

AGRA BASELINE SURVEY GHANA



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AGRA Baseline Survey (Ghana)

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Table of Contents

AGRA BASELINE SURVEY (GHANA) II

LIST OF TABLES..... I

LIST OF FIGURES III

ACRONYMS AND ABBREVIATIONS IV

1. EXECUTIVE SUMMARY..... 5

2. INTRODUCTION 6

3. BACKGROUND 8

 3.1 COUNTRY BACKGROUND8

 3.2 AGRA PROGRAM OBJECTIVES.....9

4. STUDY DESIGN..... 10

 4.1 SURVEY OBJECTIVES 10

 4.2 FOCUS REGIONS AND CROPS..... 10

 4.2.1 *Focus crops* 10

 4.2.2 *Focus regions* 10

 4.3 SAMPLE SIZE AND POWER ANALYSIS..... 11

 4.4 DATA COLLECTION AND QUALITY CONTROL 12

 4.4.1 *Fieldwork and Data Collection*..... 12

 4.4.2 *Quality Control*..... 13

 4.5 KEY OBSERVATIONS AND CONCERNS 13

5. DESCRIPTIVE CHARACTERISTICS 14

 5.1 DEMOGRAPHICS..... 14

 5.2 EDUCATION AND LITERACY..... 18

6. HOUSEHOLD WELFARE 20

 6.1 INCOME AND EMPLOYMENT..... 20

 6.2 FOOD SECURITY 28

 6.3 HOUSEHOLD ASSETS 32

 6.4 HOUSING CHARACTERISTICS 35

7. ACCESS TO CREDIT AND SAVINGS..... 40

8. WOMEN EMPOWERMENT IN AGRICULTURE INDEX 50

 8.1 DECISION-MAKING AND EMPOWERMENT 50

8.1.1	<i>Time Use</i>	57
8.2	WOMEN'S DIETARY DIVERSITY	60
9.	AGRICULTURAL PRODUCTION AND INPUT ACCESS	62
9.1	PLOT CHARACTERISTICS AND SOIL QUALITY	62
9.2	FARM LABOUR.....	65
9.3	CHEMICAL USE	66
9.4	AWARENESS OF HYBRID/IMPROVED SEED VARIETIES AND USAGE	68
9.5	AGRICULTURAL MECHANISATION	70
9.5.1	<i>Machinery</i>	70
9.5.2	<i>Use of machinery in specific cropping activities</i>	73
9.6	FARMER BASED ORGANISATIONS' (FBOs) MEMBERSHIP.....	76
9.7	AWARENESS AND USE OF EXTENSION SERVICES	77
9.8	AWARENESS AND APPLICATION OF AGRONOMIC PRACTICES	81
9.9	CROP YIELDS	84
9.10	PRE-HARVEST CROP LOSSES	86
9.11	POST-HARVEST STORAGE, CROP SALES, PROCESSING AND MARKET PRICE INFORMATION	87
9.11.1	<i>Post-Harvest Crop Storage</i>	87
9.11.2	<i>Crop Sales</i>	88
9.12	SOURCES OF MARKET PRICE INFORMATION	89
10.	CONCLUSION	91

List of Tables

Table 1: Indicators and Parameters for Sample Size Determination.....	11
Table 2: Demographic characteristics of sampled households	16
Table 3: Education and literacy of households	19
Table 4: Farmers with Salaried Employees by target crop and region.....	22
Table 5: Distribution of Farmers Engaging in off-farm Activities by Crop and Region	22
Table 6: Distribution of 10 Most Common Non-Farm Activities by Target Crop and Region.....	23
Table 7: Mean Annual Non-farm Income (US\$) by Target Crop and Region	24
Table 8: Distribution of Farmers with in Salaried Employment by Target Crop and Region.....	25
Table 9: Mean Annual Salaried Employment Income by Target Crop and Region (US\$)	26
Table 10: Commonly Consumed Food Crops (Top 5).....	29
Table 11: Distribution of Households that Experienced Food Shortages.....	30
Table 12: Average Number of Months of Adequate Food Supply	31
Table 13: Hunger Scale by Target crop and Region.....	33
Table 14: Large Agricultural Asset Ownership by Region and Crop	33
Table 15: Large Household Asset Ownership by Region and Crop.....	34
Table 16: Small household Asset Ownership by Region and Crop.....	34
Table 17: Distribution of Ownership Status by Region and Target Crop.....	36
Table 18: Distribution of water sources during the Dry Season	37
Table 19: Distribution of roofing types by region and target crop	38
Table 20: Average distance in KM to water source in the Dry season by Target Crop and Region	39
Table 21: Distribution of Households that tried to get Credit	42
Table 22: Sources of Household Credit by Target Crop and Regions	42
Table 23: Distribution of Household that obtained Credit requested.....	43
Table 24: Amount of credit obtained by Household.....	44
Table 25: Uses of credit by household.....	45
Table 26: Distribution of Households that have Bank Accounts.....	46
Table 27: Distribution of Account locations by Region and Target crop.....	47
Table 28: Distance to Nearest Banking Point	48
Table 29: Individual empowerment for each domain	53
Table 30: Gender differences in Empowerment Index	56

Table 31: Household women's dietary diversity score, distributed by region and target crop ...	61
Table 32: Plot Characteristics and Soil Quality by Region	63
Table 33 Plot Characteristics and Soil Quality by Target Crop Groups	64
Table 34: Farm Labour by Region.....	65
Table 35 Farm Labour by Target Crop Group.....	66
Table 36 Chemicals Use by Region	67
Table 37 Chemical Use by Target Crop Group.....	68
Table 38: Awareness and cultivation of hybrid/improved varieties.....	69
Table 39: Awareness and cultivation of hybrid/improved seed varieties by target crop	70
Table 40: Tractor and animal draught services.....	72
Table 41: Tractor and animal draught services by target crop	73
Table 42: Use of tractor and animal services in cropping activities by region.....	74
Table 43: Use of tractor and animal services in cropping activities by target crop	75
Table 44: Household membership of Farmer Based Organisations (FBOs).....	76
Table 45: Household membership of Farmer Based Organisations (FBOs) by target crop	77
Table 46: Awareness and use of extension services by region.....	79
Table 47: Awareness and use of extension services by target crop	80
Table 48: Awareness and application of agronomic practices by region	82
Table 49: Awareness and application of agronomic practices by target crop	83
Table 50 Crop Yields by Region.....	85
Table 51 Crop Yields by Target Crop Groups.....	86
Table 52: Pre-Harvest Crop Losses by Region.....	86
Table 53: Pre-Harvest Crop Losses by Target Crop Group	87
Table 54 Post-Harvest Crop Storage by Region.....	87
Table 55 Crop Storage by Target Crop Group.....	88
Table 56: Quantity of Crop Sold by Region.....	89
Table 57: Quantity of Crop Sold by Target Crop Group	89
Table 58 Source of market price Information by Region	90
Table 59 Source of Market Price Information by Target Crop Group	90

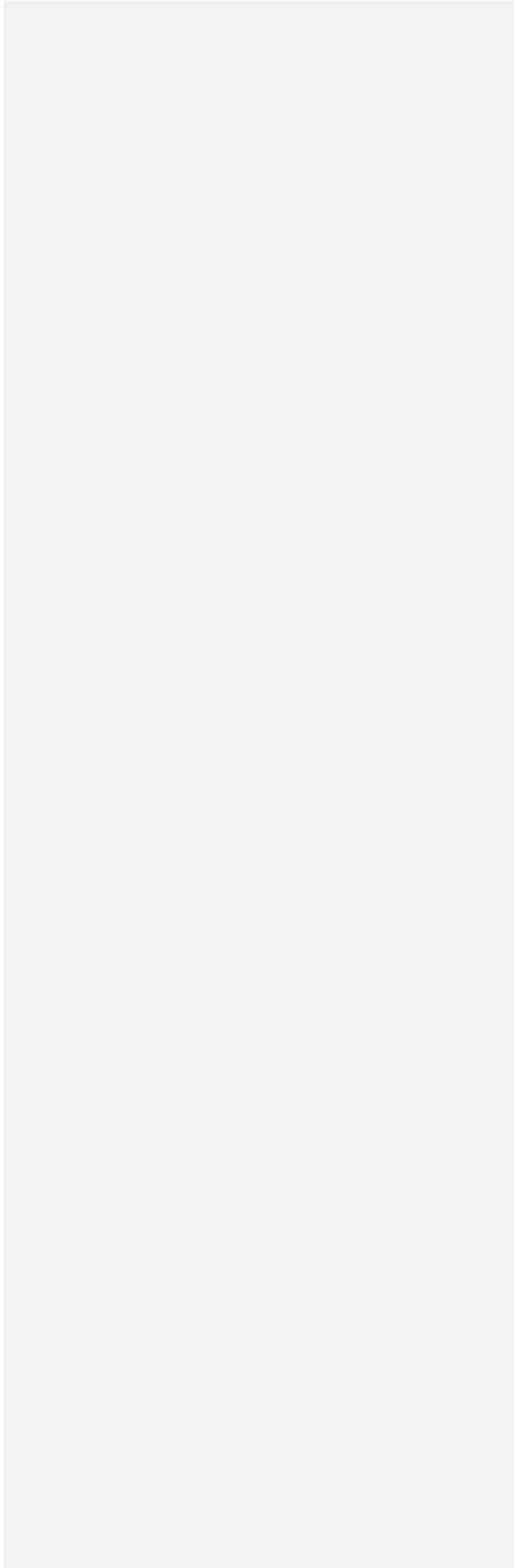
List of Figures

Figure 1: Ecological Zones of Ghana 8

Figure 2: Population Age and Sex Distribution of Sample (by Region) 17

Figure 3: Thematic network on gender, income and employment..... 27

Figure 4: Household Decision-Making Structure 50



Acronyms and Abbreviations

AFC	Agricultural Finance Corporation
AGRA	Alliance for a Green Revolution in Africa
CAPII	Computer-Assisted Personal Interviews
EA	Enumeration Area
FAO	Food and Agriculture Organization
FASDEP	Food and Agriculture Sector Development Policy
FBO	Farmer Based Organization
FGD	Focus Group Discussion
GSGDA	Ghana Shared Growth and Development Agenda
HDDS	Household Dietary Diversity Scale
HFIAS	Household Food Insecurity Access Scale
HHS	Household Hunger Scale
ICC	Inter-Correlation Coefficient
IDI	In Depth Interviews
ISSER	Institute of Statistical Social and Economic Research
KII	Key Informant Interviews
MFI	Micro-Finance Institution
NGO	Non-Governmental Organization
SACCO	Savings And Credit Co-Operative Organization
SSA	Sub-Saharan Africa
USAID	United States Agency for International Development

1. Executive Summary

The Alliance for a Green Revolution in Africa (AGRA) aims to effect market-led agricultural transformation in Africa. In Ghana, its objectives are to increase farmer productivity through access to quality inputs, reduce post-harvest losses through access to post-harvest storage technologies and support farmers through an enabling policy environment.

The Institute of Statistical, Social and Economic Research (ISSER) was tasked to conduct a baseline survey of farmer households in two regions in Ghana, Brong Ahafo and Northern, to create baseline data of farming practices, yields, post-harvest loss and other features of the value chain in the cultivation of four major crops; namely maize, rice, cassava and soybean. The data is intended to help identify key challenges to the production of these crops in the two regions, and support the development and subsequent evaluation of AGRA interventions over a five-year period.

The main findings of this baseline survey are summarized as follows, based on the objectives of this AGRA initiative for Ghana:

- ◆ Demographic characteristics and cultural norms are important factors which affect household production.
- ◆ Plot ownership and use is made complex by gender roles in the home and community.
- ◆ Soil characteristics, which affect quality and fertility, vary from zone to zone. As a result, the input needs will differ across regions.
- ◆ Small-scale farmers rely heavily on casual farm labour over other types of labour and mechanization for farm preparation and management
- ◆ While chemicals are popularly used in agricultural production, improved seeds are less commonly used. Even with awareness, certain local preferences for food staples hinder adoption.
- ◆ There is a knowledge-sharing gap, where few farmers participate in FBO activities or seek extension services.
- ◆ Yields for crops vary across regions and crops.
- ◆ Soybean, though initially introduced to the Brong Ahafo region, did not achieve the same adoption in some communities, as it did in the Northern region.

In the following report, the individual sections present the quantitative and qualitative data, which support the listed observations. Qualitative findings are included in the main text, complete with quotes. The relevant thematic frameworks are attached in a separate Appendix, for further understanding.

2. Introduction

In sub-Saharan Africa (SSA), of which Ghana is part, smallholder farmers are the primary producers of agricultural outputs. In Ghana, they account for about 60% of all the farms in the country (80% in sub-Saharan Africa). They directly employ about 14 million people (175 million in SSA) and about 42% (52% in SSA) of all smallholders are women **Invalid source specified**. Agriculture accounts for 23% of gross domestic product. Production is characterized as rain-fed subsistence farming, for which, despite boasting 44.7%¹ percent of the Ghanaian workforce, productivity is low.

Majority of smallholder farmers in Ghana cultivate small parcels of land, which often lack the required inputs like irrigation infrastructure, fertilizer, efficient agronomic practices etc. to catalyze improvements in production and, thus, living standards. Moreover, these farmers do not have access to sufficient skilled labour and are, at times, classified as 'resource poor'. In terms of welfare for the average smallholder farmer, issues of accessibility to credit and commercial markets, as well as low-yield subsistence agricultural practices, put the smallholder Ghanaian farmer in a worse state.

Labour-intensive agriculture in the country does not benefit from adequate mechanization, improved varieties, agricultural inputs and networks. For five decades, government development policy has prioritized agricultural growth, as a means of driving economic expansion. The Food and Agriculture Sector Development Policy II (FASDEP II), for instance, developed for the period of 2007 to 2015, focused on poverty and income growth, addressing food security and the growth of staple food crops, agricultural commercialization, environment sustainability and food import reduction, through the Medium-Term Agriculture Sector Investment plan.

Despite these efforts, the low returns for agricultural production has caused a shrinkage in the labour force, as more of the rural population abandon farming for more profitable ventures in the growing service sector. Services, which is composed mainly of commerce, finance and hospitality, is more attractive to rural youth than farming and have caused a population drift to urban localities. About 21 percent of the Ghanaian population has moved out of agriculture to other more productive economic sectors over an 18-year period between 1992 and 2010.² Certain challenges make agriculture a risky and unattractive venture for the economically active youth. Inadequate credit (with high lending rates) stifles expansion and mechanization, especially for irrigation during dry periods. Poorly functioning markets make it difficult for farmers to access inputs that are crucial

¹ GLSS6 (2014)

² Evans Boah-Mensah, "Lonely Agric...As More People Abandon the Sector", Business & Financial Times Online, <http://www.thebftonline.com>.

for improved yield. Even with bumper harvests, following heavy rains, farmers are unable to capitalize on high yield due to poor storage facilities and marketing options. (FAO, 2005)

AGRA's recognition of these issues has led to the development of a 5-year strategy aimed at addressing the productivity of the Ghanaian farmer and providing support to encourage transformation of local farming, through innovation, improved market access and partnerships. The purpose of this survey, conducted by the Institute of Statistical, Social and Economic Research (ISSER) is to satisfy one of the key components of AGRA's country model for Ghana, which incorporates one of its core assets: "Real-time, on-the ground intelligence and insight regarding the current status of activities, farmer realities, and new opportunities to accelerate progress towards transformation". The achievement of this objective will occur through the provision of current and applicable data, detailing the demographic and cultural characteristics of target farmer households, commonly-used farming practices and tools, approaches to pre- and post-harvest activity, awareness and adoption of beneficial inputs, specifically fertilizer and improved varieties of seeds, and storage and sales which determine income and returns to production. Key indicators will be assessed, in terms of not only the target crop, but also where these target crops are grown. This will allow AGRA to understand, not only welfare dynamics of the farmers, but also the influences that the regions and, more specifically, the farming communities where the farmers reside have on production of the target crops.

The observations made are arranged in the following sections:

- ◆ **Background** provides a background of the study area and program objectives
- ◆ **Study Design** defines the study design and objectives as well as the sampling and survey process
- ◆ **Descriptive Characteristics** break down the sampled groups by key demographic characteristics
- ◆ **Welfare** lays out the living conditions of the sampled households
- ◆ **Credit** looks at credit access for farmer households
- ◆ **Women Empowerment in Agriculture** discusses gender differences in empowerment within the homes in the context of decision making in production and other activities.
- ◆ **Agricultural Production and Input Access** identifies trends in agricultural production, pre-, during and post-harvest.

3. Background

3.1 Country Background

Farming activity covers half of Ghana's total land area of 238,535 km², with the rest covered by either inland water or forest area. The arable land is concentrated in the country's interior, covered by the Deciduous Forest, Transitional and Guinea Savannah agro-ecological zones. This is a result of the rain-fed nature of agriculture in Ghana, as these regions have the combined benefit of more fertile soil than the coastal regions, more frequent and reliable rains than the Sudan Savannah zone and more accessible land area than the rain-forest area.

Figure 1: Ecological Zones of Ghana



Even with the rapid expansion of the service sector, agriculture is still the largest and most crucial contributor to Ghana's economy. A combination of subsistence and commercial farming provides food for over 25 million inhabitants, especially for the growing non-farming urban population, and employment for over 45 percent of households (over 76% of rural). There are regional variations in the proportions engaged in this activity, with more than 70 percent of the economically active population in the Northern and Upper West regions engaged in agriculture, forestry and fishing activities. While, in Greater Accra, significant proportions of the economically active population are engaged in wholesale and retail trade, manufacturing and hospitality service activities, with only 5.2 percent engaged in agricultural activity.

Due to its importance, there is a strong interest by the Ghanaian government and development-focused institutions to promote growth in the agricultural sector. Though still high, the proportion of the economically active population involved in agriculture has decreased over the years, due to increased migration from the rural agricultural areas to urban cities to seek non-agricultural employment. Factors such as, dependence on increasingly unreliable rainfall, poor input and market networks, and low price-negotiating power for small-scale farmers, increase the perceived risk associated with agricultural production and motivate rural-urban flow of people. As a result, the attraction to the sector and, consequently, agricultural production has declined over the years, inspiring government policy such as the Ghana Shared Growth and Development Agenda (GSGDA 2010-2013) and Food and Agriculture Sector Development Policy (FASDEP II, 2007) and interventions from institutions like the Alliance for the Green Revolution in Africa (AGRA).

The focus of agricultural policy and interventions in Ghana often aim at increasing production volumes per household through input adoption, practice of efficient soil water and fertility management techniques and mechanization. Additionally, they attempt to tackle price volatility for farm produce through the introduction of irrigation options to enable year-round farming and even production volumes in and out of rain seasons, storage options for bumper seasons and ready markets for produce, to prevent post-harvest crop loss.

