41	68.33	68.33
No	18	30.00	98.33
Missing/not reported	1	1.67	100.00
Total	60	100.00	

## **5.6. Natural Disasters, Shocks, and Coping Strategies**

Data on shocks and coping strategies were also collected as part of the baseline survey. Common shocks faced by the farmers were listed in the survey questionnaire and farmers were asked to report their occurrence and impact based on a scale of 1-3 with 1= low, 2=medium, 3=high. The results show that drought, diseases and pests outbreak, sudden decline in farm gate prices, decline in the household income, and surge in the food prices are the most common shocks faced by the households throughout the last 12 months followed by flooding, deaths in the family, loss of assets, reduction in irrigation and drinking water, insecurity/violence, extreme weather, and earth shake. In general, shocks and natural disasters are quite common in the sampled regions and districts. Understanding the shocks and their potential impact is important for the project management in predicting risks as well as developing coping strategies to mitigate the adverse impacts associated with risks.

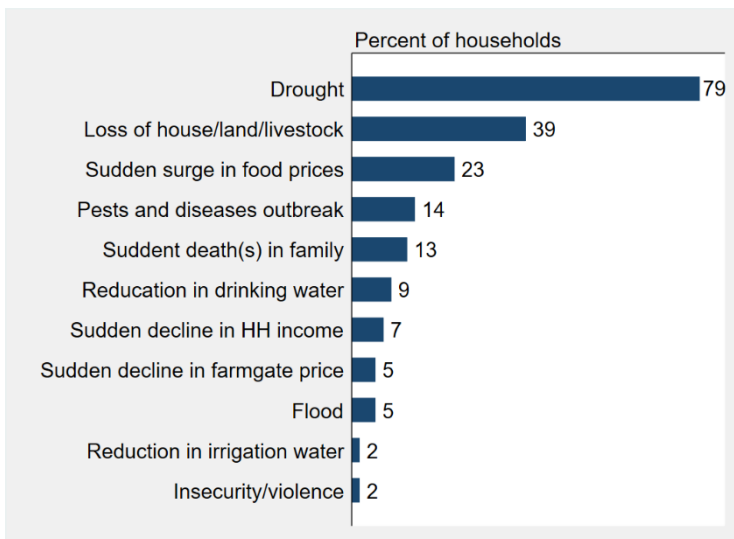


Figure 5. 13: Shocks faced by the households in the sample

We plotted the severity of the most common shocks faced by the households to visualize the potential implications of the reported shocks for agriculture and the overall welling of the households. Majority of the drought related shocks appear to have medium to high impact. Loss of assets (e.g. house, land, farm animal, etc) appears to have low to medium impact. Note that “zero” signifies either households that did not report a particular shock or households that actually reported a particular shock, but the impact was zero. Figure below illustrates the severity of the most common shocks. Understanding shocks are important for the project to ensure coping strategies are in place to mitigate the unprecedented impacts of potential risks and achieve the target impact.

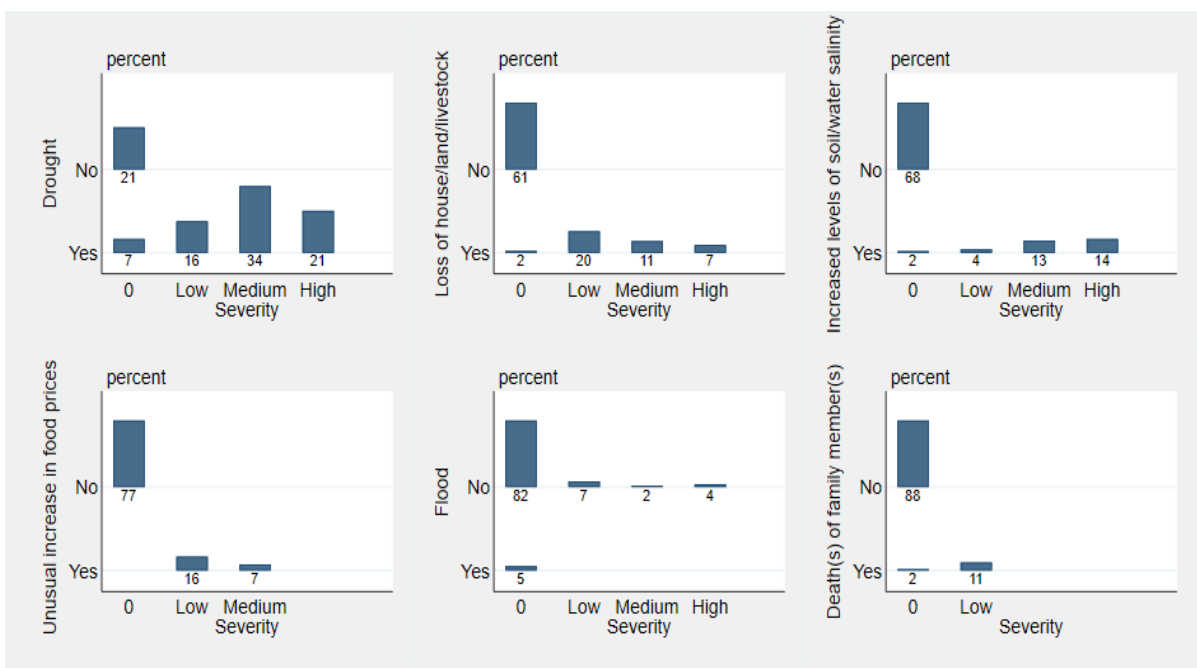


Figure 5. 14: Impact severity of the selected shocks

## 5.7. Salinity and Management Strategies

Salinity is one of the major aspects of the current project. Data on different aspects of salinization were collected including data on the extent of salinity, its impact in terms of area being affected and in terms of losses in yields/production, and potential intervention strategies that households devised to cope with the salinity problems. Information on the effectiveness of the intervention strategies (e.g. whether these interventions have worked to mitigate the potential impacts of salinity) were also collected. Nearly 97 percent of the households in the sample reported that salinity is a common problem in their village directly affecting agriculture production (e.g. yields).

Table 5. 14: The extent of salinity among the sample households

Is salinity a problem in your village/area?	Freq.	Percent	Average land affected by salinity
No	1	1.67	1.3
Yes	58	96.67	
Missing/not reported	1	1.67	
Total	60	100	

Households were asked about how they identify and recognize that their lands are affected by salt. All the respondents in the sample indicated that they see white crust as the most common symptom of salinity/salinization, whereas some households also indicated low infiltration of water in the soil, soil compactness, and appearance of a dark brown colour of soil as other signs of salinization.

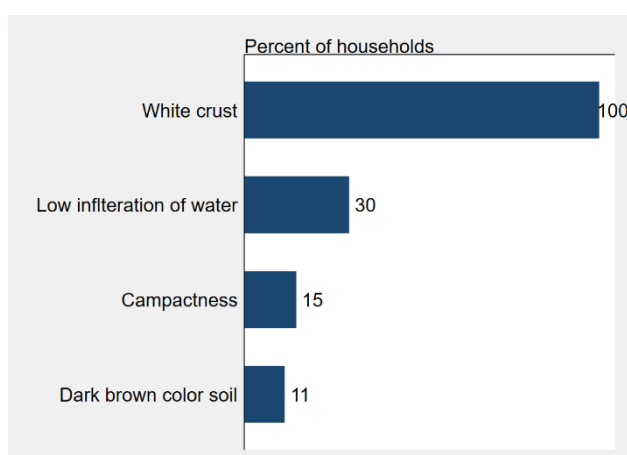


Figure 5. 15: Salinity identification- common signs of salinity

On average, 1.30 hectares of land was reported to be affected by salinity. This is nearly a third of the average land owned by the households (recall the average landholding size is 3.83 ha). However, the impact severity of salinity varies: 47% of the households reported that their land is severely affected with a high impact on production leading to the loss of 25-100% in yields, 43% of the households

indicated medium severity leading to a loss of 25-50% in yields, and the remaining 35% of the of the households indicated a low severity leading to the last of 25% of loss in the yields.

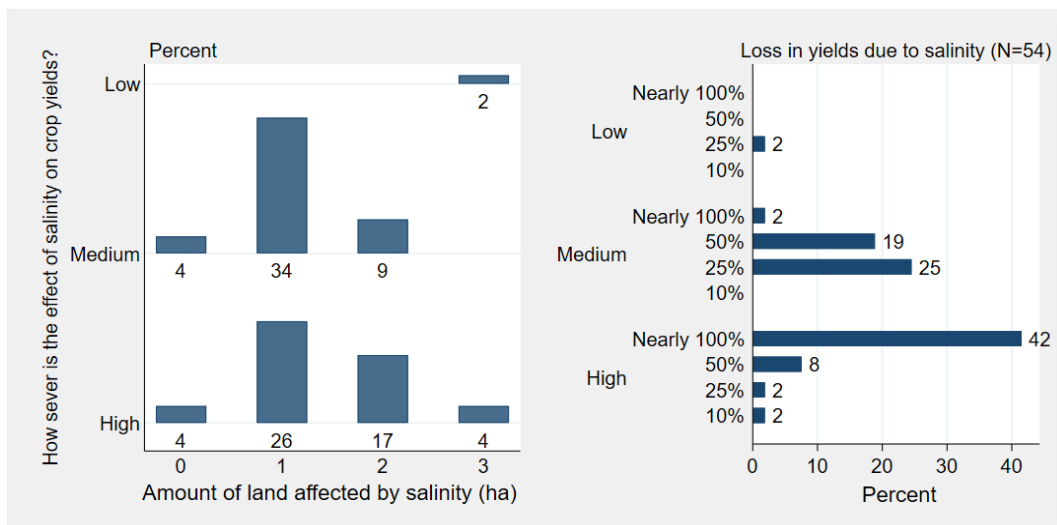


Figure 5. 16: Salt affected areas and impact severity

The data collected on the potential causes of salinity from the households in the sample show that majority (52%) of the respondents indicated “natural causes or parent material” as a main cause of salinity, 17% indicated climatic factors as the cause of salinity, about 10% of the respondents reported that high concentration of salts in the irrigation water drives salinization. Less than 10% of the households in the sample reported that salinity is the outcome of other factors including land levelling problems, lack of drainage systems, irrigation practices and methods.

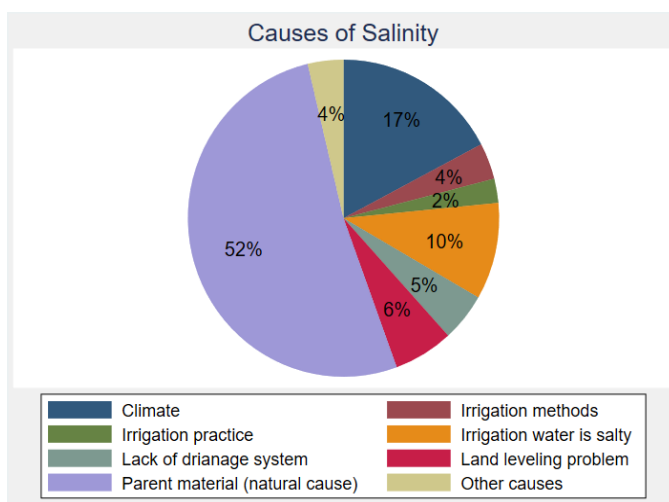


Figure 5. 17: Potential causes of salinization

Households in the sample executed several intervention strategies to manage salinity including deep ploughing, crop diversification, crop rotation, soil amendment, drainage. Soil amendment is by far the



most famous strategy followed by improved irrigation methods and drainage. When the respondents were asked to provide information on whether the intervention strategies they implemented have actually worked, nearly 20% of the households reported the interventions were effective increasing yield by 50-10%, whereas the majority (8) reported no improvements in yields.