3.2 AGRA Program Objectives

AGRA's motivations for the survey are to lead transformations in Ghana through interventions that tackle low yield, high post-harvest crop loss and distortions in the value chain caused by an ineffective policy environment. With a focus on maize, rice, cassava and soybean, AGRA hopes to impact markets related to these main crops in order to eventually drive higher production. These markets include input and output markets, to accomplish the following:

- ◆ Increase use of high-yielding improved varieties, as less than a quarter of farmers use them for the planting of the target crops. The aim is to reduce yield gaps.

- ◆ Increase provision of suitable fertilizer for the crop and soil types found in the study regions, further aimed at improving yield.
- ◆ Build farmer networks and linkages with agro dealers, extension officers, input producers and NGOs to increase knowledge and awareness of inputs, and technology through extension services, leading to better farming practices.
- ◆ Reduce post-harvest crop loss by increasing storage options, improving the availability of post-harvest technology such as threshers and PICs bags and decentralising processing units to lower loss during transportation.

4. Study Design

4.1 Survey Objectives

This survey, contracted by AGRA, is a series of baseline surveys scheduled for four countries, Burkina Faso, Ghana, Mali and Mozambique, in line with AGRA's overall objective to access real-time intelligence on the activities and experiences of farmers in selected regions of the above-named countries, to inform efficient and timely interventions. As a result, the processes followed as part of this survey aim to achieve the following

- ◆ Collate farmer experience and challenges, from interviews with farmers and agro-institutions, with regard to the target crops.
- ◆ Create a baseline database and directory of 3000 farmers with which AGRA can conduct follow up surveys on the subject matter.
- ◆ Analyse baseline quantitative and qualitative data to identify key trends for the indicators of interest, while using anecdotal context provided by stakeholders to help inform AGRA's next steps

4.2 Focus regions and crops

AGRA's five-year strategy covers the Brong Ahafo and Northern regions, located in the Guinea Savana and Transitional agro-ecological zones, where agricultural production mainly occurs. To a large extent, the two regions each represent one of the zones, the characteristics of which manifest in the soil, vegetation and climate conditions of the area. These are crucial regions, especially for the

production of staple food and cash crops such as yam, maize, cocoa and palm. As a result, this study samples households from districts in these regions, in line with AGRA's interests.

4.2.1 Focus crops

Though there are a variety of crops grown in these regions, the survey is narrowed down to major crops that are widely consumed nationwide and whose availability impact food security in Ghana, namely maize, rice, cassava, or crops that have recently shown increasing popularity within farming communities, namely soybean. The focus crops were identified using a framework designed by AGRA, which assessed impact potential and ease of delivery for future interventions initiated during the period.

4.2.2 Focus regions

The Northern region is the largest region in Ghana. It covers an area of 70,384 km² found in the Guinea Savannah zone. Only one rainy season occurs in the area from May to September, with a semi-arid climate. As a result, there is only one major planting season. The vegetation compared to the forest and transitional zones, is sparse, characterized by low trees and grassy areas. The Volta River flows through this region, allowing for rice farming. The survey targets households that farm three of the four target crops, maize, rice and soybean, since cassava production is low in the region.

The Brong Ahafo region follows the Northern region in terms of land size at 39,557 km². It is found in the transitional ecological zone, where thick forest gradually transforms into savannah and grassland. Due to the intermediate nature of this zone, all four target crops are expected to grow in economically viable quantities by households in this region. They experience two rainy seasons, a major one from March to July and a minor from September to October. They experience two planting season, with the minor in anticipation of harvest during the harmattan season at the end of the calendar year.

4.3 Sample size and power analysis

Quantitative and qualitative data collection occurred in both regions from 23 districts. The enumeration areas visited were selected using 2010 Census demarcations. Based on existing and projected estimates for crop yields and crop losses in AGRA's business plan for Ghana, the survey targeted a statistically acceptable sample size of 3,000 farm households.

A two stage sampling strategy was employed to ascertain the needed sample size for the survey. In the 1st Stage (Primary Sampling), power calculations determined the number of clusters or enumeration areas (EAs,) required to attain the necessary effect size for a power of at least 80%. It was determined that at least 15 farming households would be selected randomly from each of the 200 EAs to give the total sample of 3000 households. We selected these clusters randomly from the list generated by the census information, ensuring that the target crops were cultivated across the regions and their districts, as provided by the AGRA country business plan. The result of the power calculations are shown in Table 1 for the yield and loss indicators. The results state a suitable sample size of

2520 households, which was increased to 3000 to account for anticipated future attrition and difficulty accessing households or EAs during the initial baseline data collection.

Table 1: Indicators and Parameters for Sample Size Determination

Indicator	Crop	2016	2020	Annual Average Change	Standard Deviation	ICC	Effect Size (Annual)	Sample Size per Crop
Crop Losses	Maize	24	5	-4.75	6.8	0	-0.70	420
	Cassava	32	10	-5.5	6.8	0.09	-0.81	710
	Rice	18.6	7	-2.9	0.66	0.6	-4.39	570
	Soybean	32	10	-5.5	7.1	0	-0.77	430
	Total Estimated Sample Size							
15% Attrition								320
Overall Sample Size								2450
Crop Yields	Crop	2016	2020	Annual Average Change	Standard Deviation	ICC	Effect Size	Sample Size per Crop
	Maize	1.85	3.6	0.4375	0.66	0.38	0.66	680
	Cassava	16.8	23.4	1.65	13.2	0.14	0.13	500
	Rice	2.5	4.5	0.5	0.99	0.08	0.51	470
	Soybean	1.9	2.4	0.125	0.683	0.16	0.18	560
	Total Estimated Sample Size							
15% Attrition								332
Overall Sample Size								2542

Source: Compiled by the Authors from estimates using Optimal Design.

In the second stage (Secondary Sampling), within each selected EA, households were randomly selected, following a listing process which created a master list of households that fit the required criteria; that at least one member of the household was engaged in agricultural production of the target crop linked to the EA.

4.4 Data Collection and Quality Control

4.4.1 Fieldwork and Data Collection

Fieldwork covered an overall period of about 8 weeks, beginning October 18th, 2016, for listing and both quantitative and qualitative surveys. The selected period coincided with the harvest period for the target crops for most farmers, while ensuring that fieldwork

ended before the presidential elections scheduled for December 7th, 2016. Prior, enumerators for the quantitative survey were trained on the content and techniques for administering the instruments, after which they were deployed to the fields

As mentioned by the section on sampling strategy, listing data was collected on households in the chosen EAs to build a master list from which households would be randomly selected. The following data was collected on each listed household: name and contact information for the household head, household size and whether they satisfied the criteria of farming at least one acre of the target crop. At least 30 households were listed from each EA. Almost immediately after listing; enumeration teams were sent a list of randomly selected households, with backups in case of unavailability, to begin quantitative interviews.

The instruments focused on farming activities of households in both regions, for all stages of production of the target crops, and household welfare, related to income, food security and housing conditions. The questions in the quantitative instrument covered land tenure and use, input adoption, agronomic practices, harvest, storage and sales, income and employment, housing conditions, food security and *Women Empowerment in Agriculture*. As part of the quantitative fieldwork, data collectors measured plot sizes, using specialized logging devices, which produced satellite-generated GPS coordinates, measurement and maps of farm plots for a third of the selected households.

The qualitative fieldwork followed a different format, where seventy-eight targeted interviews were conducted in twenty-one communities: nine from the Northern region and twelve from Brong Ahafo. The difference in number of communities was to accommodate cassava farmers recorded in Brong Ahafo, but not in the North. The interviews consisted of Key Informant Interviews with agents of stakeholder organizations such as the Ministry of Food and Agriculture (MoFA), extension officers and aggregators. Additionally, In Depth Interviews (IDIs) and Focus Group Discussions (FGDs) were conducted with the farmers. Three teams were selected to conduct the interviews. The enumerators were assigned based on language proficiency relevant to the areas.

A sampled list was used to locate and identify farm households in the communities for the interviews. However, being a harvest season, most the households were engaged in farming activities thus making it difficult access them for the interviews. The respondents, once identified were willing to be interviewed and receptive to the questions. As with the quantitative experience, it was challenging to identify soybean farmers in three Brong Ahafo communities assigned for this focus crop.

Two instruments were used in collecting data for the qualitative baseline study. These were semi-structured interview and discussion guides. Both instruments were designed to address focus areas of the baseline study. Semi-structured interview guides were used as instruments to conduct IDIs and KIIs. A semi-structured discussion guide was designed and used to conduct the FGDs. They focused on the following areas for each interview:

- ◆ Structure, activities and sources of household income

- ◆ Asset, wealth, income and food security
- ◆ Access and use of agricultural inputs
- ◆ The management and the use of agricultural output
- ◆ Women empowerment in agriculture
- ◆ Potential extraneous variables

4.4.2 Quality Control

Throughout the data collection process, the research team monitored the activities of enumeration teams to ensure that interviews were conducted ethically and that the data met the quality standards set by ISSER. This was done using the following steps:

- ◆ Enumerators conducted interviews using a computer-assisted personal interview (CAPI) setup installed on tablets. At the end of day's work, team supervisors were required to review and upload data to be sent to the CAPI operations team in Accra. The research team reviewed the available data and, for any issue, contacted the team associated with the specific case for clarification and corrections to be made.
- ◆ Twice, during the period, two teams comprising of members of the research team visited field workers to monitor the data collection process, provide necessary logistics and address any issues that came to their attention while in the field. Field teams reported their progress at each turn, so that the research team could ensure that schedules were adhered to for fieldwork.

4.5 Key Observations and Concerns

During the listing process, field teams in the Brong Ahafo region uncovered that, while, at the time of the population census, households in some EAs cultivated soybean, it was no longer the case. According to community leaders and other informants, they had been introduced to soybean production by some NGOs. However, they were no longer incentivized to continue production, since they found it difficult to access seeds and a ready market for their harvest. Soybean is not a food staple in the country and, without an aggregator, it was difficult to sell. As a result, the enumerators could not list for that particular crop and had to either replace those EAs, list for maize, rice and cassava instead, or during the survey, interview more households per EA that was successfully listed for soybean.

Although the fieldwork was pushed as far to the end of the year as possible, a number of households had not yet harvested their plots. This was most commonly observed, in all EAs for cassava, although some households also recorded zero harvest at the time for the other target crops. It is anticipated that follow-up surveys, if done at the same time of the year, will encounter a similar occurrence.

5. Descriptive Characteristics

In this section, we offer a snapshot of the households and the key characteristics that describe them on average, broken down by region and by the main crop that they farm, given the EA in which they reside.

5.1 Demographics

By the end of field work, household-level data had been collected for 2,958 farming households in the Brong Ahafo and Northern regions in the quantitative study and 168 farm households in the qualitative study. For the Brong Ahafo region, households were sampled for all four target crops while, in the northern region, they were sampled only for maize, rice and soybean, since cassava is not commonly grown in the region. The demographic characteristics of the household heads and members are presented in Table 2 below. For the purpose of this survey, a household is defined as a group of people living in the same dwelling or living space, who share a household head and feeding and production arrangements.

Households are large on average, with about six members living in the same home, sharing farming and feeding arrangements. Overall, there are more male household members than females, with rice-growing homes in Brong Ahafo having the largest proportion of male members (52.1%). Maize-growing households in Brong Ahafo and rice households in the North, however, have majority female members (50.7). Households are smaller in Brong Ahafo than in the Northern region; having 5 members compared to 7, respectively. Related findings from the qualitative study identified a link between comparatively higher prevalence of polygamous marriages in the Northern region to the relatively higher size of farm households in that region. Households are majority male-headed (87.4%) with the share of male heads even higher in the Northern region (95.7 – 97.4%), compared to the Brong Ahafo region. The largest proportion of female heads are recorded for maize households in Brong Ahafo and rice-growing households in the North.

The average age of household members is approximately 22 years old, while household heads averaged about 46 years of age. Households in Soybean communities in the Northern region showed the lowest average age for household members, while the highest was recorded in cassava-growing communities in Brong Ahafo. Mimicking the national picture, the sample is young, with almost half of household (44.9%) of members aged 0-14 years old. This share is higher in the Northern region, than in the Brong Ahafo region for all comparable crop groupings. The age and sex population distribution pyramids in

Indicator	Brong Ahafo Region				Northern Region			Overall				Total Sample
	Maize	Cassava	Rice	Soybean	Maize	Rice	Soybean	Maize	Rice	Soybean	Cassava	
No. of Households	349	810	193	270	419	532	385	768	810	725	655	2,958
Household Size	5.2	5.0	5.2	4.9	6.6	7.1	7.0	6.0	5.0	6.6	6.1	5.9
Gender Breakdown HH Heads												
Male (%)	84.8	77.7	81.9	79.3	95.7	96.4	97.4	90.8	77.7	92.6	89.9	87.4

Female (%)	15.2	22.4	18.1	20.7	4.3	3.6	2.6	9.2	22.4	7.5	10.1	12.6
Gender Breakdown of HH Members												
Male (%)	49.3	51.1	52.1	50.8	51	49.9	50.5	50.3	51.1	50.4	50.6	50.6
Female (%)	50.7	48.9	47.9	49.16	49	50.1	49.5	49.7	48.9	49.6	49.4	49.4
Average Age												
HH Heads (%)	46.7	49.3	45.2	48.2	44.5	43.5	45.2	45.47	49.3	43.9	46.4	46.4
HH Members (%)	22.9	24.7	23.1	23.6	21	19.9	21.0	21.73	24.7	20.6	21.9	22.1
Age Breakdown (% of household members)												
0-14	43.8	40.9	40.	40.8	46.6	49.8	46.8	45.5	40.9	47.8	44.8	44.9
15-64	52.5	54.0	56.9	55.2	50.8	48.0	50.6	51.5	54.0	49.9	52.1	51.8
65+	3.8	5.1	3.0	4.0	2.6	2.2	2.7	3.1	5.1	2.4	3.1	3.4
HH Dependency Ratio	1.0	1.0	0.9	0.9	1.1	1.2	1.1	1.0	1.0	1.1	1.0	1.0
Marital Status of HH Head (%)												
Single	4.0	4.7	6.2	3.7	2.6	2.8	2.9	3.3	4.7	3.7	3.2	3.8
Monogamous married	75.4	70.0	70.5	68.9	63.7	62.4	65.2	69.0	70.0	64.6	66.7	67.7
Polygamous Married	6.6	6.2	7.8	8.5	29.4	30.5	28.3	19.0	6.2	24.4	20.2	17.1
Divorced	4.6	6.1	7.3	4.4	1.0	1.1	0.8	2.6	6.1	2.8	2.3	3.5
Widowed	7.5	10.6	6.7	11.1	2.4	3.2	2.6	4.7	10.6	4.1	6.1	6.5
Separated	1.4	1.7	0.5	2.6	1.0	0.0	0.3	1.2	1.7	0.1	1.2	1.1
Cohabitation	0.6	0.7	1.0	0.7	0.0	0.0	0.0	0.3	0.7	0.3	0.3	0.4

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Figure 2 below show the concentration of household members within the age group 0-24, for the overall sample and each region. It is also observed that, for female members, there is a larger percentage aged 25 and above than there are for the males.

Finally, we look at the marital status of household heads. Majority of the overall sample (67.7%) are in monogamous unions. The proportion is less for Northern regional households, as there are more heads in polygamous marriages, especially compared to those in Brong Ahafo. Another interesting trend shows that no heads were recorded as cohabitating in the Northern region. Insights from qualitative interviews identified most farming communities in the Northern Region have marriage arrangements that are longitudinal in nature. The implication of these process marriages is that farm couples are socially acknowledged as married and duly living together after initial marriage requirements are met pending gradual submission of all material requirements. Most longitudinal marriage processes are completed years after couples have lived and started families together. However, this constitutes the least common marital status for the overall sample (0.4%).

Indicator	Brong Ahafo Region				Northern Region			Overall				Total Sample
	Maize	Cassava	Rice	Soybean	Maize	Rice	Soybean	Maize	Rice	Soybean	Cassava	
No. of Households	349	810	193	270	419	532	385	768	810	725	655	2,958
Household Size	5.2	5.0	5.2	4.9	6.6	7.1	7.0	6.0	5.0	6.6	6.1	5.9
Gender Breakdown HH Heads												
Male (%)	84.8	77.7	81.9	79.3	95.7	96.4	97.4	90.8	77.7	92.6	89.9	87.4
Female (%)	15.2	22.4	18.1	20.7	4.3	3.6	2.6	9.2	22.4	7.5	10.1	12.6
Gender Breakdown of HH Members												
Male (%)	49.3	51.1	52.1	50.8	51	49.9	50.5	50.3	51.1	50.4	50.6	50.6
Female (%)	50.7	48.9	47.9	49.16	49	50.1	49.5	49.7	48.9	49.6	49.4	49.4
Average Age												
HH Heads (%)	46.7	49.3	45.2	48.2	44.5	43.5	45.2	45.47	49.3	43.9	46.4	46.4
HH Members (%)	22.9	24.7	23.1	23.6	21	19.9	21.0	21.73	24.7	20.6	21.9	22.1
Age Breakdown (% of household members)												
0-14	43.8	40.9	40.	40.8	46.6	49.8	46.8	45.5	40.9	47.8	44.8	44.9
15-64	52.5	54.0	56.9	55.2	50.8	48.0	50.6	51.5	54.0	49.9	52.1	51.8
65+	3.8	5.1	3.0	4.0	2.6	2.2	2.7	3.1	5.1	2.4	3.1	3.4

HH Dependency Ratio	1.0	1.0	0.9	0.9	1.1	1.2	1.1	1.0	1.0	1.1	1.0	1.0
Marital Status of HH Head (%)												
Single	4.0	4.7	6.2	3.7	2.6	2.8	2.9	3.3	4.7	3.7	3.2	3.8
Monogamous married	75.4	70.0	70.5	68.9	63.7	62.4	65.2	69.0	70.0	64.6	66.7	67.7
Polygamous Married	6.6	6.2	7.8	8.5	29.4	30.5	28.3	19.0	6.2	24.4	20.2	17.1
Divorced	4.6	6.1	7.3	4.4	1.0	1.1	0.8	2.6	6.1	2.8	2.3	3.5
Widowed	7.5	10.6	6.7	11.1	2.4	3.2	2.6	4.7	10.6	4.1	6.1	6.5
Separated	1.4	1.7	0.5	2.6	1.0	0.0	0.3	1.2	1.7	0.1	1.2	1.1
Cohabitation	0.6	0.7	1.0	0.7	0.0	0.0	0.0	0.3	0.7	0.3	0.3	0.4

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
Source: ISSER – Ghana Baseline Data (AGRA), 2016

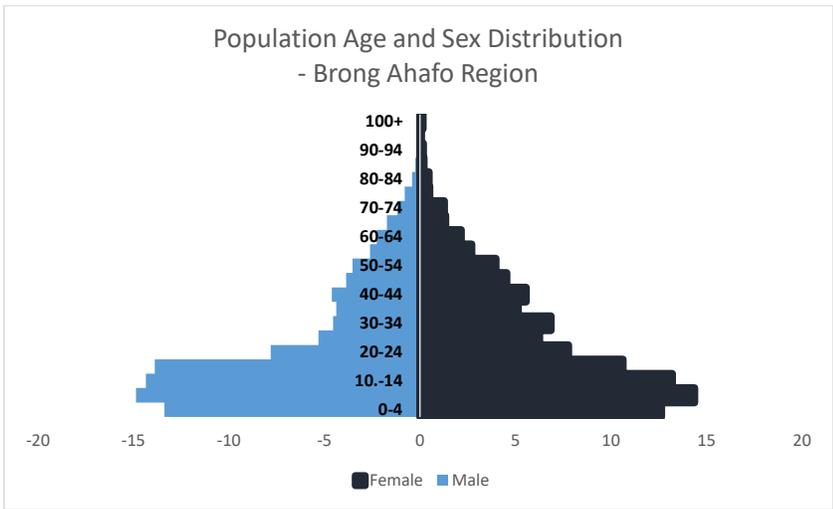
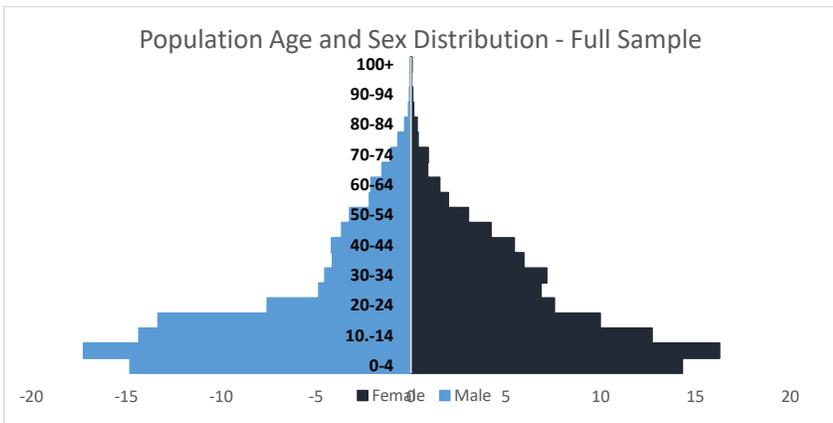
Table 2: Demographic characteristics of sampled households

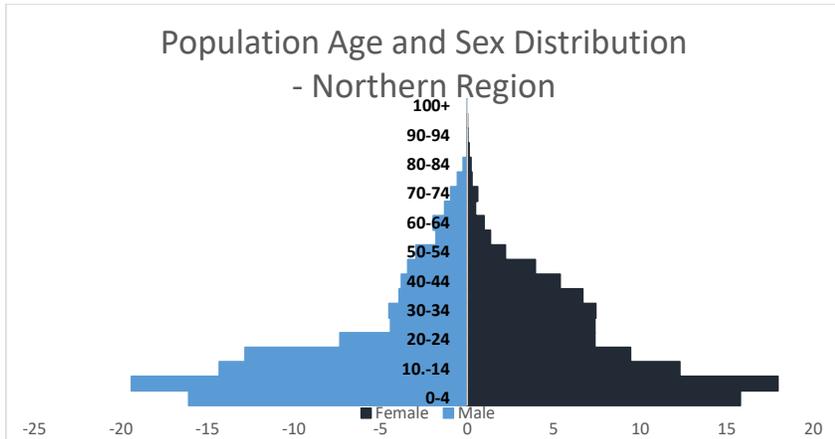
Indicator	Brong Ahafo Region				Northern Region			Overall				Total Sample
	Maize	Cassava	Rice	Soybean	Maize	Rice	Soybean	Maize	Rice	Soybean	Cassava	
No. of Households	349	810	193	270	419	532	385	768	810	725	655	2,958
Household Size	5.2	5.0	5.2	4.9	6.6	7.1	7.0	6.0	5.0	6.6	6.1	5.9
Gender Breakdown HH Heads												
Male (%)	84.8	77.7	81.9	79.3	95.7	96.4	97.4	90.8	77.7	92.6	89.9	87.4
Female (%)	15.2	22.4	18.1	20.7	4.3	3.6	2.6	9.2	22.4	7.5	10.1	12.6
Gender Breakdown of HH Members												
Male (%)	49.3	51.1	52.1	50.8	51	49.9	50.5	50.3	51.1	50.4	50.6	50.6
Female (%)	50.7	48.9	47.9	49.16	49	50.1	49.5	49.7	48.9	49.6	49.4	49.4
Average Age												
HH Heads (%)	46.7	49.3	45.2	48.2	44.5	43.5	45.2	45.47	49.3	43.9	46.4	46.4
HH Members (%)	22.9	24.7	23.1	23.6	21	19.9	21.0	21.73	24.7	20.6	21.9	22.1
Age Breakdown (% of household members)												
0-14	43.8	40.9	40.	40.8	46.6	49.8	46.8	45.5	40.9	47.8	44.8	44.9
15-64	52.5	54.0	56.9	55.2	50.8	48.0	50.6	51.5	54.0	49.9	52.1	51.8
65+	3.8	5.1	3.0	4.0	2.6	2.2	2.7	3.1	5.1	2.4	3.1	3.4
HH Dependency Ratio	1.0	1.0	0.9	0.9	1.1	1.2	1.1	1.0	1.0	1.1	1.0	1.0
Marital Status of HH Head (%)												
Single	4.0	4.7	6.2	3.7	2.6	2.8	2.9	3.3	4.7	3.7	3.2	3.8
Monogamous married	75.4	70.0	70.5	68.9	63.7	62.4	65.2	69.0	70.0	64.6	66.7	67.7
Polygamous Married	6.6	6.2	7.8	8.5	29.4	30.5	28.3	19.0	6.2	24.4	20.2	17.1
Divorced	4.6	6.1	7.3	4.4	1.0	1.1	0.8	2.6	6.1	2.8	2.3	3.5
Widowed	7.5	10.6	6.7	11.1	2.4	3.2	2.6	4.7	10.6	4.1	6.1	6.5
Separated	1.4	1.7	0.5	2.6	1.0	0.0	0.3	1.2	1.7	0.1	1.2	1.1
Cohabitation	0.6	0.7	1.0	0.7	0.0	0.0	0.0	0.3	0.7	0.3	0.3	0.4

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Figure 2: Population Age and Sex Distribution of Sample (by Region)





Source: ISSER – Ghana Baseline Data (AGRA), 2016

5.2 Education and Literacy

In this section, the educational access and literacy of household heads and members is assessed. This characteristic is an important determinant of the success of agricultural interventions, as it influences uptake of inputs, practice of agronomic practices and understanding of extension advice. Respondents were asked to indicate whether they had ever attended school and literacy levels, defined by their ability to read or write a phrase in English.

At 42.9 percent, almost half of the household heads interviewed had completed at least one level of education. We observe a difference between the focus regions for this particular indicator. The proportion of educated household heads are larger in Brong Ahafo than in the Northern region. When it comes to current enrolment, investigated for all households and a subset of members of school going age (3-25), two key trends stand out. First, the overall share of household members currently enrolled in school (60%) surpass that of household heads that have ever attended school. However, by region, this is only observed for the Northern. The second is that, in the case of current enrolment, the Northern region has a larger percentage of members currently enrolled than the Brong Ahafo region.(Table 3)

The sample hosts a majority illiterate adult population, with only 31.6% and 32.4% of household members, aged 15 and above, indicating that they could read or write, respectively. The share of literate household heads is even smaller: 24.9% reading and 25.7% writing. Following the trend of school attendance by household heads, literacy rates are higher in the Brong Ahafo region than in the Northern region.

Table 3: Education and literacy of households

Indicator	Brong Ahafo Region				Northern Region			Overall				Total Sample
	Maize	Cassava	Rice	Soybean	Maize	Rice	Soybean	Maize	Rice	Soybean	Cassava	
Ever Attended (% of HH Heads)	57.3	64.8	60.6	62.2	17.2	19.4	21.6	35.4	64.8	30.3	38.3	42.9
Current enrollment												
All ages (%)	55.6	54.7	58.4	55.7	64.3	67.0	59.7	60.9	54.7	65.1	58.4	60.0
Ages 3-25 (%)	28.0	25.4	33.0	29.6	45.8	50.5	40.2	39.1	25.4	46.9	36.9	37.7
Adult literacy (15+)												
% that can read	39.6	45.6	43.0	42.6	18.8	15.8	25.7	27.4	45.6	22.4	31.6	31.6
% that can write	40.0	46.8	43.9	44.4	19.5	16.3	25.9	27.9	46.8	23.0	32.4	32.4
HH Head Literacy												
% that can read	32.7	39.6	36.8	31.1	9.1	11.3	12.5	19.8	39.6	18.1	20.2	24.9
% that can write	32.4	41.2	37.8	31.9	9.6	12.2	12.7	19.9	41.2	19.0	20.6	25.7

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

6. Household Welfare

In this section, we examine the welfare indicators for farmers of the four (4) target crops in Ghana, provided by the country business plans published by AGRA in relation to their outlined strategy for the country. This baseline report looks particularly at five welfare indicators: Income and Employment, Food Security, Access to Credit and Saving, Household Assets and Housing Characteristics.

6.1 Income and Employment

This chapter presents the results of the employment and income levels of target crop farmers in the survey. Although, the sampled farmers are primarily engaged in farming, the survey also looks at income that was earned from self-employment or non-farm employment, which, in one way or the other, may supplement the income of the household. In addition to this, the report also looks at the ability of farmer households to employ other people in their households by paying these employees some wages. In terms of general welfare, the ability to take care of one's self as well as other members in a household cannot be underestimated. As we analyze income in terms of the annual wages received from the various activities, the study also looks at the most common forms of activities that our study population is engaged in. In this way, the study tries to draw some inferences from what farmers are engaged in outside their usual farming activities.

The section starts by looking at the number of farmers who, at the time of the survey, had salaried individuals working in their households. Although, among the target crop farmers there is a very small number having salaried employees, it is worth mentioning that, some few fall within this category.

Table 4 below shows the number of people who have salaried workers as well as those farmers who do not. This is broken down at the target crop level and at the regional level. It can be seen that just 20 farmers agreed that they had some individuals who they paid at the end of each month for some services they rendered to them. In terms of regional distribution, Cassava farmers in the Brong Ahafo region had the highest number of individuals who had salaried employees while in the Northern region, Rice farmers recorded the highest number of people who were paying wages to individuals working in their households.

Next, we look at the number of household members who are engaged in off-farm activities. The study assessed several off-farm activities. However, not all these activities could feature specifically in the analysis. For ease of expression and clarity, the top ten (10) non-farm activities are selected and categorized, with the remaining activities labelled as "Other". This comprises mainly of those activities that did not have a frequency of 40 individuals. Some of these non-farm activities recorded in the "Other" category are Electricians, Plumbers, *Trotro*³ drivers, Butchers, Hotel, Cobblers, Laundry business, Brick making, Pet breeding, Vehicle mechanic, Spraying, etc.

³ Public transportation

Table 5 below shows the distribution of the number of farmers that engage in non-farm activities recorded in the survey, based on the target crop and the region in which they grow. Among farmers surveyed in the study, a total of 1,211 (8.9%) agreed that they in one way or the other engaged in non-farm activities irrespective of their usual activities on their farms as compared to the total of 12,416 (91.1%) who were not engaged in other non-farm.

In the Brong Ahafo region, 830 farmers (12.6%) had some non-farm activities they engaged in. In this region, most Cassava farmers, representing 15% of cassava growers in the region agreed that apart from growing cassava, they engaged in other activities that had nothing to do with cassava cultivation. This was followed by 11% among soybean farmers, 10.4% among Maize farmers and finally 8.7% among rice farmers. In the Northern region, 381 farmers (5.4%) had some off-farm activities they engaged in. There were no cassava farmers recording non-farm activities in this region. A total of 185, representing 6.6% of rice growers in the region, agreed that they engaged in other activities that had nothing to do with rice cultivation. This was followed by 6.1% among maize farmers and finally 3.2% among rice farmers. As pointed out in earlier paragraphs, the study identifies the most common off-farm activities that farmers engaged in. Table 6 shows this distribution.

From Table 6, we see that most households in the survey were engaged in Agricultural trading. Agricultural trading includes sale of agricultural inputs, crops and other prior engagements in the agricultural sector, which are not necessarily linked to actual farming activities. A total of 129 farmers (10.65%) were engaged in Agricultural Trading. The second highest off-farm activity engaged was Retail/Shop keeping/kiosk where 109 farmers (9.0%) were engaged in.

The next activity is fish trading in which a total number of 89 people (7.4%) were engaged, followed by Food Vending with 88 people (7.3%). It is not surprising that food vending features frequently because we are dealing with farmer households, as crop farmers may prepare and sell some of their produce for some extra money. Casual workers such as by-day workers, farm labourers, fetching water for pay etc. follows next with 86 people (7.1%) engaging in this activity. Next is Livestock trading activities in which 69 people (5.7%) are engaged. This is primarily linked to the Northern part of the country where cattle rearing has been in existence for a while, hence the willingness to do this in addition to their usual crop farming activities. Charcoal Burning follows with 59 people (4.9%), which is primarily linked to the Brong Ahafo region due to the abundant forest in these parts of the country. The next non-farm activity group that followed is tailoring of which 53 people (4.4%) were found to be engaged in. The next off-activity was recorded for individuals who were operating drinking bars or spots. Forty-four people (3.63%) were reported as engaging in operating drinking bars and spots. Lastly, activities that provide income from other farms, such as renting farmland, was bottom of the top ten list of off-farm activities. In total, 25 people representing 2.1% were engaged in various kinds of activities that brought them income from some other farm or land they possessed. The regional analysis follows the same trend.

Table 4: Farmers with Salaried Employees by target crop and region

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Salaried Employees														
No	805	349	191	269	1,614	415	525	383	1,323	805	764	716	652	2,937
	99.4	100	99.0	99.6	99.5	99.3	98.7	99.5	99.1	99.4	99.6	98.8	99.5	99.3
Yes	5	0	2	1	8	3	7	2	12	5	3	9	3	20
	0.6	0	1.0	0.4	0.5	0.7	1.3	0.5	0.9	0.6	0.4	1.2	0.5	0.7
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 5: Distribution of Farmers Engaging in off-farm Activities by Crop and Region

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Engages in Non-farm Activities														
Yes	493	151	70	116	830	130	185	66	381	493	281	255	182	1,211
	15.0	10.4	8.7	11.0	12.6	6.1	6.6	3.2	5.4	15.0	7.8	7.1	5.8	8.9
No	2,789	1,303	736	943	5,771	2,016	2,611	2,018	6,645	2,789	3,319	3,347	2,961	12,416
	85.0	89.6	91.3	89.1	87.4	93.9	93.4	96.8	94.6	85.0	92.2	92.9	94.2	91.1
Total	3,282	1,454	806	1,059	6,601	2,146	2,796	2,084	7,026	3,282	3,600	3,602	3,143	13,627
	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 6: Distribution of 10 Most Common Non-Farm Activities by Target Crop and Region

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Agricultural Trading	53	16	3	9	81	18	18	12	48	53	34	21	21	129
(%)	10.8	10.6	4.3	7.8	9.8	13.9	9.7	18.2	12.6	10.8	12.1	8.2	11.5	10.7
Casual Worker	50	22	0	7	79	3	3	1	7	50	25	3	8	86
(%)	10.1	14.6	0.0	6.0	9.5	2.3	1.6	1.5	1.8	10.1	8.9	1.2	4.4	7.1
Charcoal Burning	34	4	6	10	54	1	4	0	5	34	5	10	10	59
(%)	6.9	2.7	8.6	8.6	6.5	0.8	2.2	0.0	1.3	6.9	1.8	3.9	5.5	4.9
Fish Trading	61	12	7	5	85	2	0	2	4	61	14	7	7	89
(%)	12.4	8.0	10.0	4.3	10.2	1.5	0.0	3.0	1.1	12.4	5.0	2.8	3.9	7.4
Livestock Trading	6	4	1	1	12	27	27	3	57	6	31	28	4	69
(%)	1.2	2.7	1.4	0.9	1.5	20.8	14.6	4.6	15.0	1.2	11.0	11.0	2.2	5.7
Retail/Shopkeeping	36	11	15	12	74	6	24	5	35	36	17	39	17	109
(%)	7.3	7.3	21.4	10.3	8.9	4.6	13.0	7.6	9.2	7.3	6.1	15.3	9.3	9.0
Tailor	17	6	4	4	31	6	11	5	22	17	12	15	9	53
(%)	3.5	4.0	5.7	3.5	3.7	4.6	6.0	7.6	5.8	3.5	4.3	5.9	5.0	4.4
Food Vending	42	8	7	19	76	1	5	6	12	42	9	12	25	88
(%)	8.5	5.3	10.0	16.4	9.2	0.8	2.7	9.1	3.2	8.5	3.2	4.7	13.7	7.3
Other farm Income	5	3	1	0	9	2	9	5	16	5	5	10	5	25
(%)	1.0	2.0	1.4	0.0	1.1	1.5	4.9	7.6	4.2	1.0	1.8	3.9	2.8	2.1
Bar Operator	23	8	4	7	42	1	1	0	2	23	9	5	7	44
(%)	4.7	5.3	5.7	6.0	5.1	0.8	0.5	0.0	0.5	4.7	3.2	2.0	3.9	3.6
Other	166	57	22	42	287	63	83	27	173	166	120	105	69	460
(%)	33.7	37.8	31.4	36.2	34.6	48.5	44.9	40.9	45.4	33.7	42.7	41.2	37.9	38.0

Notes: We only show the top 10 activities. Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

The study not only looks at these work categories, but the income earned by the households undertaking these non-farm activities. Annual average net profits obtained by each household is tabulated in Table 7 below. This was done by aggregating low earnings, average earnings, and high earnings over a one-year period for each month. This aggregation gave an idea of the annual revenue and cost figures for low, average and high earnings, which were differenced to obtain mean annual earnings for the target crop farmers.

Table 7: Mean Annual Non-farm Income (US\$) by Target Crop and Region

Region	Cassava	Maize	Rice	Soybean	Total
Brong Ahafo	593.96	167.91	926.48	360.73	474.72
Northern		502.31	734.81	606.29	587.82
Overall	593.96	324.41	790.25	452.10	510.31

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

From the study, we see that, farmers in non-farm employment earned an average net profit of US\$ 510.31 in the 2015/2016 farming season. In terms of regional and crop breakdown rice farmers engaged in non-farm activities in both regions made the most net profit earnings of US\$4 926.48 in Brong Ahafo and US\$ 734.81 in the Northern region. Maize farmers in the Brong Ahafo regions who are engaged in non-farm activities made the least profits (US\$ 167.91 annually)

The study also ascertains the number of sampled target crop farmers engaged in salaried employment in the 2015/2016 farming season. In terms of salaried work, the study includes pensions as well as local and foreign remittances. Table 8 below shows the distribution of individuals who agree they had some kind of salaried employment.