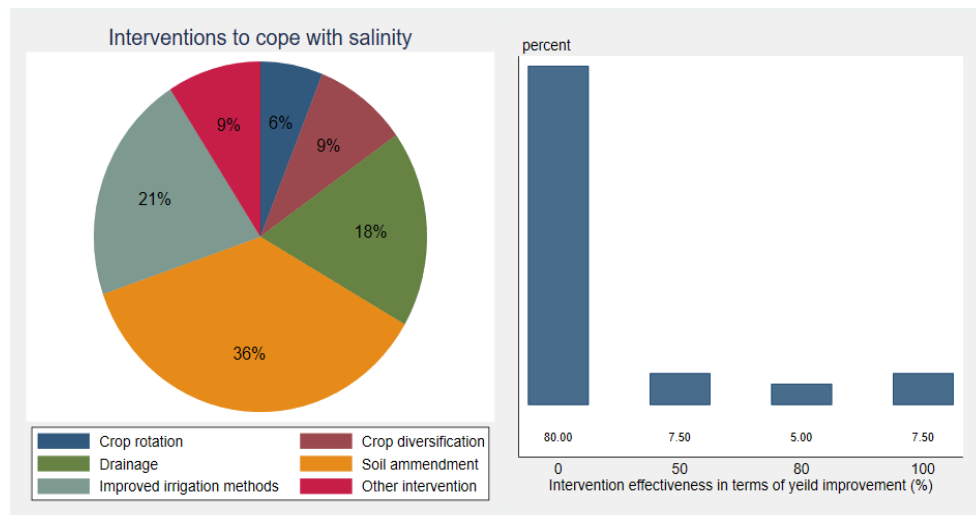


Figure 5. 18: Households Intervention strategies and their effectiveness

Training on salinity management is an important aspect of farming in the context of biosaline agriculture to improve the household’s capacity to be able to identify salinity and design appropriate and effective coping strategies. However, based on the descriptive statistics, more than two-thirds of the household reported that they had no opportunity to participate in trainings on salinity management, about 3% confirmed that they have received trainings, and data on trainings for about 25% of households in the sample were not reported in the survey (e.g. missing values).

Table 5. 15: Training on salinity management

Training provided by the research center	Freq.	Percent	Cum.
No	44	73.33	73.33
Yes	2	3.33	76.67
Missing/not reported	14	23.33	100.00
Total	60	100.00	

### 5.8. Gender and Women Involvement in Agriculture

The gender section of the survey was allocated to collecting information on the gender balance, particularly women involvement in agricultural activities and household decision making. Majority (about 80%) of the respondents reported that women are actively participating in farming activities. When respondents were asked to specify if women are involved in any decision-making related to the

household, about 93% of the respondents reported that women, in general, were actively participating in the household decisions.

Table 5. 16: Participation in the household and farm related decisions

Women involvement in decisions	Yes		No		total
	Freq.	Percent	Freq.	Percent	
Are women involved in any decisions related to the household?	56	93.33%	4	6.67%	60
Are women involved in any decisions related to farming	47	78.33%	3	5.00%	60

The specific decisions related to farming and women patriation in decisions are illustrated in the figure below. Based on the descriptive statistics, it seems that the majority of the decisions related to land (rental, or cultivation), crop choices, purchase of farm tools and inputs, hiring labour from the market, and selling agricultural products are made by men alone. These decisions appear to be comparatively less gender balanced and signify that women do not have stronger participation in decision farming making.

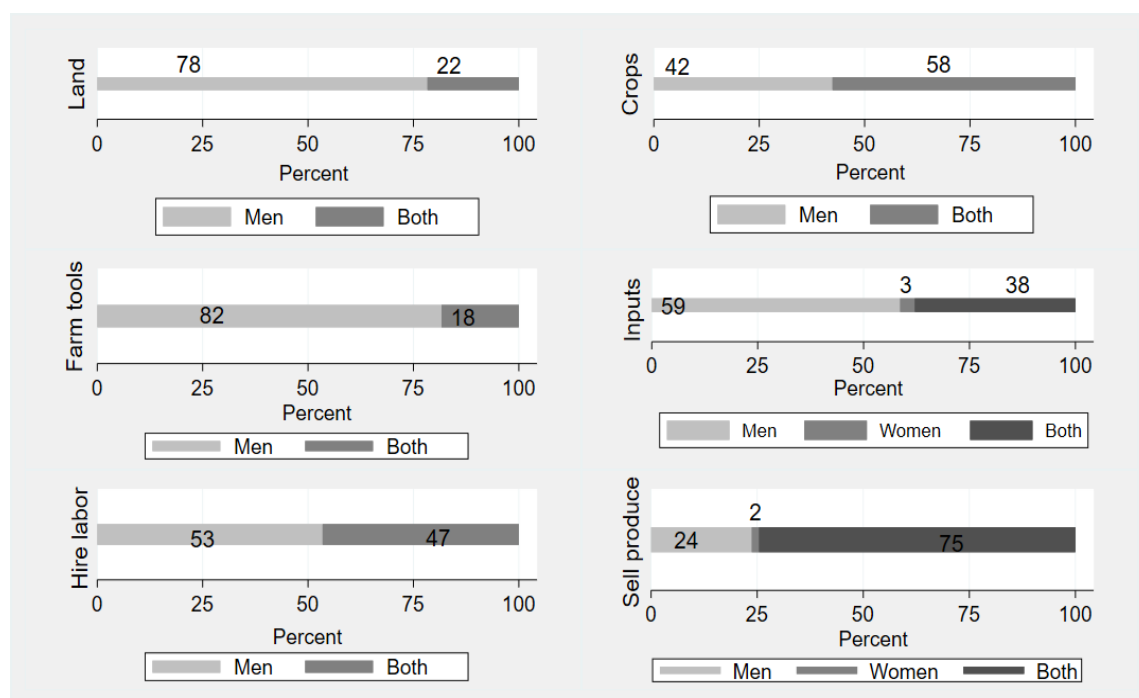


Figure 5. 19: Women participation in decision-making related to farming

Though majority of the decisions related to expenditures on food- and non-food items are jointly made by both men and women, about two thirds of the respondents specify men alone lead decisions on food expenditures. Similarly, about 20 of the households reported that decisions related to non-food expenditures are made by mean alone.

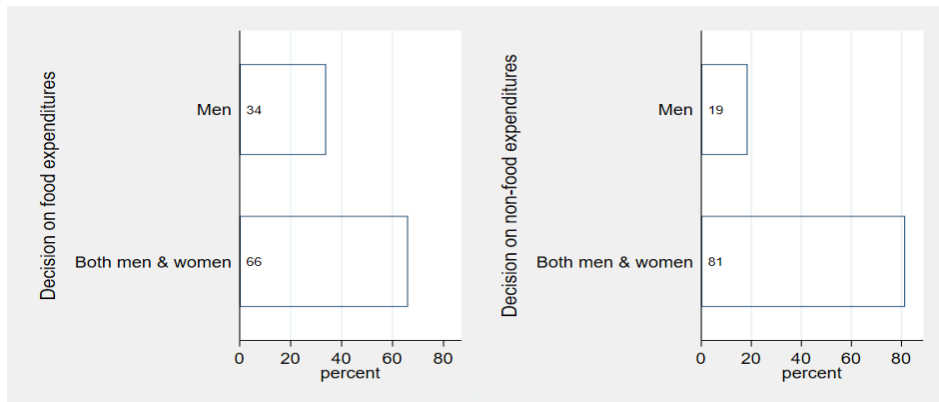


Figure 5. 20: Decisions on food- and non-food items

### 5.9. Food Security and Nutrition

Food security of the target rural households is the ultimate objective of the current project. Considering this overarching goal, data on household food consumption and type of food that they consume were collected. The objective of this exercise is to identify key staple food crops, whether household have enough to consume throughout the year, and whether the household rely on market or their own production for consumption.

The households in the sample relied heavily on rice, vegetables, nuts, and dairy products that appear to be consumed more compared to other food items. This implies, that these three products are in the core of households' diets and are therefore staple products and household's food security crucially depend on them. In terms of access, nearly 97% of the households responded that they had access to rice during the last 7 days, whereas 88% of the households reported access to vegetables, 88 % of the household had access to nuts, and 85% percent of the households had access to butter/dairy productions.

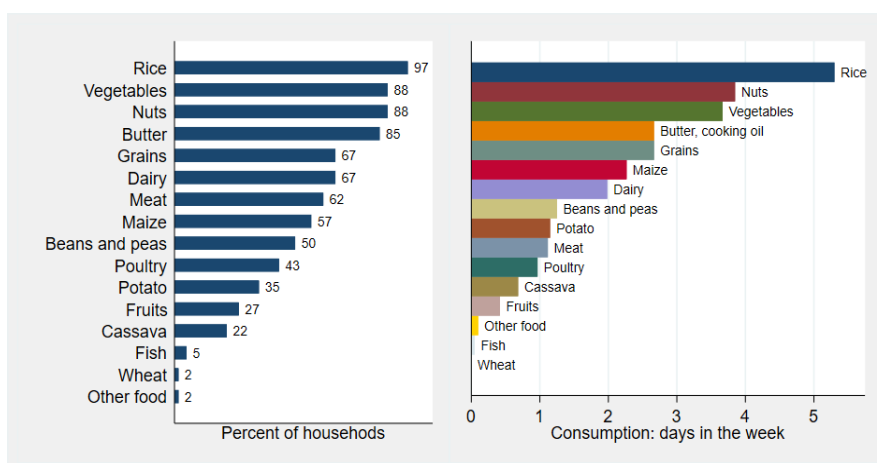


Figure 5. 21: Common food items consumed by the households

The household demand for food consumption is met through own production and local markets, especially for rice and vegetables. Nearly 88 % of the households relied on markets, whereas about 62% of the respondents in the sample relied on the market for vegetables. Own production comprises a small proportion of the household’s demand for rice and vegetables. Households who reported consumption of nuts indicated own production as the primary source, whereas a small fraction (28%) of the households reported that their demand for nuts is met through markets. grains, on the contrary, appears to be mainly sourced from household’s own production.

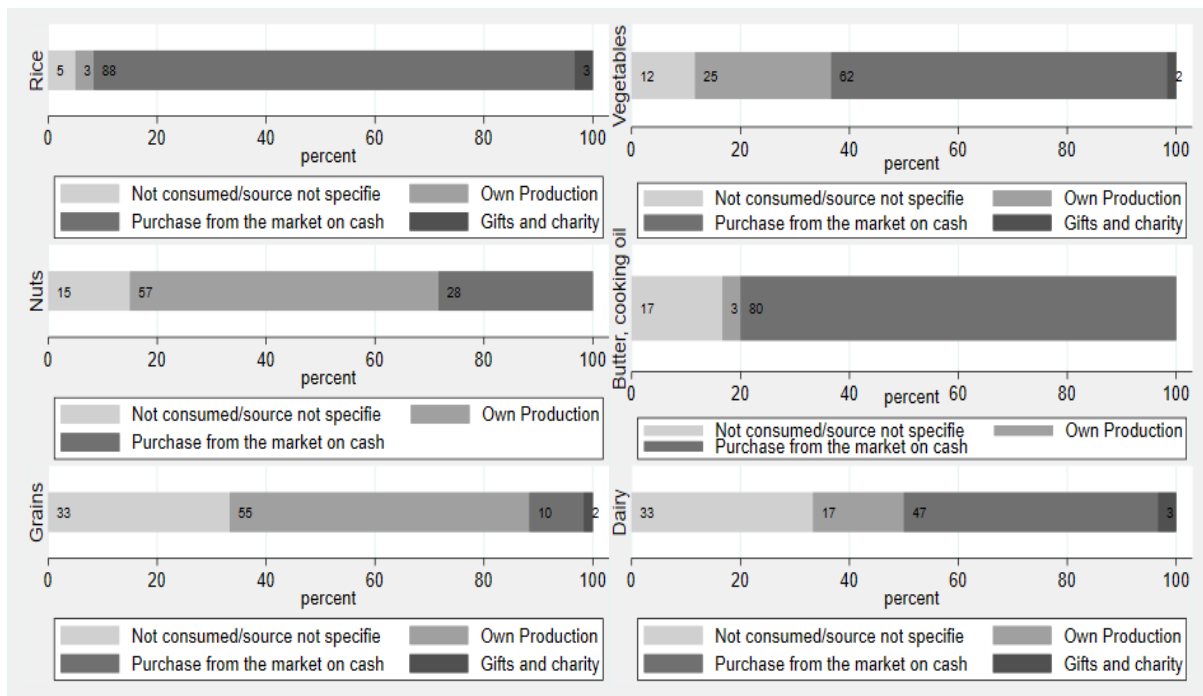


Figure 5. 22: Sources of selected food items

### 5.10. Access to Infrasructure and Services

This section of the survey form collects information on the household’s access to infrastructure and c services including roads, local and regional markets, as well as basic services such as agricultural credit, health and education facilities, and water. The objective of this section is to provide an overall picture of the households’ profile in terms of access to services and overall wellbeing.