Table 8: Distribution of Farmers with in Salaried Employment by Target Crop and Region

Regions	Target Crops	Salaried Employment				Total
		Yes	%	No	%	
Brong Ahafo Region	Cassava	139	4.2	3,143	95.8	3,282
	Maize	59	4.1	1,395	95.9	1,454
	Rice	25	3.1	781	96.9	806
	Soybean	62	5.9	997	94.2	1,059
	Total	285	4.3	6,316	95.7	6,601
Northern Region	Maize	39	1.8	2,107	98.2	2,146
	Rice	47	1.7	2,749	98.3	2,796
	Soybean	48	2.3	2,036	97.7	2,084
	Total	134	1.9	6,892	98.1	7,026
Overall	Cassava	139	4.2	3,143	95.8	3,282
	Maize	98	2.7	3,502	97.3	3,600
	Rice	72	2.0	3,530	98.0	3,602
	Soybean	110	3.5	3,033	96.5	3,143
	Total	419	3.1	13,208	96.9	13,627

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

In Table 8, 419 (3.1%) individuals indicated that they were engaged in some sort of salaried employment. In the Brong Ahafo region, 285 farmers (4.3%) had some salaried employment they engaged in. In this region, 3.1% of Rice farmers were engaged in non-maize farm salaried jobs, 139 representing 4.06% of maize growers in the region agreed that apart from growing maize, they engaged in other wage related activities that had nothing to do with maize cultivation. This was followed by 4.2% among cassava farmers and, finally, 5.9% among Soybean farmers. In the Northern region, a total of 134 farmers (1.9%) had some salary related activities they engaged in. as shown in earlier chapters there were no cassava farmers, recording salaried employment in this region. A total of 47 representing 1.7% of rice growers in the region agreed that apart from growing Rice, they engaged salaried employment that had nothing to do with cassava cultivation. This was followed by 1.7% among Rice farmers and finally 1.8% among Maize farmers.

In addition to this, we calculated the average earnings that target crop farmers made from these salaried engagements. Aggregation for annual incomes obtained from salaried employment was done in two ways. First, if the respondent confirmed that monthly income never changed in the course of the year, a sum over the 12 months gave annual salaried employment income. However, in cases where the respondent confirmed that payments were uneven over the course of the year, efforts were made to aggregate the different amounts obtained each month over the

course of the year. Table 9 below shows the distribution of average annual income earned from salaried employment.

Table 9: Mean Annual Salaried Employment Income by Target Crop and Region (US\$)

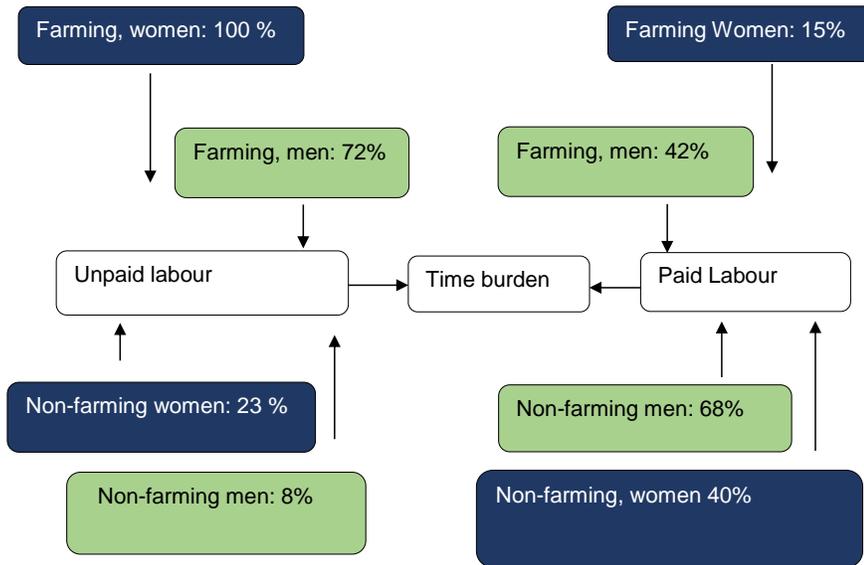
Regions	Target Crops				
	Cassava	Maize	Rice	Soybean	Total
Brong Ahafo	737.77	594.13	661.17	501.99	617.80
Northern		514.68	805.87	436.88	555.69
Overall	737.77	561.83	756.26	475.18	597.89

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
Source: ISSER – Ghana Baseline Data (AGRA), 2016

From the study, we see that, farmers engaged in salaried employment earned an average income of US\$ 597.89 in the 2015/2016 farming season. In terms of regional and crop breakdown, Rice farmers engaged in salary related activities in the Northern region earned the highest salaries of US\$ 805.87 annually. This figure also doubles as the highest in the study. Soybean farmers in the Northern region who are engaged salaried employment made the least profits (US\$ 436.88 annually). From the background that a significant proportion of small holder farmers (42% in Ghana and 52% in SSA) are women (Thornton, Jones, Ericksen, & Challinor, 2011), qualitative interviews explored an assertion (82%) that the income earnings of household members correlate positively with their level of involvement in both farming and non-farming decision making (Figure 3). This was an attempt to enhance understanding of the context of both paid farming and non-farming work in farm households. Some respondents stated: "...as for that one it doesn't matter whether man or woman if you earn high you become important in every decision making in the house. yes, both farming and non-farming all..."

FGDs and IDIs examined gendered patterns of income. Differences in income earnings of women manifested in what were mostly patriarchal farming communities. Paid and unpaid farming and non-farming activities mentioned herein after share the same definition quoted in the quantitated analysis. Figure 3 provides an overview of the spread of women and men farm household members over paid and unpaid farming and non-farming activities.

Figure 3: Thematic network on gender, income and employment



Source: ISSER – Ghana Baseline Qualitative Data (AGRA), 2016

All interviewed women from focus crop farm households reported not receiving payment for farming activities. A lesser proportion of men from farm households (72%) rendered unpaid labour-based services on farming plots. More women (23%) were engaged in unpaid non-farming activities than men (8%) were. Women dominated unpaid non-farm activities were mostly related to provision of child and aged care and home maintenance daily routines. Men were passively involved in home management tasks mostly in the absence of designated females in charge on household activities. Less than half (42%) of the male sample engaged in paid farming activities mostly on plots of other focus and non-focus crop farmers while women reported lesser (15%) paid farming activities rendered on other farms within their setting. Women dominated paid labour were in harvesting, processing and storage. The Northern region had more women (82%) in paid farm labour than the Brong Ahafo (18%). Rice and maize communities had more women in paid farming activities in both regions than any selected focus crop setting.

Respondents linked household income earnings to decision-making and establishes a connection between the income of adult female farm household members (and their dominance in unpaid labour, both farming and non-farming) and their relatively low decision-making involvement in both farming and non-farming activities in both regions across all focus crops explored in Section 7, *Women Empowerment in Agriculture*.

6.2 Food Security

Despite long-standing efforts to improve the food security situation of populations globally, food deprivation and its physical consequences remain a continuing problem in resource-poor areas throughout the world. The Food and Agriculture Organization of the United Nations (FAO) estimated that, in 2010 alone, 925 million people worldwide did not have access to sufficient food to meet their dietary energy requirements (Coates, Swindale, & Bilinsky, 2007).

Household food access is defined as the ability to acquire sufficient quality and quantity of food to meet all household members' nutritional requirements for productive lives. Given the variety of activities implemented by AGRA to improve household food access and the significant challenges most surveys face in measuring household food access for reporting purposes, there is a need to build consensus on appropriate household food-access impact indicators. This section provides an approach to ascertain household food access. This is done in terms target crops and region.

The first step is to ascertain the types of food available and commonly consumed by households. This will inform the study on how food secure households are. USAID defines food security as, "when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life." Three distinct variables are essential to the attainment of food security: 1) Food Availability: sufficient quantities of appropriate, necessary types of food from domestic production, commercial imports or donors other than USAID are consistently available to the individuals or are within reasonable proximity to them or are within their reach; 2) Food Access: individuals have adequate incomes or other resources to purchase or barter to obtain levels of appropriate food needed to maintain consumption of an adequate diet/nutrition level; 3) Food Utilization: food is properly used, proper food processing and storage techniques are employed, adequate knowledge of nutrition and child care techniques exist and is applied, and adequate health and sanitation services exist (USAID, 1992).

Since availability of food is the first key to food security, the survey investigates the availability of some food crops in the household, which indicates some kind of household food security. Table 10 below shows the distribution of the five most commonly consumed foods in the surveyed households.

Table 10: Commonly Consumed Food Crops (Top 5)

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Commonly consumed food (% of households)														
Maize, dry	159	133	22	90	404	388	447	368	1,203	159	521	469	458	1,607
	19.7	35.6	8.0	31.8	23.2	61.7	63.8	65.6	47.4	19.7	68.4	64.9	70.4	54.6
Millet	0	9	7	4	20	9	7	4	20	0	9	7	4	20
	0.0	2.4	2.5	1.4	1.2	1.4	1.0	0.7	0.8	0.0	1.2	1.0	0.6	0.7
Cassava	297	108	10	76	491	108	10	76	491	297	108	10	76	491
	36.8	28.9	3.6	26.9	28.2	17.2	1.4	13.6	19.3	36.8	14.2	1.4	11.7	16.7
Rice	11	11	30	8	60	11	30	8	60	11	11	30	8	60
	1.4	2.9	10.9	2.8	3.5	1.8	4.3	1.4	2.4	1.4	1.4	4.2	1.2	2.0
Yams	340	113	207	105	765	113	207	105	765	340	113	207	105	765
	42.1	30.2	75.0	37.1	44.0	18.0	29.5	18.7	30.1	42.1	14.8	28.6	16.1	26.0
Total	807	374	276	283	1,740	629	701	561	2,539	807	762	723	651	2,943
	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 11: Distribution of Households that Experienced Food Shortages

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Household Experienced Food Shortage														
1. Yes	280	87	97	56	520	177	172	184	533	280	264	269	240	1,053
(%)	34.6	24.9	50.3	20.7	32.1	42.3	32.3	47.8	39.9	34.6	34.4	37.1	36.6	35.6
2. No	530	262	96	214	1,102	241	360	201	802	530	503	456	415	1,904
(%)	65.4	75.1	49.7	79.3	67.9	57.7	67.7	52.2	60.0	65.4	65.6	62.9	63.4	64.4
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

The study revealed that dried maize, cassava, millet, rice and yam were the five most commonly consumed food. However, among these food crops, dried maize was most available in the surveyed households. A total of 1,607 households representing 54.6% agreed that they had dried maize stocks for their food needs. This is not surprising because in Ghanaian households, many foods consumed are maize-based; hence, each household tries to keep some stock to meet their daily food requirements. The next most common food crop consumed was yam where 765 households representing 26% confirmed that they had yams in stock for consumption. Third most consumed food crop is cassava and 491 households (16.7%) had this crop in stock. Fourth food crop recorded is Rice where 60 households (2.0%) agreed to the fact that they had this food crop in stock. Last is Millet where 20 households (0.7%) had this food crop in stock.

In discussing food security, the study also tries to investigate the number of households that are currently experiencing or have experienced food shortages in the last 12 months. This food shortage experience is compared at the regional and the target crop level. Table 11 shows this distribution. From the surveyed sample of 2,957 households, 1,053 households (35.6%) agreed that they experienced food shortages in the course of the year. The reverse was 1,904 households (64.4%) who indicated that they experienced no food shortages in the course of the year.

In terms of regional distribution of food shortage Table 11 shows that there were slightly more people in the Northern region 533 households (39.4%) as compared to 520 households (32.1%) in the Brong Ahafo region experiencing food shortages in the course of the year. This is evident from the short spells of rain during the rainy season as well as the short seasons of harvests.

For households that indicated that they had experienced shortage, they were able to supply adequate food for consumption for 10 out of the past 12 months surveyed. This is approximately the case across the board for all regions and target crop groups. (Table 12)

Table 12: Average Number of Months of Adequate Food Supply

Region and Target Crop	Target Crop				
	Cassava	Maize	Rice	Soybean	Overall
Average Number of Months of Adequate Food					
Brong Ahafo	10	10	10	10	10
Northern	-	10	10	10	10
Total	10	10	10	10	10

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
Source: ISSER – Ghana Baseline Data (AGRA), 2016

The next step in the study is to weigh households on a hunger scale to know target farmer households that are more or less prone to hunger. Arguably, one of the first steps to effectively addressing food insecurity is to establish reliable methods for measuring it. In the absence of reliable measurement, it is not possible to target interventions appropriately, to monitor and evaluate programs and policies, or to generate lessons learned to improve the effectiveness of these efforts in the future.

This study uses the Household Hunger Scale (HHS) to measure household hunger in food secure areas. The HHS is different from other household food insecurity indicators in that it has been specifically developed and validated for cross-cultural use. This means that the HHS produces valid and comparable results across cultures and settings so that the status of different population groups can be described in a meaningful and comparable way. The HHS is a household food deprivation scale, derived from research to adapt the United States (U.S.) household food security survey module for use in a developing country context and from research to assess the validity of the Household Food Insecurity Access Scale (HFIAS) for cross-cultural use. Table 13 below shows the distribution of household susceptibility to hunger by target crops and region.

Table 13 shows that out of the total sample of 2,959 households, about 48.8% of this number were found to be experiencing little or no hunger at all when placed on the hunger scale. A total of 1,443 households made this tally whereas 1,465 households (49.5%) when assessed on the hunger scale were found to moderately hungry. In terms of households experiencing severe hunger, 51 households (1.7%) through the hunger scale were assessed to be experiencing severe hunger. In terms of regional assessment more than half of the target crop farmers in the Northern region (35 households) were found to experiencing severe hunger as compared to that of households in the Brong Ahafo region (16 households).

6.3 Household Assets

Assets are key determinants of household welfare. Ownership or access to a range of assets largely determines the livelihood strategies of poor rural households and whether they manage to get out of poverty. In agriculture, the combination of assets endowments and access to agrarian institutions is crucial in forming the incentives faced by agricultural households and their ability to respond to changes in markets and policy. This is why a sizeable share of the agricultural economics literature, particularly of that concerned with developing regions, is devoted to the study of issues in wealth and asset creation for farmer households (Zezza, et al., 2007).

For the purposes of this study, we group assets into four (4) main categories namely: large mechanized agricultural assets, small agricultural assets, large household assets and small household items. Large agricultural assets comprise mechanized items such as animal traction, harrows, planters, power saws, etc., whereas small household assets consist of hand-powered tools like chaff cutters, hammers, wheelbarrows etc. On the other hand, large household assets comprise bicycles/motorcycles, computers etc. Table 14 to Table 16 below shows the distribution ownership of household assets by region and target crop. No households recorded ownership of small agricultural assets

For large agricultural assets, about a quarter of the households surveyed made up of about 726 households (25%) had none of these assets in their households as compared to 2,231 households who confirmed that they had at least one of such items in their household. Table 14 shows this ownership distribution by target crop and region

Table 13: Hunger Scale by Target crop and Region

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Hunger Scale														
Little/no hunger	435	210	109	144	898	165	237	143	545	435	375	346	287	1,443
(%)	53.7	60.2	56.5	53.3	55.4	39.4	44.5	37.1	40.8	53.7	48.8	47.7	43.8	48.8
Moderate Hunger	364	137	83	124	708	239	285	233	757	364	376	368	357	1,465
(%)	44.9	39.3	43.0	45.9	43.7	57.0	53.5	60.5	56.6	44.9	49.0	50.7	54.5	49.5
Severe hunger	11	2	1	2	16	15	11	9	35	11	17	12	11	51
(%)	1.4	0.6	0.5	0.7	1.0	3.6	2.1	2.3	2.6	1.4	2.2	1.7	1.7	1.7
Total	810	349	193	270	1,622	419	533	385	1,337	810	768	726	655	2,959
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 14: Large Agricultural Asset Ownership by Region and Crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
No. of Large Agricultural Assets owned														
None	90	46	21	18	175	189	223	139	551	90	235	244	157	726
(%)	11.1	13.2	10.9	6.7	10.8	45.2	41.9	36.1	41.3	11.1	30.6	33.7	24.0	24.6
At least One	720	303	172	252	1,447	229	309	246	784	720	532	481	498	2,231
(%)	88.9	86.8	89.1	93.3	89.2	54.8	58.1	63.9	58.7	88.9	69.4	66.3	76.0	75.5
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 15: Large Household Asset Ownership by Region and Crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
No of Large HH Assets owned														
None	31	11	4	8	54	50	43	35	128	31	61	47	43	182
(%)	3.8	3.2	2.1	3.0	3.3	12.0	8.1	9.1	9.6	3.8	8.0	6.5	6.6	6.2
At least One	779	338	189	262	1,568	368	489	350	1,207	779	706	678	612	2,775
(%)	96.2	96.9	97.9	97.0	96.7	88.0	91.9	90.9	90.4	96.2	92.1	93.5	93.4	93.9
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 16: Small household Asset Ownership by Region and Crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
No of Small HH Assets owned														
None	60	19	9	12	100	151	187	95	433	60	170	196	107	533
(%)	7.4	5.4	4.7	4.4	6.2	36.1	35.2	24.7	32.4	7.4	22.2	27.0	16.3	18.0
At least One	750	330	184	258	1,522	267	345	290	902	750	597	529	548	2,424
(%)	92.6	94.6	95.3	95.6	93.8	63.9	64.9	75.3	67.6	92.6	77.8	73.0	83.7	82.0
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 15 on the other hand shows the number of households who own a Large Household Assets. More than 90% of the households surveyed had large household asset in their homes. More often than not, such large household assets categorized for the basis of this study (Boreholes, wells, Bicycles) are found in rural homes hence this large percentage share. On the other hand, about 6.2% of households had no large household asset in their possession.

Lastly, for Small household assets less than a quarter of the households surveyed made up of about 533 households (18%) had none of such assets in their households as compared to 2,424 households (82%) who confirmed that they had at least one of such items in their household Table 16 shows this ownership distribution by target crop and region.

6.4 Housing Characteristics

In this section, we discuss the household features encountered during the baseline study. This will enable readers appreciate the nature of the localities visited during the survey. One of the basic needs of humanity is shelter. A great deal of the household activities takes place in the home. The household structure serves as a place of sleeping for household members, receiving visitors, resting, cooking and as a shelter for farm animals where applicable. For households with sizeable compounds it also serves as playground for children. Other sub-structures such as toilet facilities are also essential for the comfort and sanitary conditions of the home. This section discusses ownership or rental arrangements of the dwelling structure and the amenities and utilities found within it.

For the purposes of this study, there are four main occupancy statuses that a household may possess in relation the dwelling in which they live. The household may own, rent, receive from a relative who owns the structure or some other type of ownership arrangement. Across the both the Northern and Brong Ahafo localities most of the households own the dwelling in which they live, 68.2%. However, more Northern households (74.9%), compared to the Brong Ahafo households (62.7%), own the dwelling in which they live. On the other hand, there are more Brong Ahafo households (6.5%) than Northern households (0.45%) who are renting their dwellings in proportionate terms. Households whose dwelling is owned by relatives is higher for Brong Ahafo households (29.8%) as compared to the Northern households (24.6%). Other occupancy status was on the low side and accounted for about 0.5% of the sample. See Table 17

Table 17: Distribution of Ownership Status by Region and Target Crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Ownership Arrangements														
Owned	494	248	112	164	1,018	289	393	318	1,000	494	537	505	482	2,018
(%)	61.0	71.1	58.0	60.7	62.8	69.1	73.9	82.6	74.9	61.0	70.0	69.7	73.6	68.2
Rented	55	16	18	16	105	1	4	1	6	55	17	22	17	111
(%)	6.8	4.6	9.3	5.9	6.5	0.2	0.8	0.3	0.5	6.8	2.2	3.0	2.6	3.8
Owned by relative	258	83	61	82	484	128	135	66	329	258	211	196	148	813
(%)	31.9	23.8	31.6	30.4	29.8	30.6	25.4	17.1	24.6	31.9	27.5	27.0	22.6	27.5
Other(specify)	3	2	2	8	15	0	0	0	0	3	2	2	8	15
(%)	0.4	0.6	1.0	3.0	0.9	0.0	0.0	0.0	0.0	0.4	0.3	0.3	1.2	0.5
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 18: Distribution of water sources during the Dry Season

Indicator	Brong Ahafo Region					Northern Region					Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total	
Pond	0	1	0	1	2	1	5	2	8	0	2	5	3	10	
(%)	0.0	0.3	0.0	0.4	0.1	0.2	0.9	0.5	0.6	0.0	0.3	0.7	0.5	0.3	
Dam/ sand dam	9	2	16	0	27	56	56	86	198	9	58	72	86	225	
(%)	1.1	0.6	8.3	0.0	1.7	13.4	10.5	22.3	14.8	1.1	7.6	9.9	13.1	7.6	
Lake	1	0	0	0	1	0	0	1	1	1	0	0	1	2	
(%)	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	0.1	0.0	0.0	0.2	0.1	
Stream/ River	141	95	57	40	333	99	75	63	237	141	194	132	103	570	
(%)	17.4	27.2	29.5	14.8	20.5	23.7	14.1	16.4	17.8	17.4	25.3	18.2	15.7	19.3	
Unprotected spring	0	0	0	0	16	8	0	0	8	0	8	0	0	8	
(%)	0	0	0	0	1.0	1.9	0	0	0.6	0	1.0	0	0	0.3	
Protected spring	0	0	0	0	795	0	0	1	1	0	0	0	1	1	
(%)	0	0	0	0	49	0	0	0.3	0.1	0	0	0	0.2	0.0	
Well	8	1	7	0	4	30	43	15.0	88	8	31	50	15	104	
(%)	1.0	0.3	3.6	0	0.3	7.18	8.08	3.9	6.6	1.0	4.0	6.9	2.3	3.5	
Borehole	391	150	112	142	443	218	336	194	748	391	368	448	336	1,543	
(%)	48.3	43.0	58.0	52.6	27.3	52.2	63.2	50.4	56.0	48.3	48.0	61.8	51.3	52.2	
Piped into compound	3	1	0	0	4	1	1	2	4	3	2	1	2	8	
(%)	0.4	0.3	0.0	0.0	0.3	0.2	0.2	0.5	0.3	0.4	0.3	0.1	0.3	0.3	
Piped outside compound	256	99	1	87	443	5	16	15	36	256	104	17	102	479	
(%)	31.6	28.4	0.5	32.2	27.3	1.2	3.0	3.9	2.7	31.6	13.6	2.3	15.6	16.2	
Water tankers	1	0	0	0	1	0	0	5	5	1	0	0	5	6	
(%)	0.1	0	0	0	0.1	0	0	1.3	0.4	0.1	0	0	0.8	0.2	
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957	
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 19: Distribution of roofing types by region and target crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Type of Roofing														
Grass/thatch	190	131	34	78	433	155	183	181	519	190	286	217	259	952
	23.5	37.5	17.6	28.9	26.7	37.1	34.4	47.0	38.9	23.5	37.3	29.9	39.5	32.2
Iron sheet	619	217	159	192	1,187	257	341	204	802	619	474	500	396	1,989
	76.4	62.2	82.4	71.1	73.2	61.5	64.1	53.0	60.1	76.4	61.8	69.0	60.5	67.3
Tiles	1	1	0	0	2	0	0	0	0	1	1	0	0	2
	0.1	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Other(specify)	0	0	0	0	0	6	8	0	14	0	6	8	0	14
	0.0	0.0	0.0	0.0	0.0	1.4	1.5	0.0	1.1	0.0	0.8	1.1	0.0	0.5
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

One other important element for a complete household is water for drinking and for general use. Different households used different sources as their main source of water supply. In the dry seasons, over 52% households source domestic water from boreholes. Boreholes are used by 27.3% of dwellers in the Brong Ahafo region and 56% of Northern folks in Ghana. Streams and rivers followed with 19.3%, and then public standpipe (16.2), after water from wells serves 3.5% of farmer households surveyed. Ponds, Unprotected springs, indoor pipes, water tankers, lakes, and protected springs followed with an average of less than 1%. See Table 18.

The roofing materials in a household also shows a household's standard of living. In this study, we categorize the type of roofing into grass or thatch, Iron sheets and tiles. In the study, more than about 67% of the households surveyed were roofed with iron sheets. Although quite outmoded, 32.2% of households surveyed were roofed with grass or thatch. Roofing tiles are much more exquisite and expensive for the households surveyed. This is reflective on the number of people who are using this roofing type. Only two households confirmed that they used this kind of roof (0.07%). See Table 19.

The situation and distance of sources of water for household consumption is a crucial factor in determining how much time households can allocate to other household activities after fetching water for drinking and for general use, especially in the dry season. The average distance in kilometres to the source of water from the household dwelling is consistently lower in the Brong Ahafo localities than the Northern localities for both drinking and general use water. Brong Ahafo and Northern dwellers on average must in the dry season travel 0.7km and 0.8km to get to their drinking water and general use water respectively. In terms of target crop farmers in the Brong Ahafo region, rice farmers travel the most, about 1.2km in search of water in the dry season whereas in the Northern region maize farmers travel the most, about 0.88km in the dry season in search of water.

Table 20 below shows this distribution

Table 20: Average distance in KM to water source in the Dry season by Target Crop and Region

Region	Cassava	Maize	Rice	Soybean	Total
Brong Ahafo	0.6	0.9	1.2	0.4	0.7
Northern	-	0.9	0.8	0.7	0.8
Overall	0.6	0.9	0.9	0.6	0.8

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
Source: ISSER – Ghana Baseline Data (AGRA), 2016

7. Access to Credit and Savings

Agricultural credit access has particular salience in the context of Ghanaian rural development. Improving local agricultural production and exports is a government policy objective. Recent structural adjustment loans to Ghana from the World Bank (World Bank, 2015) have pushed the Ghanaian government to reduce agricultural subsidies and price interventions and let the private sector control the marketing of the agricultural products. It is therefore important to know the current situation concerning how farmer households finance their day-to-day activities. This section tries to investigate if, in the first place, farmers have tried to get credit. Moreover, if they did, where was this credit sought? In addition, was this credit request granted? Lastly, if granted what was the credit used for? This section also looks at the saving attitudes of farmers surveyed. The study seeks to understand if savings exist in the first place as well as the channels through which savings are done.

To ascertain whether farmers tried to obtain credit, the study uses a period of 12 months. We probe into if, within this period, any household member tried to get credit in cash or in kind for any purpose.

Out of the surveyed households, 578 households representing 19.6% confirmed that some household members tried to obtain credit whereas the remaining 80.4 of the target crop farmers replied in the negative. In regional terms, more target crop farmers in the Brong Ahafo region (20.6%) sought credit compared to their counterparts in the Northern region (18.3%).

In the next paragraphs, the study looks at where the credit was sought. In this case, we look at the main channels through which households get credit. For the purposes of this baseline study ten (10) main channels we selected and probed. These are: neighbours, Farmer groups, savings and credit cooperatives (SACCO), commercial banks, and relatives/friends, non-governmental organizations (NGO's) and Micro-Finance Institutions (MFI), agricultural finance corporation (AFC), rural banks, informal money lenders and traders. By anecdotal evidence, these are the main channels where most usually go when seeking credit. Table 22 below shows this distribution by region and target crop.

It is seen that among farmers who sought credit most households went to their Relatives/friends (34.7) as well as Neighbours (14.4%) when they were in need of some credit. This is not unusual. Being small-scale farmers, they might not usually require huge sums of credit for investments into their agricultural and off-farm activities. In the localities studied, there is a huge presence of rural banking activities so it also not surprising that rural banks were the next option. For some households (13.3%), they sought for credit when the need arose from traders. This was followed by NGO's and MFI's (8.4%) as the next most common credit source. Since evidence suggests that many NGO's are located in the Northern parts of Ghana, it is not unusual that this option features in the study. Informal moneylenders (6.2%) who may not necessarily have specific names or formal organograms follow this. In the local parlance, they are referred to as "susu" collectors who move round communities collecting and keeping individual savings for safekeeping

and sometimes for investments purposes. Other saving channels that did not form part of the study list followed with some 4.2% of households seeking credit from these channels. The last four options remaining are SACCO (3.6%), followed by commercial banks and farmer groups (2.6%) and finally by Agricultural Finance Corporation (0.3%).

Table 21 below shows the distribution among households in our two study regions who tried to obtain a loan, taking into consideration the target crop they cultivated.

Out of the surveyed households, 578 households representing 19.6% confirmed that some household members tried to obtain credit whereas the remaining 80.4 of the target crop farmers replied in the negative. In regional terms, more target crop farmers in the Brong Ahafo region (20.6%) sought credit compared to their counterparts in the Northern region (18.3%).

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Table 21: Distribution of Households that tried to get Credit

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Did Household seek Credit														
Yes	165	79	44	46	334	78	99	67	244	165	157	143	113	578
(%)	20.4	22.6	22.8	17.0	20.6	18.7	18.6	17.4	18.3	20.4	20.5	19.7	17.3	19.6
No	645	270	149	224	1,288	340	433	318	1,091	645	610	582	542	2,379
(%)	79.6	77.4	77.2	83.0	79.4	81.3	81.4	82.6	81.7	79.6	79.5	80.3	82.8	80.5
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 22: Sources of Household Credit by Target Crop and Regions

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Where was Credit Sought														
Neighbour	25	10	5	5	45	14	13	15	42	25	24	18	20	87
(%)	15.1	12.4	11.6	11.1	13.4	18.0	12.8	21.4	16.8	15.1	15.1	12.4	17.4	14.9
Farmer group	6	3	0	3	12	0	1	2	3	6	3	1	5	15
(%)	3.6	3.7	0.0	6.7	3.6	0.0	1.0	2.9	1.2	3.6	1.9	0.7	4.4	2.6
SACCO	6	7	0	5	18	0	0	0	0	6	7	0	5	18
(%)	3.6	8.6	0.0	11.1	5.4	0.0	0.0	0.0	0.0	3.6	4.4	0.0	4.4	3.1
Commercial bank	6	3	0	5	14	0	1	0	1	6	3	1	5	15
(%)	3.6	3.7	0.0	11.1	4.2	0.0	1.0	0.0	0.4	3.6	1.9	0.7	4.4	2.6
Relative/friend	32	16	12	8	68	41	52	45	138	32	57	64	53	206
(%)	19.3	19.8	27.9	17.8	20.3	52.6	51.0	64.3	55.2	19.3	35.9	44.1	46.1	35.2
NGO/MFI	23	11	4	6	44	0	5	1	6	23	11	9	7	50

(%)	13.9	13.6	9.3	13.3	13.1	0.0	4.9	1.4	2.4	13.9	6.9	6.2	6.1	8.6
AFC	0	0	0	0	0	1	1	0	2	0	1	1	0	2
(%)	0	0	0	0	0	1.3	1.0	0	0.8	0	0.6	0.7	0	0.3
Rural bank	35	12	12	5	64	0	5	3	8	35	12	17	8	72
(%)	21.1	14.8	27.9	11.1	19.1	0.0	4.9	4.3	3.2	21.1	7.6	11.7	7.0	12.3
Informal	5	6	1	4	16	9	9	2	20	5	15	10	6	36
(%)	3.0	7.4	2.3	8.9	4.8	11.5	8.8	2.9	8.0	3.0	9.4	6.9	5.2	6.2
trader	21	11	7	1	40	10	8	1	19	21	21	15	2	59
(%)	12.7	13.6	16.3	2.2	11.9	12.8	7.8	1.4	7.6	12.7	13.2	10.3	1.7	10.1
Other	7	2	2	3	14	3	7	1	11	7	5	9	4	25
(%)	4.2	2.5	4.7	6.7	4.2	3.9	6.9	1.4	4.4	4.2	3.1	6.2	3.5	4.3
Total	166	81	43	45	335	78	102	70	250	166	159	145	115	585
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 23: Distribution of Household that obtained Credit requested

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Did Household obtain Credit?														
Yes	130	71	24	39	264	77	101	67	245	130	148	125	106	509
(%)	78.3	87.7	55.8	86.7	78.8	98.7	99.0	95.7	98	78.3	93.1	86.2	92.2	87.0
No	36	10	19	6	71	1	1	3	5	36	11	20	9	76
(%)	21.7	12.4	44.2	13.3	21.2	1.3	1	4.3	2	21.7	6.9	13.8	7.8	13
Total	166	81	43	45	335	78	102	70	250	166	159	145	115	585
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 23 presents the results on the number of households that got the credit they sought taking into consideration the region and the target crop the household cultivated. Out of the 585 households that sought for loans, about 87% representing about 510 households actually obtained the credit requested. This is not surprising, because in the Table 22 above we observe that most loans are sought from friends, relatives and neighbours. There are groups who, due to communal living, rarely refuse them credit. Although rare, about 76 (13%) households had their credit applications turned down.

Average credit obtained is presented in Table 24. On average, households that successfully sought and obtained credit received US\$169.19 over the twelve-month period. Average credit obtained is higher in the Brong Ahafo region (US\$ 195.28) than in the Northern region (US\$141.07). Cassava households received the highest amount of credit (US\$192.21), while soybean households received the least (US\$149.68). Interestingly, within the regions, soybean farmers received the most credit (US\$ 212.76) in the Brong Ahafo region, while rice farmers recorded the highest average credit amount in the Northern region (US\$161.25).

Table 24: Amount of credit obtained by Household

Region	Cassava	Maize	Rice	Soybean	Total
How much credit did the Household obtain? (US\$)					
Brong Ahafo	192.21	189.61	200.30	212.76	195.28
Northern		139.06	161.25	112.96	141.07
Overall	192.21	163.31	168.74	149.68	169.19

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
Source: ISSER – Ghana Baseline Data (AGRA), 2016

The survey looks that at the uses of the credit obtained. There were six (6) categories of uses considered; school fees, medical, household consumption, building a house, farming and other purposes. Table 25 below shows the distribution of these uses by the region as well as the target crop.

Since the study concerned small-scale farmers, it is not surprising that farming purposes topped the list of uses. A total of 367 households (72%) confirmed that the credit they obtained was injected into their farming activities, followed by School fees (8.6%), Business (7.9%), Medical (4.3%), Household consumption (4.3%), other purposes (2.2%) and finally Building a house (0.6%).

Table 25: Uses of credit by household

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Uses of Credit obtained														
School fees	14	13	1	7	35	6	3	0	9	14	19	4	7	44
(%)	10.8	18.3	4.2	18.0	13.3	7.8	3.0	0.0	3.7	10.8	12.8	3.2	6.6	8.6
Medical	6	2	2	1	11	3	5	3	11	6	5	7	4	22
(%)	4.6	2.8	8.3	2.6	4.2	3.9	5.0	4.5	4.5	4.6	3.4	5.6	3.8	4.3
Business	17	5	3	6	31	3	5	1	9	17	8	8	7	40
(%)	13.1	7.0	12.5	15.4	11.7	3.9	5.0	1.5	3.7	13.1	5.4	6.4	6.6	7.9
Household consumption	1	1	0	2	4	8	7	3	18	1	9	7	5	22
(%)	0.8	1.4	0.0	5.1	1.5	10.4	6.9	4.5	7.4	0.8	6.1	5.6	4.7	4.3
Build a house	0	1	0	2	3	0	0	0	0	0	1	0	2	3
(%)	0	1.4	0	5.1	1.1	0	0	0	0	0	0.7	0	1.9	0.6
Farming	91	45	17	18	171	57	80	59	196	91	102	97	77	367
(%)	70.0	63.4	70.8	46.2	64.8	74.0	79.2	88.1	80.0	70.0	68.9	77.6	72.6	72.1
Other(specify)	1	4	1	3	9	0	1	1	2	1	4	2	4	11
(%)	0.8	5.6	4.2	7.7	3.4	0.0	1.0	1.5	0.8	0.8	2.7	1.6	3.8	2.2
Total	130	71	24	39	264	77	101	67	245	130	148	125	106	509
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 26: Distribution of Households that have Bank Accounts

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Bank Account Ownership														
Yes	437	174	96	157	864	45	69	67	181	437	219	165	224	1,045
(%)	54.0	49.9	49.7	58.2	53.3	10.8	13.0	17.4	13.6	54.0	28.6	22.8	34.2	35.3
No	373	175	97	113	758	373	463	318	1,154	373	548	560	431	1,912
(%)	46.1	50.1	50.3	41.9	46.7	89.2	87.0	82.6	86.4	46.1	71.5	77.2	65.8	64.7
Total	810	349	193	270	1,622	418	532	385	1,335	810	767	725	655	2,957
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 27: Distribution of Account locations by Region and Target crop

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Location of Bank Account														
Commercial bank	105	45	5	46	201	17	14	22	53	105	62	19	68	254
(%)	17.0	19.7	4.3	21.1	17.0	28.8	13.7	26.2	21.6	17.0	21.6	8.7	22.5	17.8
SACCO	51	25	0	29	105	0	2	2	4	51	25	2	31	109
(%)	8.3	11.0	0.0	13.3	8.9	0.0	2.0	2.4	1.6	8.3	8.7	0.9	10.3	7.6
MFI	112	40	11	23	186	0	0	1	1	112	40	11	24	187
(%)	18.1	17.5	9.4	10.6	15.8	0.0	0.0	1.2	0.4	18.1	13.9	5.0	8.0	13.1
Groups (ROSCAs)	9	11	2	18	40	15	55	22	92	9	26	57	40	132
(%)	1.5	4.8	1.7	8.3	3.4	25.4	53.9	26.2	37.6	1.5	9.1	26.0	13.3	9.3
Village bank/Rural	276	94	77	91	538	20	27	29	76	276	114	104	120	614
(%)	44.7	41.2	65.8	41.7	45.6	33.9	26.5	34.5	31.0	44.7	39.7	47.5	39.7	43.1
Phone/Mobile Banking	65	13	22	11	111	7	4	8	19	65	20	26	19	130
(%)	10.5	5.7	18.8	5.1	9.4	11.9	3.9	9.5	7.8	10.5	7.0	11.9	6.3	9.1
Total	618	228	117	218	1,181	59	102	84	245	618	287	219	302	1,426
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 28: Distance to Nearest Banking Point

Indicator	Brong Ahafo Region					Northern Region				Overall				
	Cassava	Maize	Rice	Soybean	Total	Maize	Rice	Soybean	Total	Cassava	Maize	Rice	Soybean	Total
Distance (KM)														
Less than 5km	311	107	62	95	575	30	74	45	149	311	137	136	140	724
(%)	50.3	46.9	53.0	43.6	48.7	50.9	72.6	53.6	60.8	50.3	47.7	62.1	46.4	50.8
5-15km	235	86	34	69	424	3	12	19	34	235	89	46	88	458
(%)	38.0	37.7	29.1	31.7	35.9	5.1	11.8	22.6	13.9	38.0	31.0	21.0	29.1	32.1
15-30km	55	31	15	44	145	19	5	13	37	55	50	20	57	182
(%)	8.9	13.6	12.8	20.2	12.3	32.2	4.9	15.5	15.1	8.9	17.4	9.1	18.9	12.8
30-50km	15	3	4	8	30	5	5	4	14	15	8	9	12	44
(%)	2.4	1.3	3.4	3.7	2.5	8.5	4.9	4.8	5.7	2.4	2.8	4.1	4.0	3.1
Above 50km	2	1	2	2	7	2	6	3	11	2	3	8	5	18
(%)	0.3	0.4	1.7	0.9	0.6	3.4	5.9	3.6	4.5	0.3	1.1	3.7	1.7	1.3
Total	618	228	117	218	1,181	59	102	84	245	618	287	219	302	1,426
(%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

The study now looks at the saving behaviour of the surveyed households in terms of their location and the target crop they cultivated. First, the study tried to investigate the number of households whose members had a bank account. For the purposes of this study a bank account could be held in a corporative or ROSCAS. Table 22 below shows this distribution.