Majority of the households (more than 85% of the sample) have reported having access to local markets for agricultural productions. Nearly 55% of the respondents in the sample confirmed having access to all-season drivable roads, however data on access to roads for about 43% of the sample were missing. Access to roads and market infrastructure is an important aspect of farming and improvement of agribusiness services in the local communities. Better access to markets and roads implies improved market participation for outputs and inputs.

Table 5. 17: Household’s access to roads and markets

Access	Yes		No		Missing/ not reported		Total
	Freq.	Percent	Freq.	Percent	Freq.	Percent	
Access to local markets	51	85.0%	1	1.67%	8	13%	60
Access to roads	33	55.0%	1	1.67%	26	43%	60

Majority of the households reported that markets are located within a radius of less than 60 minutes of their community, whereas only 1.56 percent of the households responded that market is not reachable with any means of transportation. 15.6 percent of the households reported markets are within their community. Majority of the households (nearly 85%) of the households are reportedly able to reach nearest markets by bike or by walking.

Table 5. 18: Time taken to reach local markets

Market reached by: walking, car, bike, animal, or public transport	Time required to reach the nearest market			
	Less than 60 minutes	Between 1-2 hours	Missing/ not reported	Total
by walking	1	0	0	1
	2.00	0.00	0.00	1.67
by car	18	0	0	18
	36.00	0.00	0.00	30.00
by public transport	31	9	0	40
	62.00	100.00	0.00	66.67
Missing/not reported	0	0	1	1
	0.00	0.00	100.00	1.67
Total	50	9	1	60
	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

Nearly 80 of the households in the sample have indicated that having access to market information, whereas data on access for about 20% of the were missing or not reported in the survey. Only a small fraction (less than 2% of the respondents in the sample) confirmed having no access to market information. Access to information on prices and other information related to market supply and demand is useful in terms of marketing their production and sourcing agricultural inputs.

Table 5. 19: Access to market information

Do you have access to market information?	Were the information obtained useful?		
	Yes	Missing/not reported	Total
No	1 1.82	0 0.00	1 1.67
Yes	43 78.18	4 80.00	47 78.33
Missing/not reported	11 20.00	1 20.00	12 20.00
Total	55 100.00	5 100.00	60 100.00

First row has *frequencies* and second row has *column percentages*

Households were also asked to provide information on access to general services including access to credit, health and educational facilities, electricity, and drinking water. Nearly all the households in the sample have indicated having access to clean drinking water, whereas about two-thirds of the household have confirmed having access to educational facilities. Less than half of the households have had access to health facility, electricity, and transportation services. Less than 10% of the households out of the total households in the sample indicated having access microfinance and credit services indicating that credit can be a binding constraint for agriculture production.

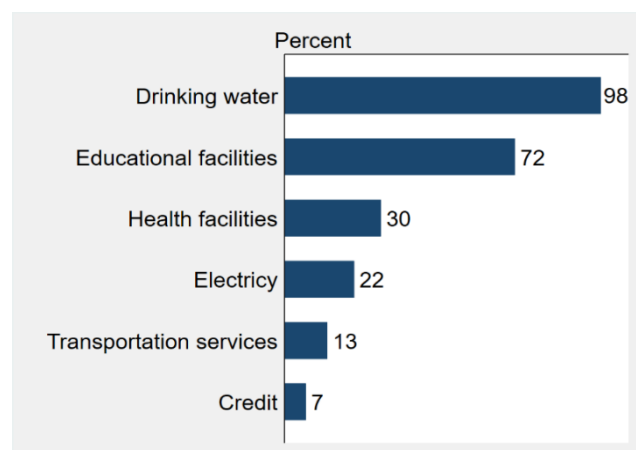


Figure 5. 23: Access to services

## Country: Togo

Togo is a West African country with a surface area of 57,000 square km and a population of 8 million inhabitants. The national poverty rate declined by just over 6 percentage points from 61.7% to 55.1% between 2006 and 2015. Despite this progress, poverty remains widespread, especially in rural areas where 69% of households were living below the poverty line in 2015.

Table 6. 1: Country profile - Togo

Indicator	Unit	Estimation
Population (2019 est.)	Millions	8.08
Agricultural Land (2016 est.)	Sq.km	38,200
Agricultural Land (2016 est.)	% of land area	70.23
GDP (in billions) (2019 est.)	Current US\$	5.46
GDP Per capita (2029 est.)	Current US\$	674.54
GDP Growth (2019 est.)	Annual %	5.31
Poverty headcount ratio (2015 est.)	% of population	55.1

*Source: World Bank Microdata-World Development Indicators*

Despite the flat productivity trends since 1990, agriculture accounts for approximately 41 percent of Togo's GDP and employs most of the rural population (World Bank, 2016; African Development Bank, 2020). Given that over half of the population lives below the poverty line, growth in the agriculture sector will play a key role in achieving poverty and hunger goals.

### 6.1. General Information and Household Demography

A total of 64 surveys were conducted from households in 5 villages in the Asahoun and the Atti Apedokoe districts. Except for the Asahoun village, the remaining surveys were fairly equally distributed among the villages covered by the survey team.

Table 6. 2: Geographical coverage and distributing of the respondents

Village	Freq.	Percent	Cum.
Ando Keke Kope	10	15.63	15.63
Asahoun	1	1.56	17.19
Atite Kope	10	15.63	32.81
Atti Betekpo	10	15.63	48.44
Atti Apedokoe	33	51.56	100.00
Total	64	100	

Data on the respondents' information show that half of the respondents of the survey were male with an average age of 44 years and nearly half of respondents were females with an average age of about 44 years. The average age of the respondent was estimated to be about 45 years.

Table 6. 3: Respondent information

Respondent Gender	Respondent age (years)		
	Mean	freq.	Percent
Male	44.08	34	53
Female	46.86	30	47
Total	45.39	64	

The average size of the household is estimated to be about 6.8 persons with a standard deviation of 3.04. The household size ranges from a minimum of 1 person per household to a maximum of 14 persons per household. The prime age-sex demographic group (e.g. members of age of 15-64) dominates the composition of the households, whereas the elderly age-sex group (e.g. household members with age of 65 and above) accounts for the lowest fraction in the household composition. Children and minors (e.g. members of household aged 14 or less).

Table 6. 4: Household size and age-sex demographic groups

Household size, age, and sex groups	Mean	Min	Max	Median	Std. Dev.
Household Size (persons)	6.80	1.00	14.00	7.00	3.04
No. of male (14 years & less)	1.41	0.00	5.00	1.00	1.19
No. of female (14 years & less)	1.25	0.00	5.00	1.00	1.28
No of male (15 – 65 years)	1.83	0.00	5.00	2.00	1.2
No. female (15 – 65 years)	2.22	0.00	8.00	2.00	1.65
No. of males (65 years & above)	0.02	0.00	1.00	0.00	0.13
No. of females (64 years & above)	0.08	0.00	3.00	0.00	0.41

Nearly 70% of the households are headed by the males, whereas only about a quarter of the household heads were reportedly female. The average age of the households' head is estimated to be about 47 years, but varies by gender as the average age of the female household heads is about 50 years, whereas the average age of the male household heads is estimated to be 45 years.

Table 6. 5: Gender and age of the household head

Household head	Freq.	Percentage	Mean age (years)
Male	46	72%	45.50
Female	18	28%	50.64
Total sample	64	100%	46.88



On average, 83% percent of the household heads are reportedly married, 31% engaged, and 5% of the household heads are single. The marital status of the households slightly varies from men to women, as majority of the male heads are married, whereas majority of the female heads are engaged and/or married.

Table 6. 6: Household head marital status

Household head marital status	Gender of the household head					
	Male		Female		Total	
	Count	percent	Count	Percent	Count	Percent
Married	45	98%	8	44%	53	83%
Single	1	2%	2	11%	3	5%
Engaged	0	0%	8	44%	8	13%
Total	46		18		64	

Data on the household educational profile show that only about 72% of the household heads in the sample are able to read and write, while about a quarter household heads are reportedly illiterate (e.g. cannot read and write). The literacy data for about 2% of the household are missing or not reported. For the household who reported enrolment in the formal education, nearly 60% of the them completed primary and/or secondary school, whereas a small fraction of the heads reported completing high school or college.

Table 6. 7: Household head literacy and formal schooling

<b>Literacy rate</b>		
Literacy	Freq.	Percent
Literate (can read & write)	46	71.88
Illiterate (cannot read & write)	17	26.56
Missing/not responded	1	1.56
Total	64	100
<b>Formal Education</b>		
Highest degree obtained	Freq.	Percent
Primary School	24	37.5
Secondary School	20	31.25
High School	1	1.56
Bachelors	1	1.56
Masters	0	0
Other	0	0
Illiterate ( <i>did not go to school</i> )	18	28.13
Total	64	100.00
Average schooling years	8.04	

## 6.2. Socioeconomic Profile

The purpose of this section of the baseline survey is to present information on the socioeconomic profile that covers information on household income and sources and households' asset ownership. As for the household income, the average income per household is estimated at about 410,000 Togolese Franc (West African CFA) with significantly higher contribution by both men. Converting the Togolese Franc to the USD dollar at the exchange rate of (1 USD=0.00182 Togolese Franc), the average household income is about 735 \$ US.

Table 6. 8: Household income segregated by gender

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total income	64	409,490	593,007	2	3,800,000
Amount earned men	64	149,312	357,434	0	2,200,000
Amount earned women	64	64,050	112,987	0	660,000
Amount earned both	64	194,581	422,173	0	3,000,000

With a contribution of about 36% to the total household income, farming is the major source of the household income, followed by livestock (24%), trade (15%), and temporary and permanent employment (20%). A relatively minor fraction of the household income come from other sources including other sources. The contribution of aid by the government and other projects is was reported to be zero.

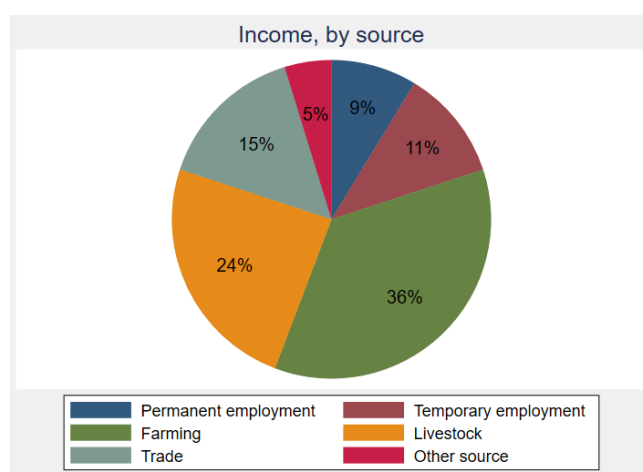


Figure 6. 1: Household Income by source

The data on household expenditures show that nearly half (about 49.21%) of the household expenditures are related to food expenses, whereas slightly over half of the spendings are related to non-food items.

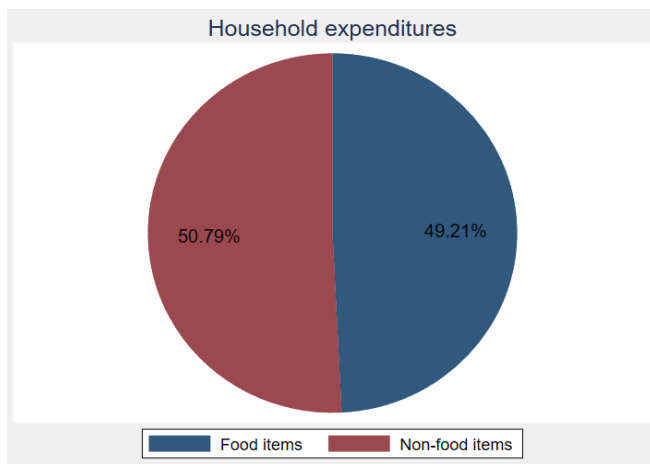


Figure 6. 2: Household expenditures

Data on the household’s asset ownership show that the most common assets owned by the households are kitchen utensils, house, mobile phones, farm tools, TV and radio, and bikes/motorbikes. Asset ownership of the households as an indicator of household wealth is one of the project indicators to be measured at the baseline stage.

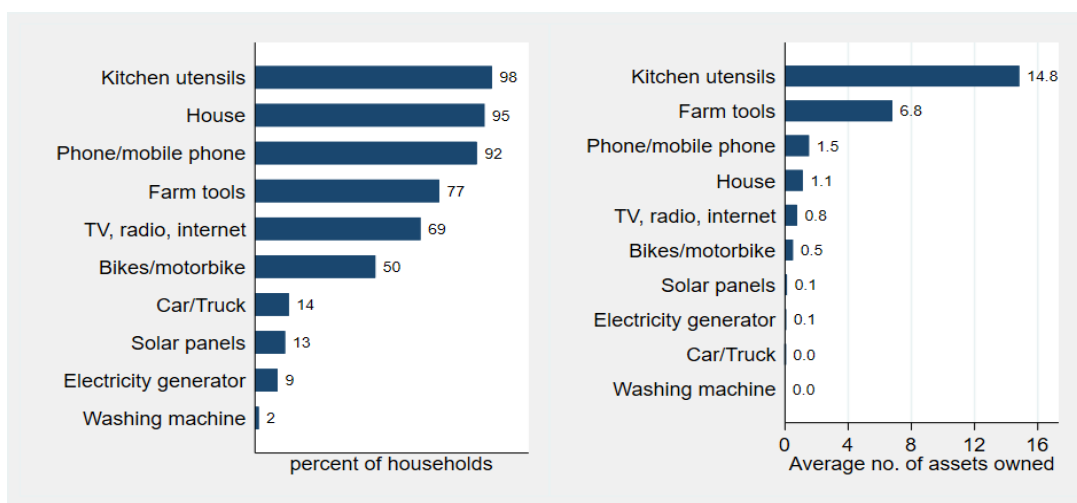


Figure 6. 3: Household’s asset ownership

The ownership of assets by women and men depend on the type of the asset. Although majority of the assets are owned jointly by both genders, women have reported higher ownership of the household items such as kitchenware, whereas men reportedly have higher ownership of the house, mobile phones, telecommunication equipment (radio and TV).

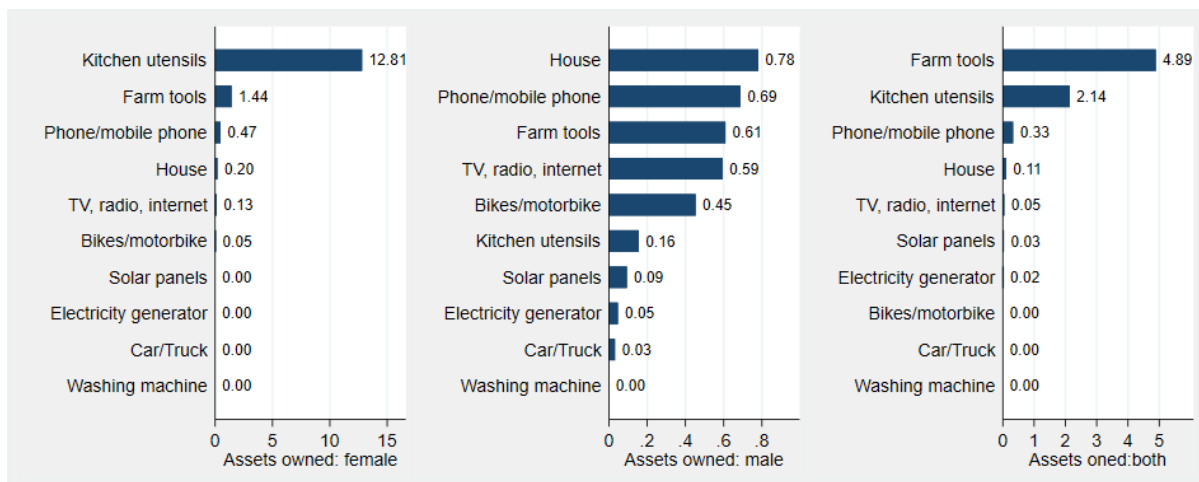


Figure 6. 4: Asset ownership segregated by gender

### 6.3. Landholding and Agriculture Production

This section of the household survey asks whether households have access to own, leased or share-crop farmland. In addition, data on agriculture production, most common crops grown by the households, yields, and area allocated to individual crops are collected and analysed in this section. Data on the access show that nearly 57% of the land operated by the household is owned by the households, 30% leased in, and about 14% of the total land is sharecropped.

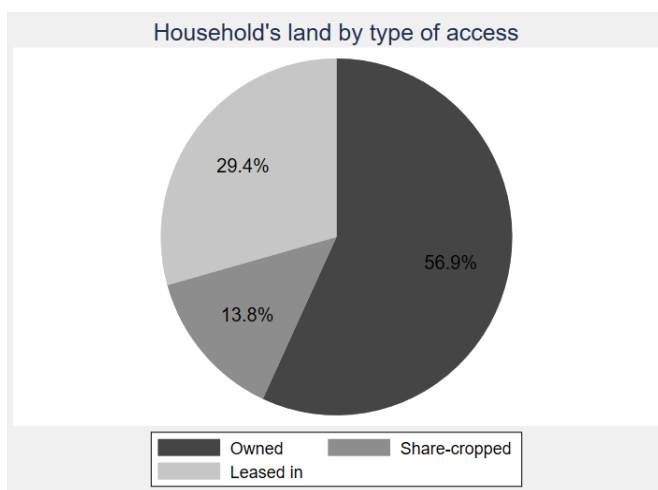


Figure 6. 5: Agricultural holding by type of access

The average size of the total land holding (including own, leased in and/or sharecropped) is about 32.66 hectares, out of which 28.40 ha is cultivated and 4.25 hectares is left fallow (Figure 6.6). majority (92%) of the land operated by the household was reported to be rainfed, whereas irrigate land comprise a small fraction of the total. The land rental rate was reported to be about 27,00 in local currency.

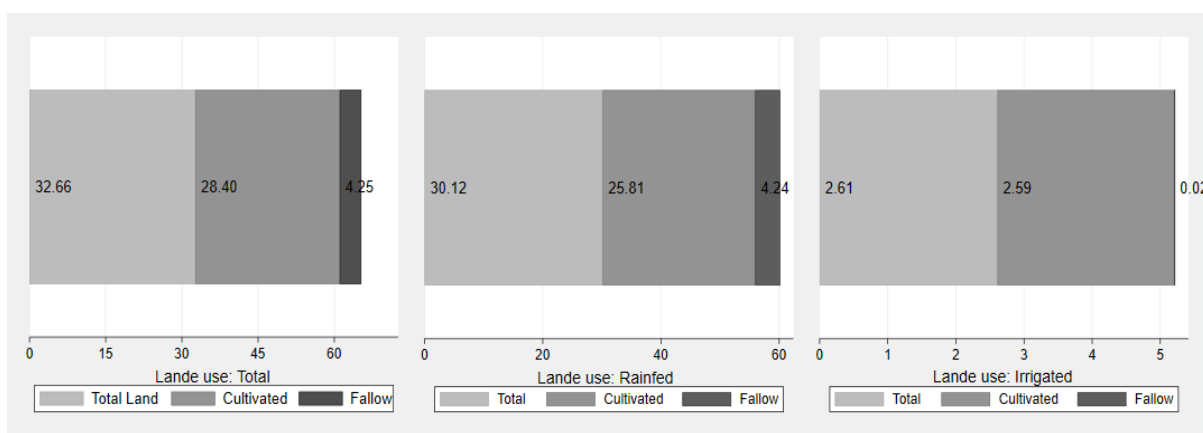


Figure 6. 6: Agricultural holding by type and use

Households were asked to specify the soil type and rate soil fertility. On a scale of 1-5 with (1=very poor, 2=poor, 3=average, 4=good, and 5=very good), the households were asked to rate the productivity of the cultivated land in terms of yield or production potential for the most common crops that the households grow. Nearly 60% of the soils were reported to be clay, and the majority (about 80%) of the households rated the fertility level to be in the range of average to good in terms of yields or production. Note that average is below “good” in the scale that is specified in the survey. The remaining 20 percent of the household rated the fertility to be very poor.

Table 6. 9: Soil type and productivity potential

<b>Type of soil</b>			
Type	Freq.	Percent	Cum.
sandy	21	32.81	32.81
clay	38	59.38	92.19
loam	5	7.81	100
Total	64	100	
<b>Fertility rate</b>			
Fertility rating	Freq.	Percent	Cum.
very poor	12	18.75	18.75
average	46	71.88	90.63
good	6	9.39	100
Total	51	100	

The survey questionnaire provided the respondents with a list of the most common crops (about 30 crops) to choose the crops that the household usually produces on the farm. We find that maize, cassava, and groundnut are the most important crops, among others. Maize dominates the production portfolio as all the households in the sample reported growing maize. Average production value for maize is estimated to be 600 kg per household. Following maize, 88 of the respondents reported

growing groundnut, 67% mung bean, and 50% indicated producing cassava with average production of 415 kg, 167 kg, and 455 kg, respectively. Households are specializing to produce the staple food crops as majority are relying on the production of one of the two dominant crops (e.g. maize and/or groundnut).