About 1,045 households representing 35.3% of the survey household population confirmed that they had bank accounts. More than half of the households (64.7%) do not have bank accounts.

Levels of formal education as well as annual income prevent such individuals from using formal financial saving instruments.

Table 27 below shows the various locations where the bank accounts are held. As discussed in previous paragraphs, the rural nature of household concerned in the study reveals a similar category that recorded the most saving account holdings. Rural/Village banks are the most common locations in the survey where farmer households kept their savings. A total of 614 individuals representing 43.1% of people in this category saved with rural banks. Most of these rural banks, due to proximity and security, make them popular places to save money.

The second most common place that savings accounts were held was in Commercial banks where a total 254 individuals (17.8%) used this channel to keep their savings. Next in line are the Micro Finance institutions where about 13.1% of individuals saved their monies through the channel. Savings or "susu" groups followed this where about 9.2% individuals were found to be holding their savings through this channel. The last known channel was phone banking or mobile wallets. Although this channel is gaining so much ground from this survey, this channel did not attract much people (9.1%). This may primarily be because of the rural nature of the study areas.

Table 20 below shows the distances that individuals have to travel to their various banking points. More often than not, a study would be interested in how close or how far individuals have to travel to cash some money from their savings. Usually distance to banking point is a strong incentive for individuals to hold savings accounts in the first place hence the importance of this variable in this study.

More than half of the surveyed farmers for this category (50.8%) have their saving accounts located less than 5km from where they live. This is followed by those who have theirs located between 5 and 15 kilometres from their residence which makes up about 12.8% of the individuals possessing savings accounts. Individuals who had saving accounts located between 30 and 50 kilometres made up 3.15% and, lastly, those who had their savings institutions located 50 kilometres or more away from their homes made up 1.3%.

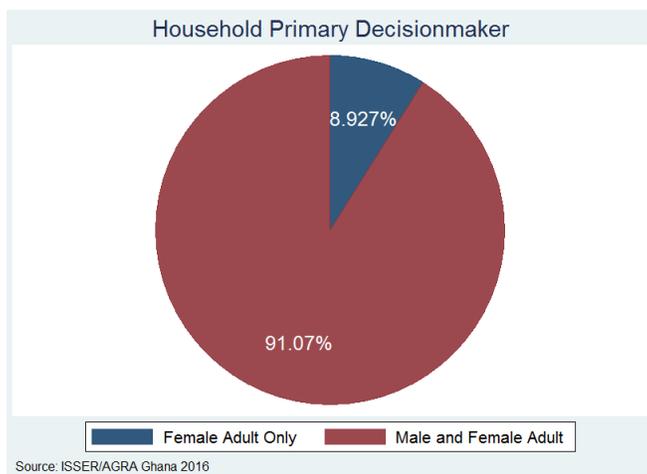
8. Women Empowerment in Agriculture Index

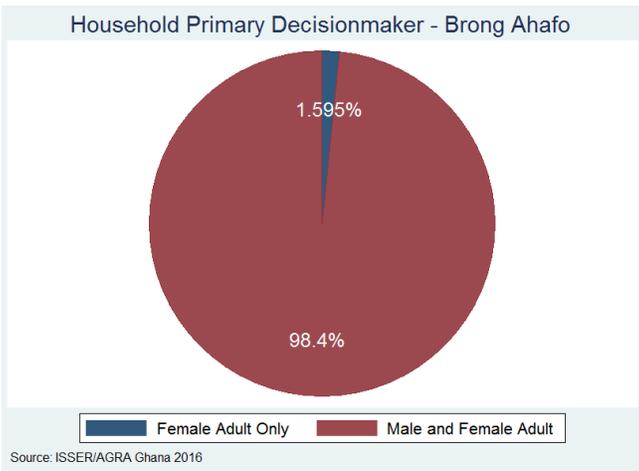
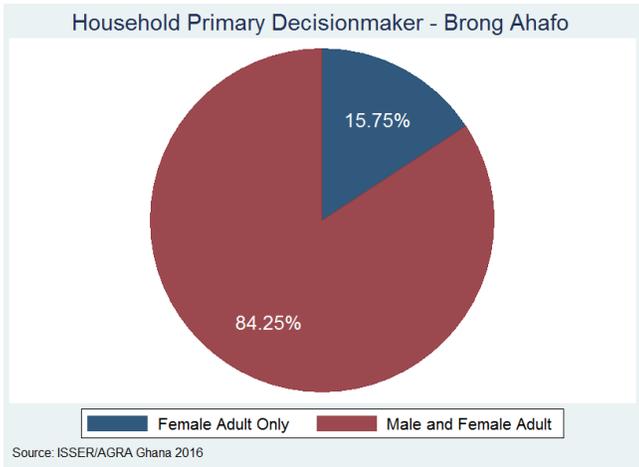
This section assesses the welfare of women in terms of empowerment in household production and decision-making, as well as their food security as defined by meal diversity.

8.1 Decision-making and Empowerment

This analysis of women empowerment in the household is adapted from the Women Empowerment in Agriculture Index, initially developed by the USAID 'Feed the Future' initiative (2012). The original WEAI looks at five domains, namely: production, income, resources, leadership and time use (or workload). In this survey, the WEAI is adapted to consider production, income and leadership quantitatively and examine time use qualitatively. For the resource domain, both household asset ownership and credit use were originally combined to rate resource use, but in this survey, we were only interested in asset use and ownership. In keeping with the proposed analysis of the indices, the section will look at the overall state of empowerment along gender lines for self-identified primary and secondary respondents in a household, as defined by adults involved in decision-making. Majority of the households have both male and female decision-makers, accounting for 91.07% overall, 84.25% for Brong Ahafo and 98.4% for Northern region (Figure 4). The proportion of female-only decision making households is larger in Brong Ahafo, compared to the Northern region.

Figure 4: Household Decision-Making Structure





An individual's adequacy for each domain is weighted to create an ad-hoc empowerment index. Adequacy is defined in the following ways:

- Production decisions: Individual is adequate if they gave some input into at least two particular farm production activities, that they and the household were involved in, or felt to a medium extent that they could make decisions if they wanted to, over the past twelve months. Farm production refers to food crop farming, cash crop farming, livestock raising and fishing or fishpond culture.
- Income decisions: Individual is adequate if they gave some input into the decision regarding use of income generated from at least one of both farm and non-farm activities.
- Resource decisions: Individual is adequate if they felt they had sole or joint ownership of at least one household asset that was not a minor asset such as fowls, non-mechanized farm equipment and small consumer durables.
- Leadership: Individual is adequate if they felt that they were comfortable speaking in public in at least one setting within the community.
- Time use (workload): This dimension concerns the allocation of time to productive and domestic tasks and satisfaction with available time for leisure activities

In Table 29, the level of individual empowerment is highlighted for each of the domains for men and women in each region. It is observed that for all domains, men are more empowered than women are. The smallest gap is recorded for income and resource decision domains, while the largest gap is recorded for empowerment in leadership. The gender empowerment gap for is smaller for all domains in Brong Ahafo than in the Northern region. For example, for leadership, the gap for Brong Ahafo is 17.56 percentage points, while that of the Northern region is 25.6 percentage points.

An Empowerment index was designed as an average of adequacy in the four selected domains, with a minimum of zero for no empowerment and one for complete empowerment. In Table 30 below, we observe that more men than women are recorded as primary or secondary household members in terms of decision-making. Overall, empowerment index values are about 18% higher for men than for women in the Brong Ahafo region and 26% higher for men than for women in the Northern region. Respondents are further defined as empowered with two key cut-off points

- (1) An empowerment index of at least .75, indicating empowerment in three domains or more.
- (2) Empowerment in, specifically, production and income decisions.

The gender empowerment gap for (1) is lower than that of (2). Between regions, the gender parity is larger for households in the Northern region (about 34 pp. for (1) and 59 pp. for (2)) than in Brong Ahafo (about 22 pp. for (1) and 55 pp. for (2)). Similar trends are observed at crop level for each region, except for the number of primary/secondary respondents recorded for cassava-growing households in Brong Ahafo, which is more for females than males.

Table 29: Individual empowerment for each domain

Indicator Empowerment (%)	Maize		Cassava		Rice		Soybean		Overall	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Brong Ahafo										
Production	82.9	34.4	83.2	40.7	86.2	36.4	82.2	39.8	83.3	38.8
Income	98.9	90.5	98.7	93.2	98.7	87.4	98.7	96.4	98.8	92.6
Resources	99.6	95.3	99.4	96.9	100.0	95.8	100.0	95.5	99.6	96.2
Leadership	87.5	67.6	91.2	74.2	90.8	72.0	88.9	72.9	90.0	72.4
Northern										
Production	72.8	18.3			79.2	14.9	73.5	12.1	75.5	15.1
Income	99.0	88.0			99.6	92.2	99.5	94.6	99.4	91.6
Resources	100.0	92.8			99.2	92.9	100.0	91.8	99.7	92.5
Leadership	91.6	62.8			92.3	70.6	91.5	64.4	91.8	66.2

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Empowerment in household production is low for females, showing the lowest values, compared to the other domains for both regions. The qualitative study shows that decision-making in production is tied to the type of crops cultivated by women and their impact on household productivity, income and food supply. A third (26 out of 78) of the study's respondents from both regions perceived and tagged certain crops as women crops. Women crops were crops that were culturally identified with women in farming and agriculture businesses. Quotes revealed key factors in understanding women crops, types of women crops and coping strategies adopted by women in response to farming non-women crops. Generally, the different understanding of women crops was more regional than focus crop specific. Women crops were understood from two different perspectives, these were the commercial component of crops and the size of cultivated plot size.

More than half of coded quotes (15 out of 26) linked the commercial value of crops to whether or not they were perceived as women crops. All quotes cited food crops as women crops, while none identified cash crops as woman crops, from a commercial perspective. His understanding was consistent in both regions. The following quotes capture how respondents expressed women crops in a commercial sense

"... the man is the one who is supposed to sell his rice after harvesting to feed the family, but we also work on the rice farm; but your husband's family want you to plant onions and pepper and that one too you cannot sell a lot because many women also plant onions and pepper in this village, so who will buy? We use all of it to cook in the house..." - female discussant in a Northern Region FGD in a rice selected EA.

"...farming is not only to get money for the house, if you are a farmer you should also plant to feed your house you see. If you are married your wife can be planting vegetables on a portion of the farm for household consumption, because not every harvest will go to the market. You also have to think of your family..." - male interviewee in a Brong Ahafo Region IDI.

The other main characteristic of women crops was the size of plot it was cultivated on. Most (11 out of 13) of the respondents who discussed women crops indicated that a smaller size of the main farm plot was allotted to farming women crops. These crops were farmed on a plot size smaller than the main household farm plot.

"... we have a small cassava farm too but that one is for the house. As for that one, we don't sell. My wife looks after that plot. She owns it... The maize is the biggest plot so we all work on it, but the cassava we use for the house so she works on that one alone. It is not a big plot..." - male maize farmer in a Brong Ahafo IDI

It was observed that though women solely managed "women crop" plots their farming activities in most cases extended to the main focus crop of the household.

Regarding examples of women crops, more than half of the respondents (16 out of 26) mentioned crops that were identified as women crops. More men than women gave examples of women crops in both regions. More examples of women crops came from respondents from the Northern

Region. Overall women crops were mostly vegetables; however, tomato was the most cited “women crop” in both regions.

“...the women have their own small plots on the main farms. So you see that there are tomatoes and onions on the side that the woman manages aside their rice...” - WIAD (Women in Agriculture Development) officer in Brong Ahafo

“...if you take the tomatoes to the farm only a few people would buy because if you go to their farms their wives plant small vegetables on the plots. That ones are different from the main crop the farmer grows...” - Male rice farmer in a Northern Region IDI

A variety of cassava was identified as a “women crop” in the Brong Ahafo Region. A few respondents (5 out of 26) discussed the cassava variety as a “women crop” because the women expressed that that particular variety was most suitable in terms of taste for preparing Fufu (a local cassava based meal) and Gari (processed cassava). The following quotes reveal a cassava variety as a “woman crop”:

“...the women farmers plant the cassava on the market but when you ask them they will tell you that they like the xxxxxx⁴ one, they say that one is more tasty in terms when they use it to prepare fufu of being one they like; the tasty cassava. they will tell you that one is better for preparing fufu (a local cassava based meal) and gari. So the women plant it a lot, those who don't plant on large scale always have a portion of land where they plant xxxxxxx (preferred cassava variety) ...” - an AEA in a Brong Ahafo KII

“... some of the men plant the one that grows bigger but xxxxxx is good for ampesi (Local plantain meal) so when you take it to the market the women know the difference, me I plant XXXXXX because it is better when you cook with it taste better and the market women also prefer it...” - female cassava farmer in a Brong Ahafo Region IDI

Commented [Office1]: Is that a footnote?

⁴ “XXXXXX” symbolizes inaudible content in interview transcription. Upon further investigation, we uncover that Bankehema and Akabon are cassava varieties preferred for fufu consumption and could be the variety name missing here in the quotes.

Table 30: Gender differences in Empowerment Index

Indicator	Maize		Cassava		Rice		Soybean		Overall	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Average Empowerment Index										
Brong Ahafo	0.9	0.7	0.9	0.8	0.9	0.7	0.9	0.8	0.9	0.8
Northern	0.9	0.7			0.9	0.7	0.9	0.7	0.9	0.7
Number of observations										
Brong Ahafo	281	253	636	647	152	143	225	221	1,294	1,264
Northern	415	333			520	395	388	331	1,323	1,059
% empowered										
Brong Ahafo	97.2	68.4	97.0	78.4	98	67.8	97.3	76.5	97.2	74.8
Northern	95.2	61			96.2	63.8	98.5	63.8	96.5	62.9
% empowered in production and income										
Brong Ahafo	83	34.4	83.2	40.7	86.2	36.4	82.2	39.8	83	38.8
Northern	72.8	18			79.2	14.9	73.5	12.1	75.5	15

The discussion on men and women crops in this context was based on the qualitative examining of the responses of recruited women farmers from rice growing EAs in the Northern Region. Discussions are limited to this set of EAs because they gave the only feedback on how women cope with both man and woman crops in their EAs. When the research team profiled discussants in the presence of their husbands and other adult male relatives, they mentioned ownership of groundnut, onion and tomato farms. When the same respondents were profiled away from the presence of male members of their communities, they mentioned that they owned rice, yam and maize plots.

They explained that the difference in the types of crops mentioned is as a result of what is expected to be a woman crop and a man crop. From their responses, groundnut, onion and tomatoes are culturally women crops in their community, while rice, yam and maize are men crops. They explained that it was expected that men take the full financial burden of the providing for the house. This was why men were expected to farm cash crops such as rice, maize and yam. Women on the other hand were expected to grow food crops, an expectation also linked to the gender roles of cooking in the household. Discussants expressed themselves in the following quotes

“...if you ask for land from your husband’s family they will ask you first what crop you want to grow before they give you the land. They say the man is the one supposed to make money. We should plant what we use in the house and then help the man with the rice farm for him to sell.” – Female rice farmer in a Northern Region FGD

“...they will not give you land to grow rice. Your husband grows rice and you too you want to grow rice. They think you want to get money than your husband but your husband too when he gets money he will go for a second wife ...” – Female rice farmer in a Northern Region FGD

8.1.1 Time Use

Qualitative in-depth interviews (IDI) and focus group discussions were organized with 87 female and 85 male farmers to examine women’s experience with paid productive work, unpaid domestic task and available time for leisure activities.