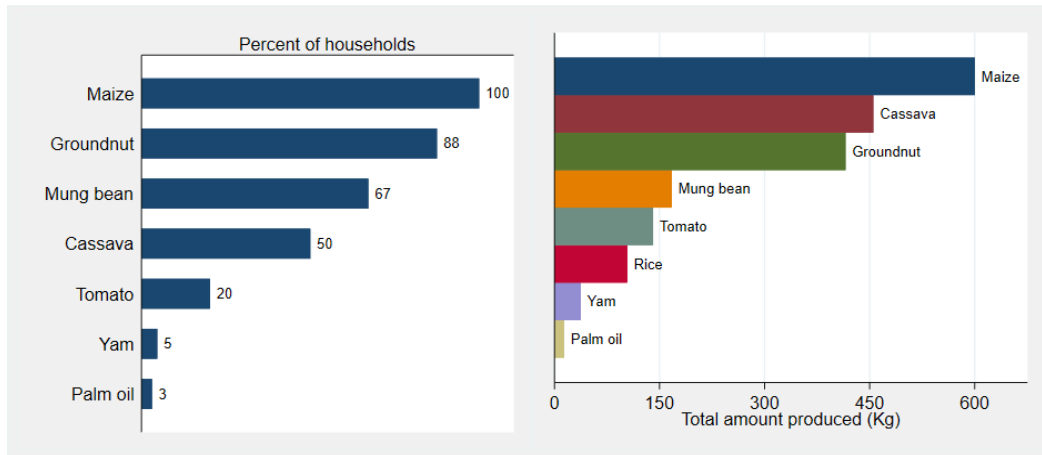


Figure 6. 7: Common crops grown by the households in the sample

About 36 % of the land is allocated to maize production, nearly 13 % of the land is allocated groundnut, and 10% of the total land is allocated to cassava. While majority of the land is allocated to these three crops, the yield data show higher per unit production for tomato and rice. This may imply that there exists production inefficiency among the sample households due to the misallocation of farmland resources (e.g. majority of the land is allocated to low yielding crops such as maize).

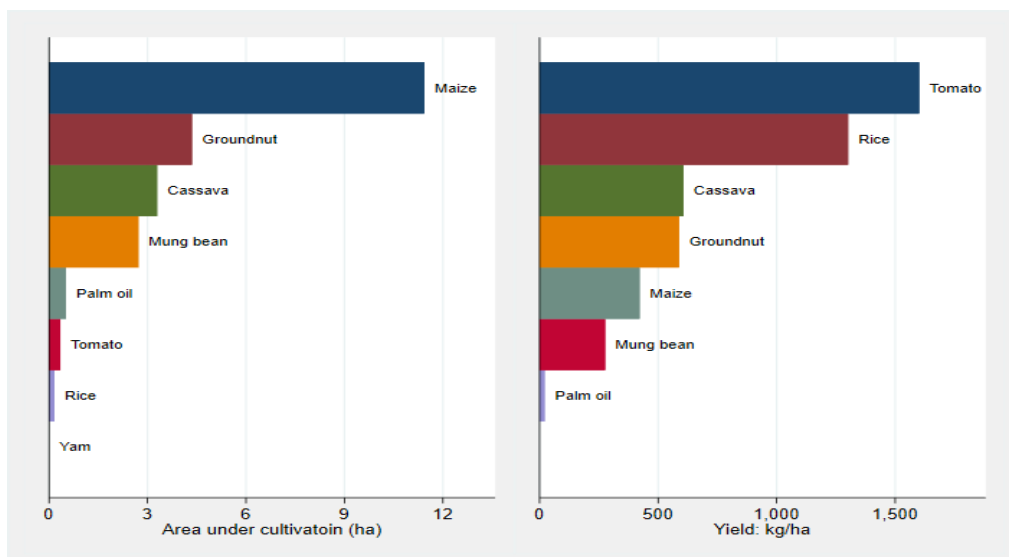


Figure 6. 8: Area allocated to individual crops and yields

Nearly three quarters of the maize produced at the farm are consumed by the households throughout the year. Cassava is the second most important crop in terms of consumption as about 37% of the total cassava produced is consumed by the households. The data confirm post-harvest losses in maize, ground, and cassava. On average, about 5% of the maize produced at the farm is reportedly lost in the post-harvest stages.

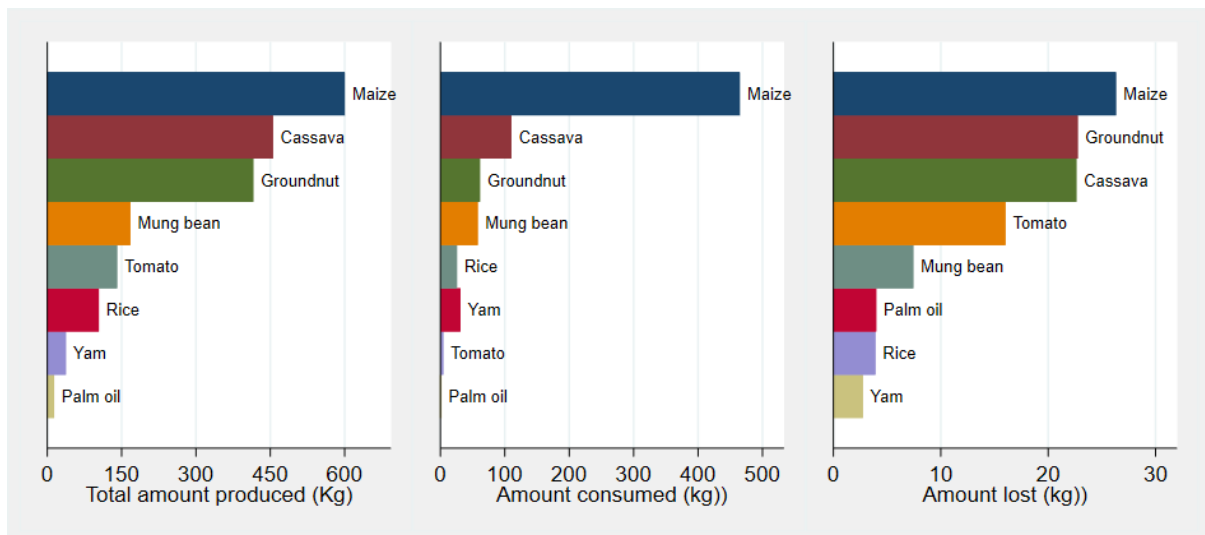


Figure 6. 9: Amounts produced, consumed, and lost

Groundnut appears to be a market or cash crop with the highest share in crop revenues followed by other crops including moonbeans, cassava, and tomato. It should be noted that data on sales were collected instead of quantities sold to the market. Price data were collected in the local currency. Groundnut and mung beans are the most expensive crops, with the average prices of 348 and 275 Togolese Franc, respectively.

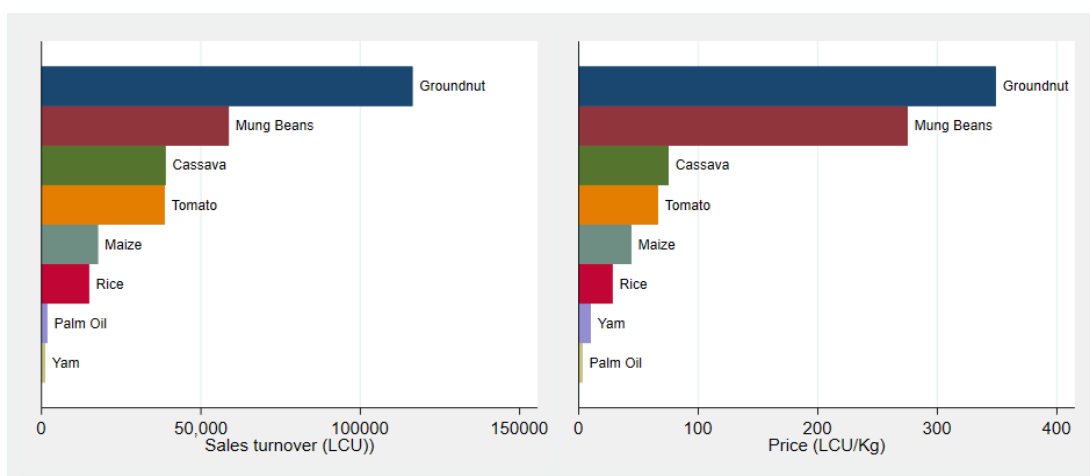


Figure 6. 10: Sales turnovers and prices by crop

Since the data for crop production, price, and cost of production were collected for each crop separately, revenues as well as costs by crops were then aggregated to calculate total income from crop farming at the household level. The cost section of the survey provide data on inputs used at the farm including seed, land preparation, weeding, irrigation application, chemical and fertilizer use, compost/biochar, harvesting, threshing, winnowing drying and bagging, cash payments for storage, transportation, broker, fuel, machinery repairs direct taxes, and other miscellaneous costs. Data on fixed costs were also collected including one-off costs for purchasing machinery, land rental or lease, buildings and other farm structures, storage facility such as building or storage bins, and other costs.

The average estimated variable cost is about 152,000 Togolese Franc per farm, whereas the average fixed cost is about 5,000 Togolese France. Total production cost (i.e. the sum of the two costs) is estimated to be about 157,000 Togolese Francs. Average aggregated revenue is estimated at 446,000, which leads of about 294,000 Togolese Francs of net profit from crop production.

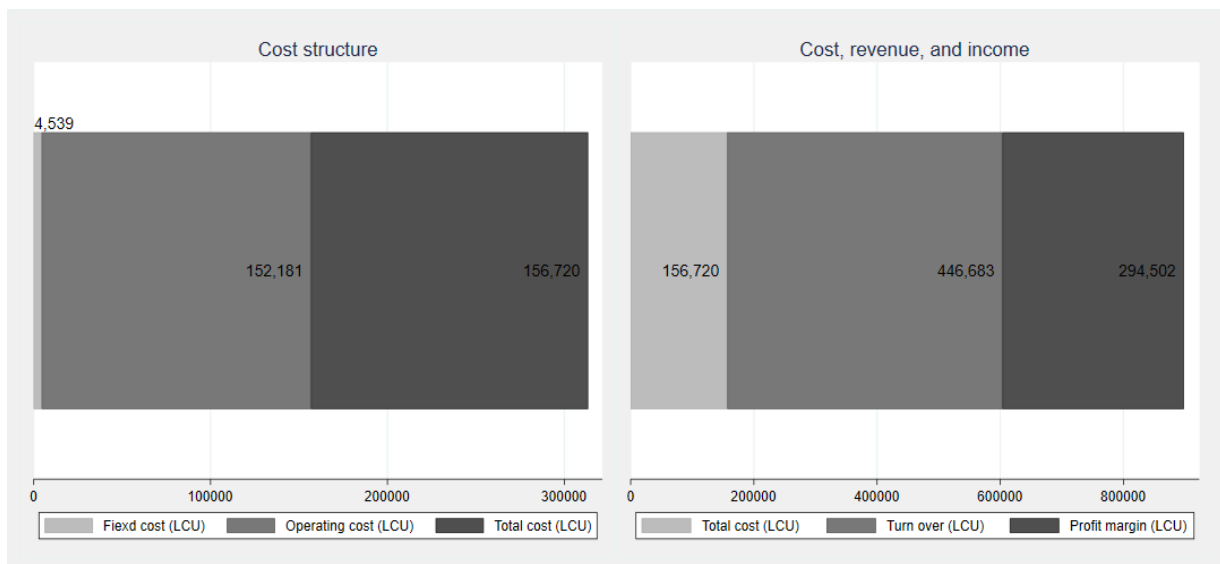


Figure 6. 11: Costs, revenues, and crop income

The next section of the baseline survey was designed to collect information on the household's livestock ownership. A list of animals was provided in the survey form for the households in the sample to choose which and how many animals they own. The data show that majority of the households (85%) own poultry, whereas roughly 60% of the household reported to own goats, 19% reported that they own sheep. Less than 10% of the households indicated that they own other animals including oxen, cows, calves, camels, and heifer. On average, the households reported that they own about 11 chickens and about 3 goats.



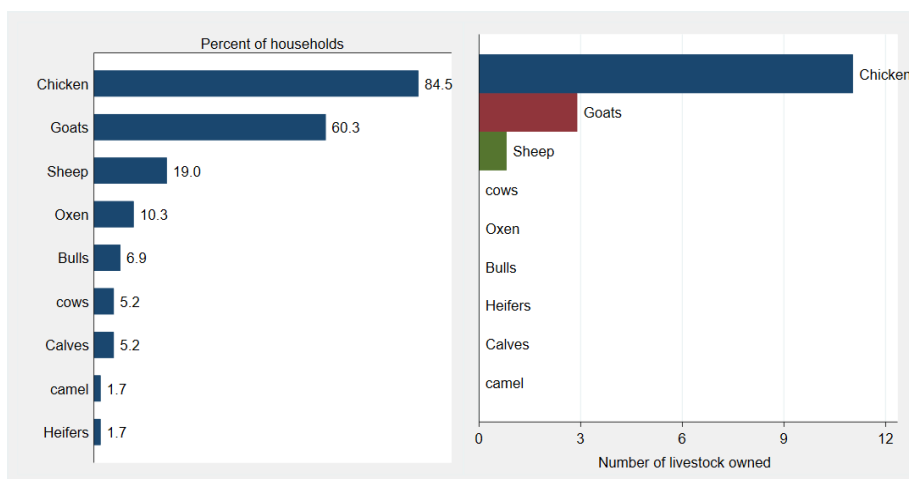


Figure 6. 12: Livestock owned by the households

#### 6.4. Farmer Organizations and Extension Services

In this section, data are gathered on whether farm households have memberships in the farmers organization (e.g. grower/producer organizations, cooperatives, trader organizations, supplier organizations, etc.) and to determine whether they have access to the extension services provided by the government or development projects. Table 6.10 summarizes households' access to extension services and the number of visits by the extension agents. Nearly 35% of the households in the sample have reported no access to extension services, and about 65% confirmed that they have access to extension services. Households in the sample were asked to specify the number of visits the extension agents paid to their farms based on a scale of 0-3 with 0= never, 1=rarely (once in three months), 2=sometimes (once or twice in a month), and 3= at least once in a week. For those households that reported to have access to extension services, nearly 50 % specified "rarely" and 15% chose "sometimes".

Table 6. 10 Access to extension services

Access to extension service?	Number of extension visits				Total
	Never	Rarely (once in a month)	Sometimes (once/twice in a month)	Missing/ not reported	
Yes	0	32	10	0	42
	0.00	100.00	100.00	0.00	65.63
No	12	0	0	10	22
	100.00	0.00	0.00	100.00	34.38
Total	12	32	10	10	64
	100.00	100.00	100.00	100.00	100.00

First row has *frequencies* and second row has *column percentages*

About 90% of the household's indicated no access or no memberships in the farmers organizations and 13% indicated that they are members of different farmer organizations. Farmers organizations usually provide key information on technical aspects of crop production, marketing, prices, and input supplies. Access to such information is critical for the farm households to increase production and incomes by helping them to identify appropriate marketing strategies.

**Table 6. 11: Households' membership in farmers organizations**

Is this household a member of any farmer organization?	Freq.	Percent	Cum.
Yes	6	9.38	9.38
No	58	90.63	100.00
Total	64	100.00	

### 6.5. Labour

Labour data on the household own as well as hired labour were collected from the sampled households to assess the amount of labor used in farming. In addition, data on whether the household's labor work off-farm were also collected. On average, nearly three labors worked on the farm with an average of about 15 days per month and about 6 hours per day. Notices that unlike the previous datasets for other countries, data on number of days were collected on monthly bases in the case of Togo. Though the labor application seems to be gender balanced in general, these estimates slightly vary by gender, as women tend to work longer hours and days than men. The overall average wage was estimated to be a little over 1,500 Togolese Francs with significantly higher average for the male laborers compared to the female laborers.

**Table 6. 12: Household labor application to farm activities**

Gender	Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	Avg no. of labors (month)	64	1.22	0.98	0.00	5.00
	Avg. days worked (days/month)	64	16.34	7.76	0.00	26.08
	Avg hours worked (hrs/day)	64	6.31	2.88	0.00	9.00
	Wage (LCU/day)	64	2,077	1,589	0.00	10,000
Female	Avg no. of labors (month)	64	1.44	1.23	0.00	7.00
	Avg. days worked (days/month)	64	18.32	4.68	0.00	25.50
	Avg hours worked (hrs/day)	64	6.44	1.61	0.00	8.00
	Wage (LCU/day)	64	2,125	2,137	0.00	14,000
Total: both male & female	Avg no. of labors (month)	64	2.659	1.763	0.667	10.00
	Avg. days worked (days/month)	64	15.884	6.275	0.75	25.333

Avg hours worked (hrs/day)	64	5.783	2.093	1.143	8.5
Wage (LCU/day)	64	1608.41	506.882	291.67	3000

The data on hired labor reveal that about 90% of the households in the sample hire labour from the market at some point throughout the year to carry out farm work. The average number of labourers shows that every month about 6.6 labours are hired from the market working for about 3 days in a week, on average. Average wage is estimated at 412 Togolese Francs, significantly higher than the estimated wages for the household labour, paraps majority of the hired labours are skilled workers who were hired by the households for skilled farm work.

Table 6. 13: Labor hired by the households for farm activities

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total hired labor (month)	64	6.484	7.242	0	50
Hired labor days (month)	64	2.658	4.263	0	17.5
Hired labor hours (hrs/day)	64	7.953	1.608	0	9
hired labor wage (LUC/day)	64	412.337	471.578	0	3166.667

Nearly a third of the households indicated that members of their households conducted off-farm work. Off-farm activities may include any non-farm activities undertaken by the household members including jobs in the service, manufacturing, and other industrial activities.

Table 6. 14: Household involvement in the off-farm activities

Does the household labor work off-farm?	Freq.	Percent	Cum.
Yes	22	34.38	34.38
No	39	60.94	95.31
Missing/not reported	3	4.69	100.00
Total	64	100.00	

## 6.6. Natural Disasters, Shocks, and Management Strategies

In this section data on shocks and coping strategies were collected as part of the baseline survey. Common shocks faced by the farmers were listed in the survey questionnaire and farmers were asked to report their occurrence and impact based on a scale of 1-3 with 1= low, 2=medium, 3=high. The results show that drought, disease and pest outbreak, decline in farm gate prices, decline in the household income, and surge in the food prices are the most common shocks faced by the households throughout the last 12 months followed by flooding, deaths in the family, loss of assets, reduction in irrigation and drinking water, insecurity/violence, extreme weather, and earth shake. In general, shocks and natural disasters are quite common in the sampled regions and districts.

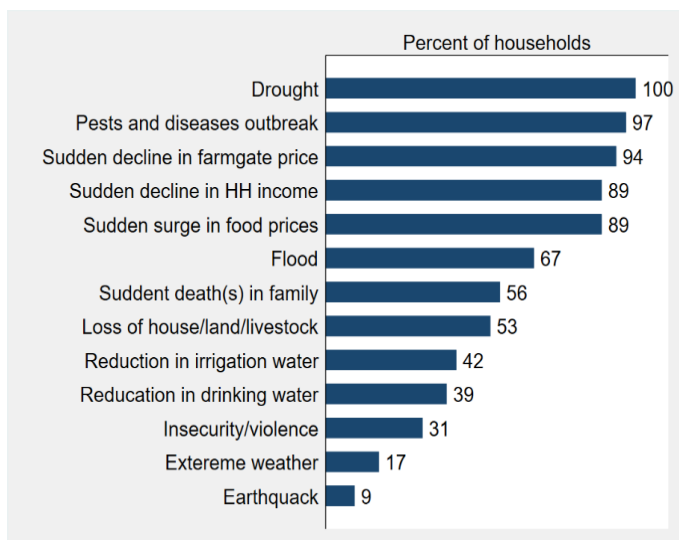


Figure 6. 13: Common shocks faced by the households

The impact severity of the most common shocks faced by the households is plotted in the figure below to visualize the potential impact of shocks for agriculture the overall welling of the households. Majority of the shocks appear to have medium to high impact. Note that “no impact” signifies either households that did not report a particular shock or households that actually reported a particular shock, but the impact was zero. Understanding these shocks are important for the project team to ensure coping strategies are in place to mitigate the unprecedented impacts of potential risks and achieve the target impact.

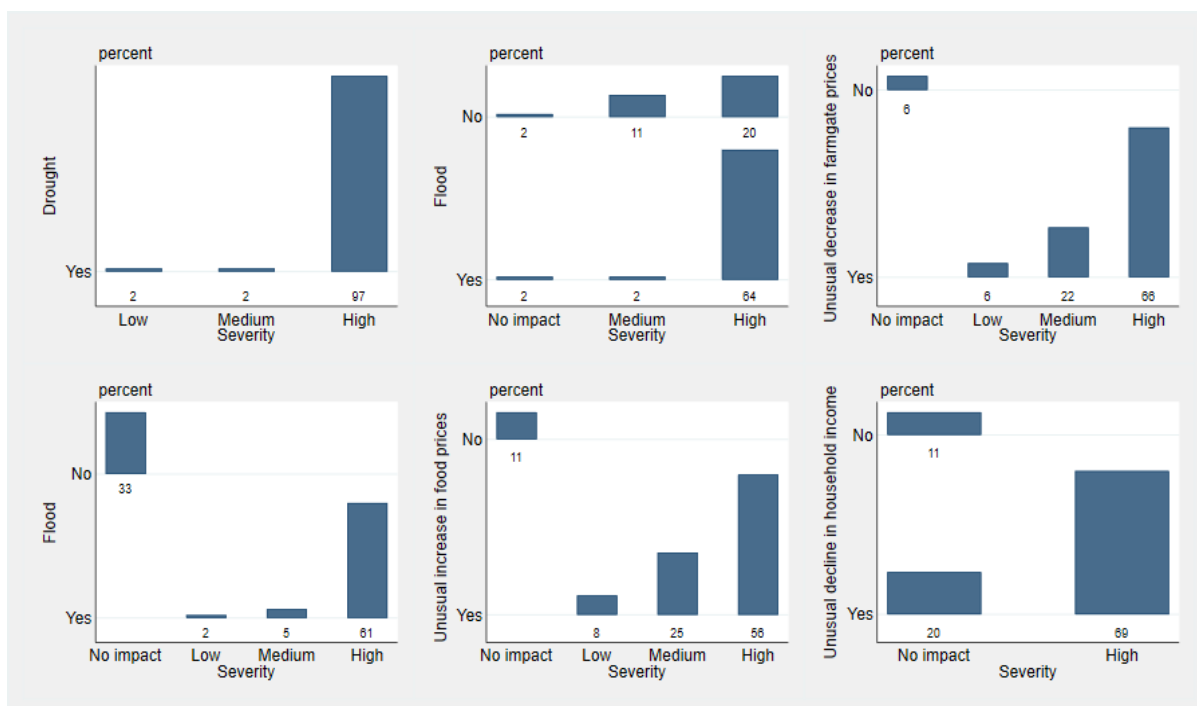


Figure 6. 14: Impact severity of selected shocks faced by the households

### 6.7. Salinity and Management Strategies

Salinity is a major aspect of the current project. Data on different aspects of salinization were collected including data on the extent of salinity, its impact in terms of area being affected and in terms of losses in yields/production, and potential intervention strategies that households devised to cope with the salinity problems and whether these interventions have worked to mitigate the potential impacts of salinity. Nearly 75% percent of the households in the sample reported that salinity is a common problem in their village directly affecting agriculture production.

Table 6. 15: Salinity problems

Salinity problems	No		Yes		Total	Average salt affected area
	Freq.	Percent	Freq.	Percent		
Is Salinity a problem in your village?	10	16%	54	84%	64	8.33
Is your land affected by salinity	16	25%	48	75%	64	

Based on the descriptive statistics, low infiltration, soil compactness, and white crust on the surface of soil were reported by about 75% the households in the sample as the most common symptoms of salt-affected soil.