Paid productive work

Women engaged in three categories of paid activities. These were petty trading, value addition agriculture businesses and sale of cooked food. Most of the women interviewed (38 out of 49) from the Brong Ahafo Region engaged in paid activities compared with less than half (16 out of 38) of Northern Region women farmers. Nearly all (36 out of 49) women from Brong Ahafo engaged in petty trading while value addition agriculture business was the most common (12 out of 16) paid activity in the Northern Region. Most women (10 out of 12) engaged in agriculture businesses in the Northern Region were from soybean cultivating households. Respondents were

beneficiaries of an NGO's women economic empowerment programme in the community. The following quotes revealed how some women expressed their engagement in paid activities:

"...we don't farm the whole year so me I sell provisions in the house, I know other people here also sell. We have to get money from different places to help take care of our children..." - Female maize farmer in a Brong Ahafo FGD

"...my sister does the corn dough in the house. We use some in the house and she also sells some at the market. She even has people who come and buy from the house..." - Female maize farmer in a Brong Ahafo Region IDI

"...when the agric. woman comes (Women in Agriculture Development officer) she buys the soya flour that I make..." - Female soybean farmer in a Northern Region IDI

"...my eldest daughter helps me with the store when she is on vacation; I sell provisions to support the money we get from farming..." - Female maize farmer in a Brong Ahafo IDI

"...I cook rice and sell at the main market..." - Female maize farmer in a Northern Region IDI

A few men (12 out of 85) who responded to the topic of women's paid activities in farm households unanimously agreed that women's engagement in paid activities was essential in supporting household income in the following quotes:

"...the house is for the two of us so she also helps with the little she gets from the things she sells..." - Male rice farmer in a Brong Ahafo IDI

"...my wife also sells second hand clothes but I intentionally allow her to save her money unless a few instances when things become really hard..." - Male soybean farmer in a Northern Region IDI

"...some women support their husbands with the money they get from their business. Others too don't keep their money. Some too when they get their money they don't respect again..." - Male maize farmer in a Northern Region FGD

Domestic tasks

Discussions revealed five types of domestic household tasks. These were; childcare, cooking, cleaning, securing water for household consumption and fetching charcoal for household. There were no crop specific experiences regarding domestic household tasks, however some women (11 out of 38) from farm households in the Northern Region indicated that they shared their household tasks with rival wives in polygamous marriages. Household tasks in polygamous marriages were assigned by the order of marriage, that is first, second and third wife roles. Responses indicated that first wives performed supervisory roles over subsequent wives. The following quotes are some of the ways that women described their household tasks:

“...there are children in the house so I am always working. Their eating, their bathing, what they wear is all on me...” - Female maize farmer in a Northern Region IDI

“...as for that one, as a woman, by all means I have to cook for the house so that my daughter also learns from me how to cook for her husband in future...” - Female maize farmer in a Brong Ahafo IDI

“...we don't buy firewood. I go with the children to collect them from the farm...” - Female rice farmer in a Northern Region IDI

“...I go with the children to fetch our water in the morning before the sun comes out...” - Female rice farmer in a Northern Region IDI

“...my husband married me after his first wife so when it comes to household chores I serve my husband and his senior wife. She is older so she looks after the house work, if our husband marries again I will share the work with the new woman...” - Female rice farmer from a polygamous rice farm household in a Northern Region IDI

Time for leisure activities

Some responses from nursing mothers, second wives in polygamous marriages and a KII indicated very little time was available for leisure after women had performed paid activities and domestic tasks activities in order to sustain the household.

“... if you ask the man if their wives work they will say she is in the house she doesn't do anything, but ask him who sweeps the house, who collects the firewood, who cooks, who takes care of the children, all this is done by the woman and what time will she have for herself...” - WIAD officer in the Northern Region

“...at the farm I am a farmer, I do what I have to do. I am also a single mother, so in the house I am both a mother and a father so I am always doing things for my children and I don't have time for myself...” - Female maize farmer in a Brong Ahafo IDI

The general impression given is that, time use is gendered, where women are more likely to spend their time engaged in paid and domestic activities than in leisure, though this is assessed differently from the male point of view versus the female. Engagement in paid activity is more common among Brong Ahafo women than Northern women.

8.2 Women's Dietary Diversity

Another indicator used to assess women empowerment in households is their dietary diversity score. In many homes, dietary diversity is influenced by age and sex of household members, as these are traditionally indicators of economic contribution to the household and determinants of nutritional requirement. Women in the households, aged 15 and above, were asked to identify the food groups that each had consumed in the past 24 hours. The dietary diversity measure, modelled after the USAID Household Dietary Diversity Score (HDDS)⁵, looks at a sum of the number of food groups consumed by each individual, categorized as:

- | | |
|------------------------|--------------------------|
| - Cereals | - Fish and seafood |
| - Root and tubers | - Pulses/legumes/nuts |
| - Vegetables | - Milk and milk products |
| - Fruits | - Oil/fats |
| - Meat, poultry, offal | - Sugar/honey |
| - Eggs | - Miscellaneous |

In this case, the score recorded by each female adult member was averaged for the household. In **Error! Not a valid bookmark self-reference.** below, we observe that on average, women consume a little more than half of the listed food groups (6.5 groups). This score is higher for households sampled from Brong Ahafo at 6.58 and lower for households sampled from the Northern region (6.4). Soybean-growing households record the highest score in Brong Ahafo (6.9), while rice-growing household record the highest scores in the Northern region.

The table also shows the share of households in which women on average consume at least six of the twelve food categories daily. Overall, 69.3 percent of households have a women's dietary diversity score of six and above. This share is larger for Brong Ahafo households (72.4%) and lower for Northern households (66.1%). When investigated by target crops, we find the largest share of households with women's dietary diversity score over six in soybean-growing households in Brong Ahafo, compared to maize-growing Northern households.

In conclusion, there is a clear distinction in women empowerment as defined by decision-making, access to resources, leadership and diet along regional lines. These differences

⁵ Swindale, A., Bilinsky, P., Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide VERSION 2, September 2006, Food and Nutrition Technical Assistance III Project (FANTA), USAID

vary dimension to dimension, when comparing households by target crop allocation. In relation to male household members, women are less empowered across the five domains explored in the empowerment index.

Table 31: Household women's' dietary diversity score, distributed by region and target crop

Indicator	Dietary Score	Diversity	% of HHs with women consuming at least 50% of food groups	No. of Obs
Brong Ahafo				
Maize	6.25		63.51	285
Cassava	6.64		73.29	629
Rice	6.61		73.46	162
Soybean	6.87		81.04	211
Total	6.58		72.42	1,287
Northern				
Maize	6.54		71.88	384
Rice	6.57		67.34	496
Soybean	6.05		58.06	360
Total	6.41		66.05	1,240
Overall				
Maize	6.41		68.31	669
Cassava	6.64		73.29	629
Rice	6.58		68.84	658
Soybean	6.35		66.55	571
Total	6.50		69.29	2,527

Note: Crops listed (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

9. Agricultural Production and Input Access

9.1 Plot Characteristics and Soil Quality

This section explores the land area available for household to cultivate and describes the size, number and soil quality of plots, as well as cropping decisions. Soil quality is specifically determined through the reported experience of farmers and the supporting evidence from qualitative interviews.

We find that a higher proportion of households (48.5%) cultivated two farm plots in the last major farming season. Overall, a few households (less than 10%) were cultivating more than three plots. Comparing the number of plots cultivated by households across the study regions show that households in the Northern Region cultivated a relatively higher number of plots compared to their counterparts in the Brong Ahafo Region. Descriptive characteristics of Northern Regional farm households show higher prevalence of polygamous marriages, larger family sizes and the comparatively higher number of cultivated plots compared to farm households in Brong Ahafo Region. Plot ownership and use are influenced by several socio-cultural rules, some of which are evidenced by the quotes below:

- Farming plots were allocated to most (78%) wives from polygamous farm households in the Northern region.

“...like my brother said as a man, it is culturally appropriate to get your wives plots of land to farm, you see? so that they can support you in hard times so for that one there is nothing wrong with that, the women have their plots you also have your plot but you all work together...” - Discussant 4 from NFMM, thematic framework

- The nuances in plot ownership and management get more complex when male household heads identified themselves as owners of the plots cultivated by their wives.

“...you got the plot for the woman to cultivate alright but you will always be the man and when matters arise you have to stand up as the owner of the land...” - Discussant 7 from NFMM, thematic framework

- Wives of polygamous farmers only identified themselves as plot owners in the absence of their husbands. The quote below was extracted from an all female Focus Group Discussion where almost all (95%) of female respondents in the presence of their husbands did not make claims to plot ownership and did not disclose the number of plot sizes cultivated in the presence of their husbands.

“... [Laughs] I cannot say I have a maize farm in front of my husband because he helps me on the farm and he is the man. He can abandon the farm for me alone to manage if I claim ownership in his presence...” - Discussant 3 from NFMM, thematic framework

Plot measurements were recorded in two main ways. First, farmers reported the area covered by each piece of cultivated land. The second method was a satellite-recorded area, using the Milano Innovincity logging devices to measure the main plot of a third of the sampled households (about

1,000). The aim of this activity was to compare and observe deviations between reported and actual plot sizes. In this case, the ratio of reported to actual plot sizes was 1.4, meaning that plots were smaller than reported. As such, an adjusted plot size was created for each plot, generated by dividing reported areas by the ratio. In Table 32 an

Table 33, we report averages for both figures, with the adjusted in parentheses. The report discusses the reported figures.

Table 32: Plot Characteristics and Soil Quality by Region

Indicators	Regions			N
	Brong Ahafo	Northern	Overall	
% of households cultivating:				
1 plot	30.2	16.2	23.9	2957
2 plots	54.0	41.9	48.5	2957
3 plots	12.6	32.0	21.4	2957
4+ plots	3.2	10.0	6.2	2957
Average number of plots	2	3	2	2957
Mean cultivated area by crop (Ha):				
Maize	1.2 (0.9)	1.7 (1.2)	1.5 (1.1)	2751
Cassava	0.6 (0.5)	0.5 (0.4)	0.6 (0.4)	1846
Rice	1.4 (1.0)	1.8 (1.3)	1.7 (1.2)	948
Soybeans	0.3 (0.2)	1.1 (0.8)	1.1 (0.8)	713
Mean cultivated plot size (Ha)	1.4 (1.0)	1.6 (1.2)	1.5 (1.1)	6258
% of households indication soil quality is:				
Very Good	46.5	13.6	31.6	2,957
Good	40.6	56.7	47.9	2,957
Average	10.5	19.0	14.4	2,957
Poor	1.9	9.9	5.5	2,957
Very Poor	0.4	0.8	0.6	2,957

Note: Adjusted plot sizes in parentheses. Crops listed in first column (maize, cassava, rice, soybean) refer to actual crops grown by the households.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

The mean cultivated plot size for all crops combined is 1.1 hectares, with rice and soybean recording the largest (1.2 Ha) and the smallest (0.6 Ha) mean cultivated plot sizes respectively. We find that over 4 out of 5 households indicated that their soil quality is at least good. Comparing farmers' assessment of their soil quality across region, we find that greater proportion of households in the Northern Region pointed more to poor soil quality compared to those in the Brong Ahafo Region (See Table 32)

Table 33 Plot Characteristics and Soil Quality by Target Crop Groups

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybeans	Overall	
% of households cultivating:						
1 plot	26.0	33.1	15.6	19	23.9	2957
2 plots	51.3	54.2	46.8	40.2	48.5	2957
3 plots	16.3	9.1	30.5	32.4	21.4	2957
4+ plots	6.4	3.6	7.2	8.4	6.3	2957
Average number of plots	2	2	3	3	2	2957
Mean cultivated area by crop (Ha):						
Maize	1.8 (1.3)	0.9 (0.6)	1.7 (1.2)	1.4 (1.0)	1.5 (1.1)	2751
Cassava	0.8 (0.5)	0.6 (0.4)	0.6 (0.4)	0.6 (0.4)	0.6 (0.4)	1846
Rice	1.7 (1.2)	1.2 (0.8)	1.9 (1.4)	1.5 (1.1)	1.7 (1.2)	948
Soybeans	1.0 (0.7)	0.7 (0.5)	1.2 (0.9)	1.1 (0.8)	1.1 (0.8)	713
Mean total plot size (Ha)	1.8 (1.3)	1.2 (0.8)	1.7 (1.2)	1.3 (1.0)	1.5 (1.1)	6258
% of households indicating soil quality is:						
Very Good	25.7	49.4	22.3	27.0	31.6	2957
Good	51.7	37.9	56.6	46.1	47.9	2957
Average	15.5	11.6	16.0	14.7	14.4	2957
Poor	6.4	1.1	4.8	10.7	5.5	2957
Very Poor	0.8	0.0	0.3	1.5	0.6	2957

Note: Adjusted plot sizes in parentheses. Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Crops listed in first column refer to actual crops grown by households
Source: ISSER – Ghana Baseline Data (AGRA), 2016

Regarding soil quality, more than half of interviewees alluded the relatively better soil quality in the Brong Ahafo Region to the two rainy seasons in the region compared to the Northern Region's one raining season.

“...Even here that we are used to two rainy seasons we still complain about the quality of our soil then how much more the three Northern Regions (including the two upper regions) so you see our problem is mostly rainfall...” - BEA 2, thematic framework

We find that a higher proportion of households selected for soybeans generally recorded a relatively higher number of cultivated plots (3 and more plots) compared to their counterparts in

the other target crop groups. Households in the rice and soybeans group reported the highest number of farm plots (mean of three plots for each). We observe that households selected for maize reported a larger cultivated area for maize compared to their counterparts not selected for maize. A similar observation is made for rice.

On the other hand, households selected for maize reported larger cultivated plot sizes for cassava compared to those selected for cassava and the other crops. For the mean cultivated plot size of soybeans, we see that households selected for rice reported slightly larger cultivated plot sizes compared to those selected for soybeans and the other crops. On a scale, we find that a relatively higher proportion of households selected for cassava reported high quality soil compared to their cohorts selected for the other target crops. On the other hand, we observe that a relatively higher proportion of households selected for rice pointed to poor soil quality compared to their counterparts in the other target crop groups.

9.2 Farm Labour

Table 34 shows the man-days and well as relative shares of various categories of labour used during the last major farming season. We find that overall, the mean total man-days used per hectare is 425. Among the three labour categories, family labour provided the highest man-days per hectare (213) whilst hired-labour provided the least man-days per hectare (41). Across the study regions, we observe that except for hired labour, households in the Northern Region generally reported higher man-days per hectare for all the categories of labour compared to their counterparts in the Brong Ahafo Region. A similar observation is made for the share of the various categories of labour in total farm labour. Overall, the share of family labour in total farm labour is 56.1%, followed by hired labour (26.0%). In addition, the share of female labour in total family labour is 21.2%.

Table 34: Farm Labour by Region

Indicators	Regions			N
	Brong Ahafo	Northern	Overall	
Per hectare total man-days used on the farm	323	549	425	2957
Per hectare family man-days used on the farm	158	280	213	2957
Per hectare hired man-days used on the farm	59	19	41	2957
Per hectare communal man-days used on the farm	106	250	171	2957
Share of family labour in total farm labour (%)	51.4	61.8	56.1	2948
Share of hired labour in total farm labour (%)	36.3	13.5	26.0	2948
Share of communal labour in total farm labour (%)	12.3	24.7	17.9	2948
Share of female labour in total family farm labour (%)	20.3	22.3	21.2	2948

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 35 Farm Labour by Target Crop Group

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybean	Overall	
Per hectare total man-days used on the farm	394	333	449	550	425	2957
Per hectare family man-days used on the farm	178	170	204	318	213	2957
Per hectare hired man-days used on the farm	33	73	28	25	41	2957
Per hectare communal man-days used on the farm	182	90	216	207	171	2957
Share of family labour in total farm labour (%)	57.6	49.7	60.1	57.8	56.1	2948
Share of hired labour in total farm labour (%)	22.4	39.0	18.2	22.7	26.0	2948
Share of communal labour in total farm labour (%)	20.0	11.3	21.7	19.5	17.9	2948
Share of female labour in total family farm labour (%)	22.1	20.1	21.5	21.2	21.2	2948

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Further, we observe in Table 35 that households selected for soybeans, followed by those selected for rice reported higher total man-days used on plot per hectare (550 and 449 respectively) compared to those selected for maize and cassava. We make a similar observation for the man-days per hectare of the various categories of labour with exception of hired labour.

9.3 Chemical Use

We observe from Table 36 that overall, a high proportion of households (80.0%) used chemical inputs (in the form of fertilizers and herbicides) in the last major farming season, though a higher proportion of households in the Northern Region (87.7%) reported chemical use compared to those in the Brong Ahafo Region (73.6%). We find that the mean expenditure on chemicals is US\$150.50; US\$147.30 for fertilizer and US\$61.10 for herbicides/weedicides. Compared to households in the Brong Ahafo Region, we observe that households in the Northern Region generally reported a higher expenditure on chemicals, though households in the Brong Ahafo Region reported a slightly higher expenditure for herbicides/weedicides. We identify that the most common source of chemicals for households in the sample is agro-dealers (56.2%). A rather large proportion of households (42.7%) also source chemicals from the market. We find differences in the source of chemicals compared across the study regions. Whilst the majority of households in the Brong Ahafo Region obtained their chemicals from agro-dealers, their counterparts in the Northern Region more commonly obtained their chemicals from the market. (Table 36)

Table 36 Chemicals Use by Region

Indicators	Regions			N
	Brong Ahafo	Northern	Overall	
% of households using chemicals	73.6	87.7	80.0	2,957
% of households using inorganic fertilizers	23.5	18.5	29.5	2,957
Mean expenditure on chemicals (US\$)	124.40	172.17	150.54	4,905
Mean expenditure on inorganic fertilizers (US\$)	120.00	164.61	147.32	1,623
Mean expenditure on herbicides/weedicides (US\$)	67.18	55.35	61.08	3267
Mean quantity of fertilizer used (Kg)	281.9	124.3	195.6	4905
Mean quantity of fertilizer used per hectare (Kg/Ha)	42.9 (60.0)	34.3 (45.7)	49.1 (67.0)	4905
Mean quantity of herbicides/ weedicides used (Litre)	67.18	55.35	61.08	3267
% of households that acquired chemicals from:				
Agro-dealers	78.3	33.7	56.2	2,364
Market	20.6	65.2	42.7	2,364
Other sources	1.1	1.0	1.1	2,364

Fertilizer used per hectare is calculated using both reported and adjusted cultivated plot areas. The values using the adjusted plot sizes is in parentheses.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

We find in Table 37 that households selected for soybeans reported the highest proportion of households (88.7%) using agro-chemicals among the four target crop groups: while their counterparts in the cassava group reported the lowest proportion of households (64.7%) using chemicals. Mean expenditure on chemicals and inorganic fertilizers are highest (US\$159.90 and US\$151.4 respectively) for households selected for maize, while the least is reported for households selected for cassava (US\$102.14 and US\$92.14 for chemicals and inorganic fertilizers respectively). Households selected for rice and maize (US\$67.21 and US\$66.35 respectively) report higher mean expenditure on herbicides/weedicides. On chemical quantities, households selected for maize generally reported higher quantities of fertilizer and weedicides used (424.5Kg and 18.3 Litres respectively).

Table 37 Chemical Use by Target Crop Group

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybean	Overall	
% of households using						
chemicals	84.2	64.7	84.6	88.7	80.0	2,957
inorganic fertilizers	28.2	14.0	25.8	28.7	23.8	2,957
Mean expenditure on chemicals (US\$)	160.0	102.1	195.6	130.2	150.5	4905
Mean expenditure on inorganic fertilizers (US\$)	151.4	92.1	185.8	127.6	147.3	1623
Mean expenditure on herbicides/weedicides (US\$)	66.35	58.83	67.21	52.10	61.08	3267
Mean quantity of fertilizer used (Kg)	424.5	57.1	147.2	108.3	195.6	4,905
Mean quantity of fertilizer used per hectare (Kg/Ha)	117.9 (163.3)	23.8 (35.7)	28.9 (40.9)	27.8 (36.1)	65.2 (88.9)	4,905
Mean quantity of herbicides/weedicides used (Litre)	18.3	17.5	15.7	13.5	16.2	2,945
% of households that acquired chemicals from:						
Agro-dealers	60.2	73.3	46.5	46.6	56.2	2,364
Market	38.9	26.2	51.6	52.7	42.7	2,364
Other sources	0.9	0.6	2.0	0.7	1.1	2,364

Note: Fertilizer used per hectare is calculated using both reported and adjusted cultivated plot areas. The values using the adjusted plot sizes is in parentheses. Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.4 Awareness of hybrid/improved seed varieties and usage

From Table 38, the results of awareness and use of hybrid/improved seed varieties are presented. Few households are aware of hybrid/improved seed varieties that they do not currently cultivate. Approximately, 16.3 percent of households know of hybrid/improved seed varieties that they are not currently cultivating. However, over 55 percent of respondents indicated that they have used these hybrid/improved seeds before. The regional breakdown shows that more farmers in the Brong Ahafo Region (64.1%) have previously used the hybrid/improved seeds they currently do not cultivate compared to farmers in the Northern Region (42.2%).