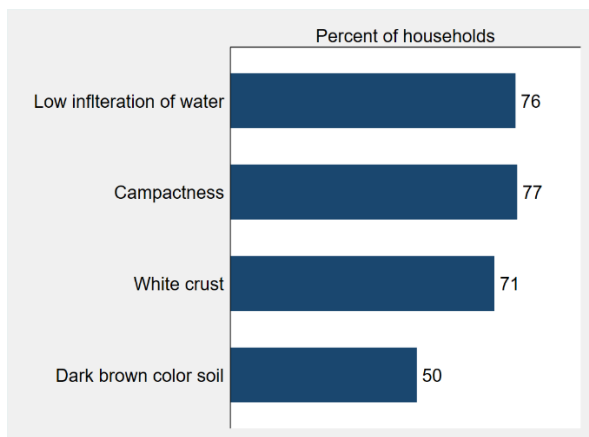


Figure 6. 15: Identification of salinity problem

On average, 8.33 hectares of the agricultural land operated by the households is reportedly affected by salinity. This is nearly a quarter of the total agricultural land owned by the households (recall that the average total land operated by the household was estimated to be 32.66 ha). However, the severity of impact of salinity varies: 29% of the households reported that their land is severely affected with a high impact leading to the loss between 25-50% in yields, majority (43%) of the households indicated medium severity leading to a loss of 10-50% in yields, and the remaining 30% of the households indicated a low severity leading to the loss of 5-25% of loss in the yields.

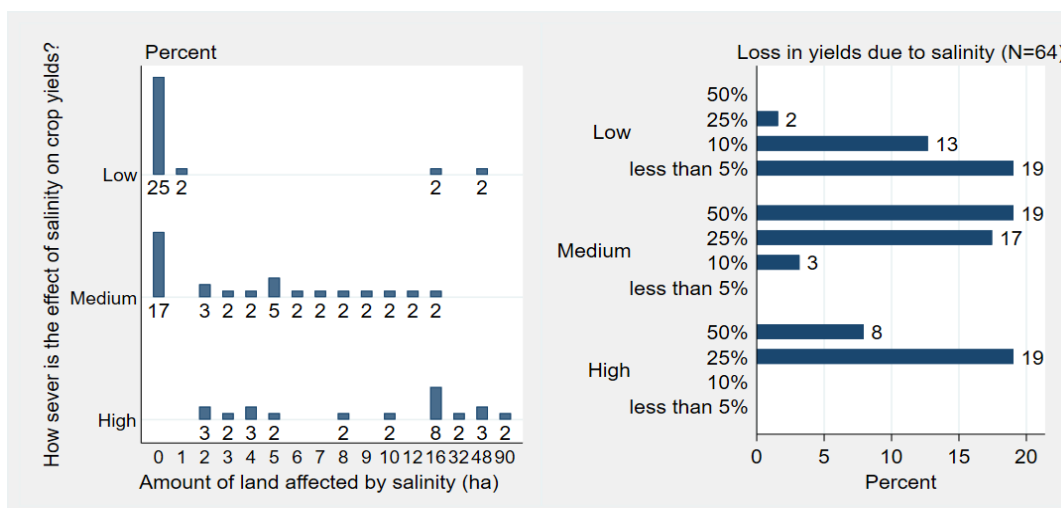


Figure 6. 16: Extent of salinity and potential impact

The data collected on the potential causes of salinity from the households in the sample show that more than half of the farm households indicated that salinity is the outcome of natural factors, nearly 13% indicated that salinity is associated with climate change, 14% of the respondents reported that high concentration in salt water was the main driver of salinization, and 13% of the households mentioned that salinity is the outcome of inappropriate irrigation methods. Less than 5% of the

households in the sample reported other causes including land levelling and lack of drainage systems as the causes of salinization.

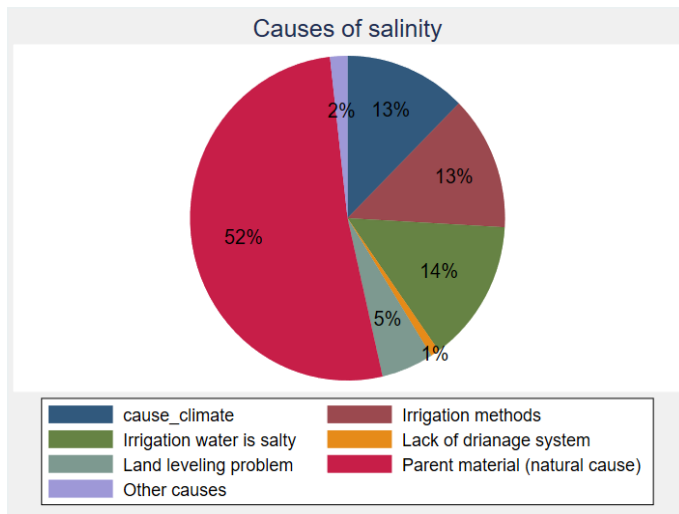


Figure 6. 17: Potential Causes of salinization

Households in the sample executed several intervention strategies to manage salinity including deep ploughing, crop diversification, crop rotation, soil amendment, drainage. Crop diversification is by far the most famous option followed by crop rotation. Less than 5% of the households reported improved irrigation methods and soil amendment as potential intervention strategies to cope with the salinity problems. When the respondents were asked to provide information on whether the interventions they have implemented have actually worked, nearly 75% of the households reported the interventions were effective increasing yield by 70-80%.

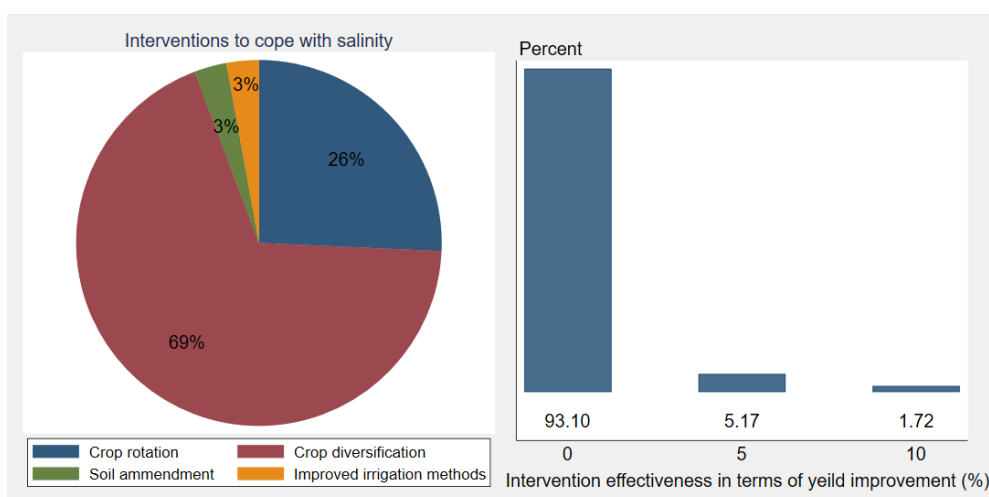


Figure 6. 18: Salinity management strategies by the households

The households were asked if they have received training on salinity management. Majority of the households (about 82%) indicated that they have not received any training, whereas about 17% of the households reported participation in trainings at some point. Training on salinity management is not quite common in the sample area as only a small fraction of the respondents in the sample have indicated that they have received some sort of training or information on salinity management.

Table 6. 16: Training on salinity management

Have you received training on salinity management?	Freq.	Percent	Cum.
No	53	82.81	82.81
Yes	11	17.19	100.00
Total	64	100.00	

### 6.8. Gender and Women Involvement in Agriculture

The gender section of the survey was allocated to collecting information on the gender balance, particularly women involvement in agricultural activities and household decision making. When respondents in the sample were asked to specify the sectors in which women are involved, nearly half of the households reported that women are actively involved in farming activities, whereas women involvement in the livestock sector is considerably low as just 15% of the respondents reported women involvement in the livestock sector. Women are also a critical part of the off-farm activities as more than 77% of the household confirmed that women work in non-farm sectors.



Figure 6. 19: Women involvement in different sectors

As per the descriptive analysis, more than 95% of the households in the sample indicated that women are actively participating in the decision making related to the household in general, and in farming decisions.



Table 6. 17: Women involvement in the household and farming decisions

Women involvement in decisions	Yes		No		total
	Freq.	Percent	Freq.	Percent	
Are women involved in any decisions related to the household?	61	95.31%	3	4.69%	64
Are women involved in any decisions related to farming	61	95.31%	3	6.67%	64

The specific decisions related to farming and women involvement in decisions are illustrated in the figure below. It appears that majority of the decisions related to land (rental, or cultivation), crop choices, purchase of farm tools and inputs, hiring labour from the market, and selling agricultural productions are jointly made by the women and men. However, when data are reported on decisions separately, women are actively participating in the decisions related to different farming activities.

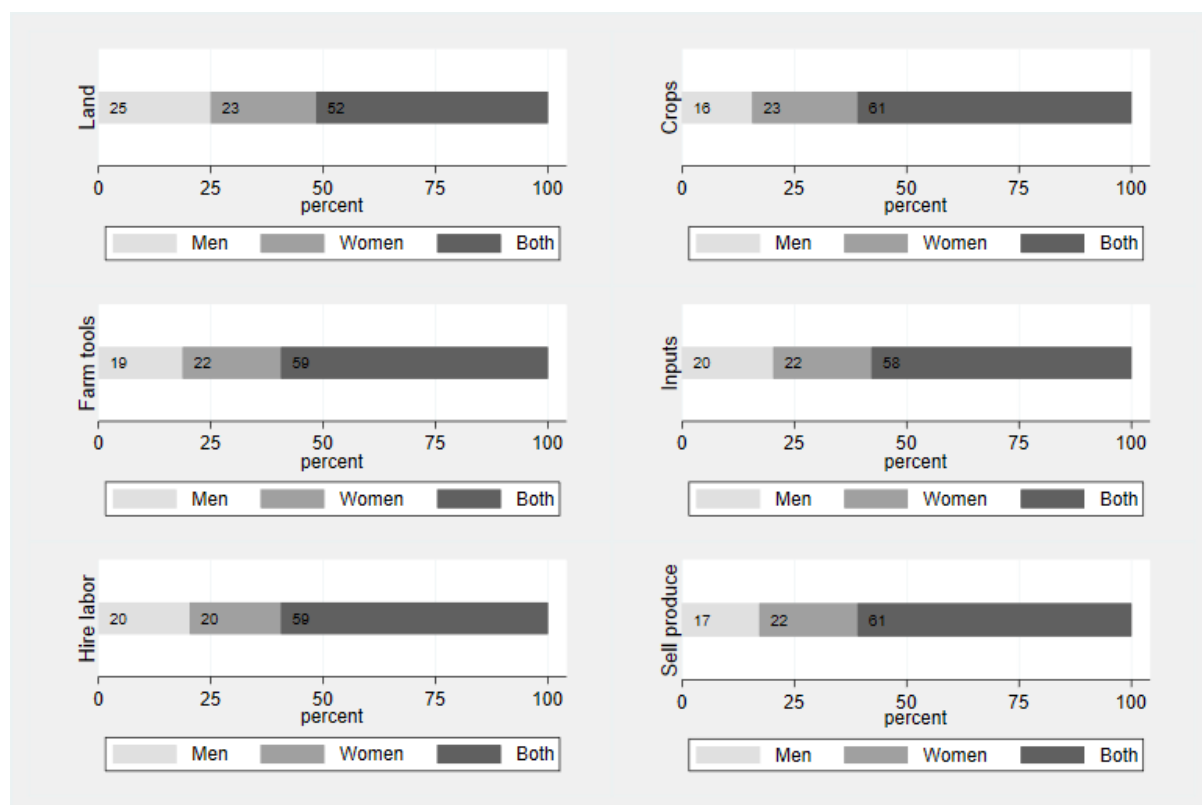


Figure 6. 20: women involvement in decision making related to selected farming activities

Women are also critical part of the household decisions related to the household expenditures, both of on food- and non-food expenses. Through majority of the decisions are jointly made by men and women, significant number of households indicated that women are involved in decision making

related to both food- and non-food expenditures when data on decision making were reported separately.

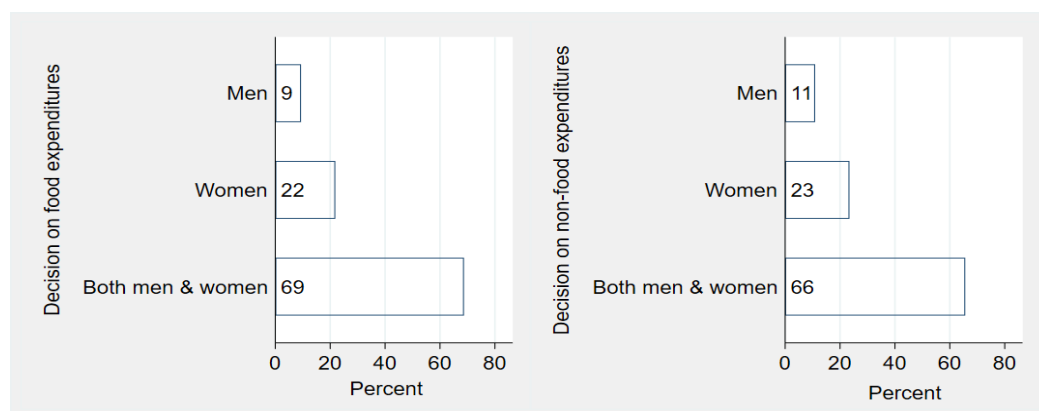


Figure 6. 21: women involvement in decisions related to the household's expenditures

### 6.9. Food Security and Nutrition

Food security of the target rural households is the ultimate objective of the current project. Considering this goal, data on household food consumption and type of food that they consume were collected. The objective of this exercise is to identify key staple food crops, whether household have enough to consume throughout the year, and whether the household rely on market or their own production for consumption.

Data on food consumption reveal that the households in the sample relied heavily maize and vegetables consumption throughout the last 7 days. This is an indication that these products are in the core of households' diets that play a critical role in household's food security. In terms of access, more than 90% of the households in the sample responded that they had access to maize, butter, rice, beans and vegetables during the last 7 days, half of the households reported access to fruits, whereas less than 30% of the households had access to poultry, meat, cassava grains, dairy, and potatoes.

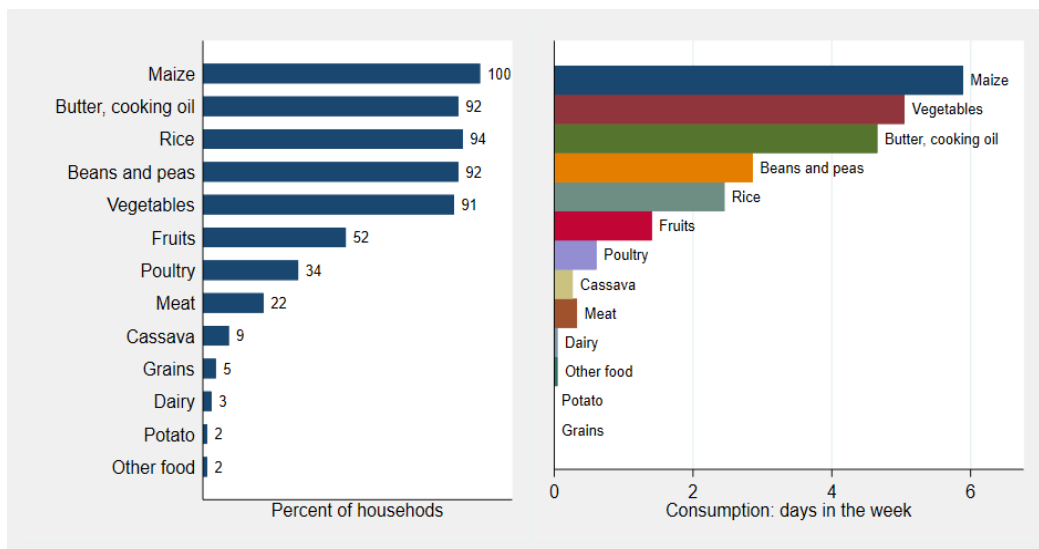


Figure 6. 22: Common foods consumed by the households (last 7 days)

The household demand for food consumption is met through own production and local markets. Households demand for maize consumption is nearly entirely met through own production as over 97% of the households indicated that the primary source for maize that they had consumed was own production. Households heavily relied on markets for vegetables and butter or cooking oil, whereas nearly of the households in the sample indicated that beans are mainly sourced from own consumption, but a significant number of households (about a third of the households in the sample) also relied on the market. Charity and food aid comprises only a small fraction of the households food demand.

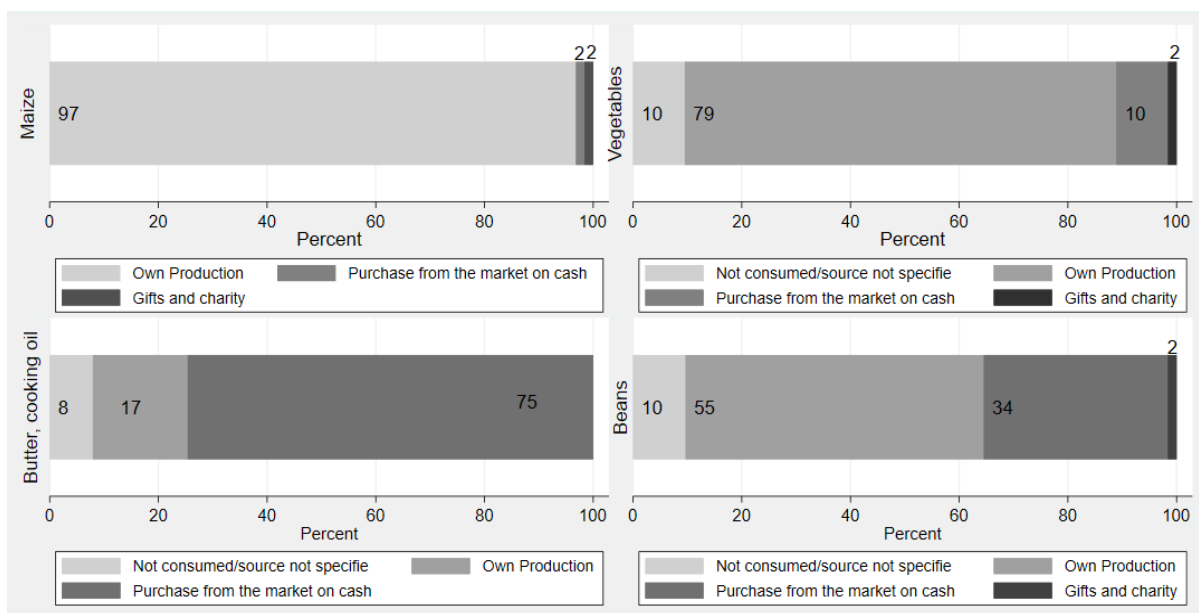


Figure 6. 23: Source of selected food items consumed by the households

## 6.10. Access to Infrastructure and Services

This section of the questionnaire provides information on the household's access to infrastructure and services including roads, local and regional markets, as well as basic services such as agricultural credit, health and education facilities, and water. The objective of this section is to provide an overall picture of the households' profile and their wellbeing.

Majority of the households (more than 98% of the sample) have reported they have access to markets and all-season drivable roads. Access to markets is an important aspect of farmer and improvement of agribusiness in the local communities. Better access to markets and roads implies improved market participation for outputs and inputs.

Table 6. 18: Access to roads and local markets

Access	Yes		No		Missing/ not reported		Total
	Freq.	Percent	Freq.	Percent	Freq.	Percent	
Access to local markets	63	98.44%	0	0.00%	1	2%	64
Access to roads	62	96.88%	1	156.00%	1	156%	64

More than 45 of the households reported that markets are located within a radius of less than 60 minutes of their community, about 37% indicated that markets located are within 1-2 hours of their community, whereas about 15% of the respondents in the sample responded that market is within the community. 15.6 percent of the households reported markets are within their community. Data on market access for about 4% of the households were missing or not reported. About 2/3 of the households reported that they walk to get to the nearest food markets, whereas the remaining households use other means of transportations including bike and car.

Table 6. 19: Means of transportation and time taken to reach nearest market

Market reached by: walking, car, bike, animal, or public transport	Time required to reach the nearest market				
	Market within the community (no travel needed)	Less than 60 minutes	Between 1- 2 hours	Missing/not reported	Total
by walking	9	12	23	0	44
	20.45	27.27	52.27	0.00	100.00
	100.00	41.38	95.83	0.00	68.75
by car	0	6	0	0	6
	0.00	100.00	0.00	0.00	100.00
	0.00	20.69	0.00	0.00	9.38
by bike	0	11	1	2	14
	0.00	78.57	7.14	14.29	100.00
	0.00	37.93	4.17	100.00	21.88
Total	9	29	24	2	64

	14.06	45.31	37.50	3.13	100.00
	100.00	100.00	100.00	100.00	100.00

First row has *frequencies*; second row has *row percentages* and third row has *column percentages*

About two-thirds of the households in the sample have indicated that they had access to market information, whereas a third of the household reported no access to any information related to prices and markets. For those who had access, 76% have confirmed that the information they obtained were useful in terms of marketing their production and sourcing agricultural inputs.

Table 6. 20: Access to market information

Do you have access to market information?	Were the information obtained useful?			
	No	Yes	Missing/ not reported	Total
No	1	7	12	20
	5.00	35.00	60.00	100.00
	50.00	14.29	92.31	31.25
Yes	1	42	0	43
	2.33	97.67	0.00	100.00
	50.00	85.71	0.00	67.19
Missing/not reported	0	0	1	1
	0.00	0.00	100.00	100.00
	0.00	0.00	7.69	1.56
Total	2	49	13	64
	3.13	76.56	20.31	100.00
	100.00	100.00	100.00	100.00

First row has *frequencies*; second row has *row percentages* and third row has *column*

Households were also asked to provide information on access to general services including access to credit, health and educational facilities, electricity, and drinking water. Over 90% of the households in the sample have indicated having access to health facility and about 85% of the household have access to educational facilities. Nearly a fifth of the total households in the sample indicated having access microfinance and credit services.

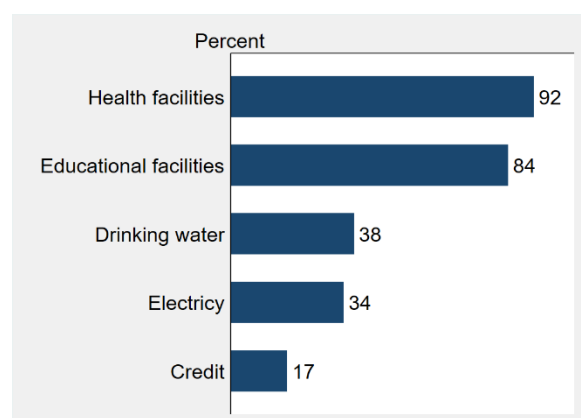


Figure 6. 24: Household's access to services

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