Out of the sampled households that have cultivated hybrid/improved seed varieties in the past, 29.2 percent indicated that they indeed planted the improved varieties last cropping season. A high proportion of households are aware of hybrid/improved maize varieties that they have not cultivated more than any other target crop. About 71 and 25 percent of households said they know of hybrid/improved maize and cassava varieties respectively that they currently do not cultivate.

Qualitative interviews were particularly interested in why farmers knew about improved maize and cassava seed varieties without cultivating them. More than half of the maize farmers (62% from

the coding frequency table) complained that unlike the local seeds when they used the improved varieties they could not get seeds for the next planting season from their harvests.

“...as for the local seeds you get your planting seeds from your harvest but the hybrid varieties you cannot get your planting seeds from the harvest you need to go and buy seeds every farming season...” - NMM 2, thematic framework

Concerns about cassava improved varieties related to marketing. About half (46%) of cassava farmers who had a history with improved varieties expressed market concerns about their harvest.

“... the market women complain the hybrid cassava is not suitable for *Fufu* (a popular cassava based meal in the Brong Ahafo Region), that is what they say, they say the taste is different, that it is different form the one they are used to, and these are the same women who buy our cassava....” - BCM 1, thematic framework

Table 38: Awareness and cultivation of hybrid/improved varieties

Indicator	Region		Overall	N
	Brong Ahafo	Northern		
% households aware of hybrid/improved seed variety of their target crop that they do not currently produce	18	14.3	16.3	2957
% households that used hybrid/improved seed variety before	64.1	42.2	55.5	472
% households that planted improved variety in the past cropping season	22.01	37.87	29.18	2,958
% awareness of improved seed varieties currently not cultivated				
Maize	71.4	70.3	71	472
Cassava	34.8	9.7	25	472
Rice	1.1	33.5	13.8	472
Soya beans	0.4	17.8	7.2	472

Note: Adjusted plot sizes in parentheses. Crops listed in first column refer to actual crops grown by households
Source: ISSER – Ghana Baseline Data (AGRA), 2016

From Table 39, the awareness and cultivation of hybrid/improved seed varieties based on target crop is presented. The highest percentage of farmers who are aware of hybrid/improved seed varieties of their target crop but currently do not cultivate them are maize farmers followed by soya bean farmers. About 18 and 17.4 percent of maize and soya bean farmers respectively said they know of hybrid/improved seed varieties that they currently do not cultivate. Cassava and rice

farmers have the least percentage of households that know hybrid/improved seed varieties of their target crops but currently do not cultivate them with 16.8 and 13.5 percent respectively.

Cassava farmers have the highest percentage of farmers who have used hybrid/improved seed varieties of their target crop in the past but currently do not cultivate them with a percentage value of 73.7. Out of this figure, 65.3 percent of these farmers planted these varieties in the last cropping season. Maize farmers (41.5%) have the least percentage of households that used hybrid/improved seed varieties they currently do not cultivate in the past. However, 32.2 percent of these maize farmers indicated that they planted these hybrid/improved varieties in the last cropping season.

More maize farmers know hybrid/improved seed varieties of their crop they currently do not cultivate, than any other group of farmers' awareness about their target crop. The percentage of maize households that know hybrid/improved maize seeds they currently do not cultivate is about 81 percent. The percentage of cassava, rice and soya bean households that know hybrid/improved cassava, rice and soya bean seed varieties they currently do not cultivate are 57.1, 36.1 and 15.2 percent respectively.

Table 39: Awareness and cultivation of hybrid/improved seed varieties by target crop

Indicator	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean		
% households aware of hybrid/improved seed variety of their target crop that they do not currently produce	17.6	16.8	13.5	17.4	16.3	2957
% households that used hybrid/improved seed variety before	41.5	73.7	48.5	56.3	55.5	472
% households that planted improved variety in the past cropping season	32.2	24.9	36.8	22.4	29.2	2,958
Maize	80.8	53.4	78.4	74.1	71	472
Cassava	10.8	57.1	6.2	19.6	25	472
Rice	18.5	0.8	36.1	4.5	13.8	472
Soya beans	10.8	0	3.1	15.2	7.2	472

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Crops listed in first column refer to actual crops grown by households
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.5 Agricultural mechanisation

This section covers the ownership and use of tractor and animal draught in agricultural activities. In addition, the average household cost of tractor and animal draught services are computed.

9.5.1 Machinery

Ghana's agriculture continues to be dominated by smallholder farmers. The use of machinery in production has been limited in scope. The results of tractor and draught animal use are presented in Table 40. From our sample, more households use tractor services than animal draught.

About 51 percent of households sampled use tractor services in their production. More tractors are used in the Northern region than in the Brong Ahafo Region. About 88 percent of households in the Northern Region use tractors, while only 19.8 percent of their counterparts in the Brong Ahafo Region use tractors. The high use of tractors in the Northern Region was further examined qualitatively. Responses from AEAs, as Key Informants, and focus crop farmers revealed three key factors that determined tractor use; soil quality, plot acreage and labour. Regarding soil quality, all AEAs from the North indicated that the quality of soil in the Northern Region was very poor and would not be able to support focus crops without tractor ploughing. According to respondents, ploughing with draught animals had proven ineffective in loosening the mostly dry soil in the Northern Region.

"...as for draught animals for ploughing it is no longer popular; farmers have realized that the animals don't plough as good as the tractors. You know the soil here is dry and you need to plough deep to loosen the soil to enable the crops to sprout out..." - NEA 2, thematic framework.

All AEAs in the Northern region stated that plot sizes in the Northern Region were larger than those found in the Brong Ahafo Region. Respondents asserted that the larger plot sizes in the Northern region made it more convenient to use tractor services than draught animals as a means of mechanization.

"...You know in the Northern Region our plot sizes are bigger than those in the Brong Ahafo Region so if you want to compare you will not get the actual comparison well, in the North here we cultivate bigger plots so that is one of the reasons why animal draughts are not as popular as before..." - NEA 1, thematic framework.

The other concern with animal draught related to labour. Farmers expressed that animal draughts came with an accompanied cost of labour. Respondents added that labour was increasingly becoming expensive and adding labour to animal draughts for mechanizing made animal draughts economically unattractive.

"... when you use animals to plough you still need to hire labour to guide the ploughing, and now labour is not cheap at all, most of the young men have migrated south so labour is increasingly becoming expensive and even the difference is significant when you use animal draught and when you use tractors. The tractors plough deeper..." - NMM 1, thematic framework

Out of the households using tractors, only 3.5 percent of them own their tractors. Less than 2 percent of households in the Brong Ahafo Region own a tractor. Approximately, 4 percent of households in the Northern Region own their tractors. The average cost of tractor services is US\$129. Tractor services are more expensive in the Northern Region than in the Brong Ahafo Region. Averagely, tractor services cost US\$109 in the Brong Ahafo Region while it cost US\$134 in the Northern Region.

The use of animal draught is very low in the survey area. In the Brong Ahafo Region, less than 1 percent of households sampled use animal draught. Out of the 2,883 total households that responded to this question, only fifty-eight (58), representing 2 percent use draught animals. About 33 percent of the households that use draught animals also own them. The average cost of using draught animals in production is US\$55.

Table 40: Tractor and animal draught services

Indicators	Regions		Overall	N
	Brong Ahafo	Northern		
% households engaged in cropping activities	97.0	98.1	97.5	2958
o/w				
% households using tractors	19.8	88.2	50.9	2883
o/w				
% households own a tractor	1.9	3.9	3.5	1466
Cost of tractor services (US\$)	109.4	134.0	128.8	1466
% household using animal draught	0.2	4.2	2.0	2883
o/w				
% households own animal draught	33.3	32.7	32.8	58
Cost of animal draught services (US\$)	16.6	56.9	54.8	58

Note: o/w means "of which" referring to a previous statistic
Source: ISSER – Ghana Baseline Data (AGRA), 2016

The use of machinery by households for cropping activities by target crop is presented in Table 41. The use of tractor service is most predominant among rice farmers. About 73 percent of rice farmers indicated that they use tractor services in their cropping activities. The proportion of households using tractor services is least among cassava cultivating households, with 14 percent using tractor services.

The proportion of tractor ownership is highest among rice cultivating households. About 4 percent of rice farmers using tractor services own the tractors. No cassava farmer owns a tractor. Tractor ownership is about 3.6 and 3.4 percent among maize and soya bean farmers respectively. Rice farmers pay the most for tractor services. The average cost of tractor services among rice farmers is US\$158.55. This is followed by maize farmers, soya bean farmers and cassava farmers with average cost of US\$120.43, US\$110.09 and US\$90.44 respectively.

Animal draught usage is least among cassava farmers with less than 0.5 percent of cassava farmers using animal draught on their farms. Animal draught is relatively more popular among soya bean farmers with about 4 percent of soya bean farmers using their services. The few cassava farmers who use animal draught services own the animals. The average cost of animal draught services is highest among rice farmers (US\$77.36) and least among cassava farmers (US\$24.85).

Table 41: Tractor and animal draught services by target crop

Indicators	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soya bean		
% households engaged in cropping activities	97.0	98.3	98.3	96.0	97.5	2958
o/w						
% households using tractors	56.1	14.1	73.2	65.8	50.9	2883
o/w						
% households own a tractor	3.6	0.0	4.2	3.4	3.5	1466
Cost of tractor services (US\$)	120.4	90.4	158.6	110.1	128.8	1466
% household using animal draught	1.3	0.1	3.1	4.0	2.0	2883
o/w						
% households own animal draught	0	100	45.5	32	32.8	58
Cost of animal draught services (US\$)	48.9	24.9	77.4	38.4	54.8	58

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Note: o/w means "of which" referring to a previous statistic
Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.5.2 Use of machinery in specific cropping activities

The result of the activities for which tractor and animal draught services are employed is presented in Table 42. The findings show that majority of households engage tractor services to plough their fields. About 94.8 percent of households employed tractor services for ploughing. About 8 percent of households also use tractor services to clear the land, while 7.4 percent of households use it for planting. Less than 1 percent use tractors to apply chemicals, weed or harvest their crops.

The use of animal draught has lost its popularity among farming households. The few households that engage draught animals, use it mostly for planting or ploughing the land. About 81 percent of households that use them, engage them in ploughing the land while about 12 percent of households use them for planting. Some households (6.9%) also use animal draught during harvesting.

Table 42: Use of tractor and animal services in cropping activities by region

Cropping activities	Usage of tractor				Use of draught animal			
	Brong Ahafo	Northern	Overall	N	Brong Ahafo	Northern	Overall	N
% of households using tractors or animal service in:								
Clearing	28.0	2.2	7.6	1466		-	-	-
Ploughing	76.2	99.7	94.8	1466		66.7	81.8	81
Planting	3.9	8.3	7.4	1466		0	12.7	12.1
Chemical application	0.0	0.3	0.2	1466		-	-	-
Weeding	0.0	0.2	0.1	1466		33.3	0.0	1.7
Harvesting	0.6	0.2	0.3	1466		0.00	7.3	6.9

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 43 presents the results of tractor and animal draught services in cropping activities by target crop. Tractor and animal draught services are used primarily by all households for clearing and ploughing activities. The percentage of maize farmers who use tractors to plough is 95.69 percent. While 82.14 and 93.87 percent of cassava and rice farmers use tractors to plough respectively. Soya bean farmers use tractors the most in ploughing, with 98.31 percent of them indicating so.

All cassava farmers who use animal draught use it to plough the field. About 90 percent of maize farmers who use animal draught also employ it in ploughing. About 77 and 80 percent of rice and soya bean farmers respectively use animal draught use it in ploughing.

Table 43: Use of tractor and animal services in cropping activities by target crop

Cropping activities	Usage of tractor						Use of draught animal					
	Target Crop Group				Overall	N	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean			Maize	Cassava	Rice	Soya bean		
% of households using tractors or animal service in:												
Clearing	6.0	22.3	9.6	2.9	7.6	1466	-	-	-	-	-	-
Ploughing	95.7	82.1	93.9	98.3	94.8	1466	90	100	77.3	80	81.0	58
Planting	2.9	2.7	15.5	2.9	7.4	1466	10	0	18.2	8	12.1	58
Chemical application	0.5	0	0.2	0	0.2	1466	-	-	-	-	-	-
Weeding	0	0	0	0.5	0.1	1466	0	0	0	4	1.7	58
Harvesting	0.5	0.9	0.2	0.0	0.3	1466	0	0	4.6	12	6.9	58

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.6 Farmer Based Organisations' (FBOs) membership

From Table 44, the result of membership of Farmer Based Organisations (FBOs) is presented. Few households belong to FBOs. Less than 5 percent of the total sample belong to FBOs. Crop production FBOs are the most common among households with 79 percent of participating households belonging to them. Seed production and multiplication FBOs also account for 8.1 percent of FBO membership by households. About 46 percent of households in the seed production and multiplication FBOs are producing their target crops. Over 81 percent of households belonging to the seed production and multiplication FBOs have received training on seed production and marketing.

Table 44: Household membership of Farmer Based Organisations (FBOs)

Indicators	Regions			
	Brong Ahafo	Northern	Overall	N
% households members of FBOs	4.1	5.2	4.6	2957
Type of FBOs				
Seed production and multiplication	10.6	5.7	8.1	136
Livestock production	0.0	2.9	1.5	136
Value addition	1.5	1.4	1.5	136
Aquaculture	3.0	2.9	2.9	136
Beekeeping	-	-	-	
Crops production	68.2	88.6	78.7	136
Others	18.2	0	8.8	136
Membership of seed production and multiplication FBO				
% households producing target crop seeds	42.9	50	45.5	11
% households trained in seed production and marketing	71.4	100	81.8	11

Source: ISSER – Ghana Baseline Data (AGRA), 2016

From Table 45, less than 10 percent, each, of maize, cassava, rice and soya bean households belong to FBOs. Majority of households belonging to FBOs, belong to crop production FBOs. About 77.5, 66.7, 84 and 85.4 percent of maize, cassava, rice and soya bean farmers respectively belong to crop production FBOs. This followed by seed production and multiplication FBOs which account for 10 percent of maize, 13.3 percent of cassava, 8 percent of rice and 2.4 % of soya bean farming households.

Out of the membership of seed production and multiplication FBOs, 50 percent of maize farmers are producing maize seeds, 25 percent of cassava farmers are producing cassava seeds/sticks, 50 percent of rice farmers are producing rice seeds and 100 percent of soya bean farmers are producing soya bean seeds. Also, 75 percent each of maize and cassava farmers in seed production and multiplication FBOs have been trained in seed production and marketing while all rice and soya bean farmers have been trained in the production and marketing of their target crop seeds.

Table 45: Household membership of Farmer Based Organisations (FBOs) by target crop

Indicators	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean		
% households members of FBOs	5.2	3.7	3.5	6.3	4.6	2957
Type of FBOs						
Seed production and multiplication	10.0	13.3	8.0	2.4	8.1	136
Livestock production	2.5	0.0	0.0	2.4	1.5	136
Value addition	2.5	0.0	0.0	2.4	1.5	136
Aquaculture	2.5	0.0	0.0	7.3	2.9	136
Beekeeping	-	-	-	-	-	
Crops production	77.5	66.7	84.0	85.4	78.7	136
Others	5.0	20.0	8.0	4.9	8.8	136
Membership of seed production and multiplication FBO						
% households producing target crop seeds	50.0	25.0	50.0	100.0	45.5	11
% households trained in seed production and marketing	75.0	75.0	100.0	100.0	81.8	11

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.7 Awareness and use of extension services

The awareness and use of extension services is provided in Table 46. Households that received extension services in the sample area is very low. Less than 10 percent of respondents said they received extension services. Households in the Northern Region received more (10.3%) extension services than households in the Brong Ahafo Region (7.5%). Out of households that received the services, 53.5 percent actively sought those services. Majority (82.3%) of households that received extension services implemented whatever advice they received. More households in the Northern Region (84.8%) implemented the advice of extension service providers compared to those in the Brong Ahafo Region (79.5%). Responses gathered from qualitative interviews indicated that extension services were more demand driven than supply sustained. Most farmers (78%, coding frequency table) indicated seeking extension service when they observed a farm crisis,

“...that is not always the case. when you notice something going wrong on your farm then you the farmer has to go and seek extension advise on how to mitigate the crisis you have observed the AEA’s are mostly not available...” - NSF 2, thematic framework

This demand driven extension service provision correlates positively with the 53.5 percent demand for extension service provision from the quantitative results.

The extension services received by households were not always free. About 4 percent of respondents had to pay for the services they received. A greater proportion of households in the Brong Ahafo Region paid for extension services compared to their colleagues in the Northern Region.

Most of the services that were provided were related to crop production (fertiliser and seed use). About 71 percent of households received advice on crop production specifically on fertiliser application and seed use. Extension service providers also addressed services on seed multiplication (34.6%), and postharvest handling and storage (17.7%). Insurance advice was the least provided service by extension officers.

Government agents are the most dominant extension service providers. Out of the 260 households that received extension services, government agents accounted for over 66 percent. Qualitative interviews targeted government extension agents as Key informants. Interviews with Agriculture Extension Agents (AEAs) revealed what AEAs described as overwhelming sizes of operational zones of influences amidst resources constraints and working conditions that challenge service provision.

“...we talk about MoFA (Ministry of Food and Agriculture) and the situation is sad, I have eight communities in my operational areas, do you understand what I am talking about? And my fuel for monitoring is not enough to take me through all my communities, you see? So how effective can service provision be...” - NEA 2, thematic framework.

All AEAs in both regions expressed working challenges in both the size of their operational zones and resource constrained working conditions.

Non-governmental organisations (NGOs) provided 24.6 percent of the services while radio programmes provided 3.5 percent of the extension services. The least common providers of extension services are the processing and marketing enterprises, and other farmers. These group of service providers accounted for 0.4 percent each of the households that received extension services.

From Table 47, the percentage of maize households that received extension services is about 10 percent while 60.5 percent of this number actively sought these services. Cassava and rice households constitute 7.4 and 7.9 percent of households that received extension services, with 36.7 and 66.7 percent respectively seeking these services. Soya bean households accounted for 10.2 percent of households that received extension services with 49.3 percent actively seeking these services. Majority of rice households (93%) implemented extension advice, while the target crop group that implemented

Table 46: Awareness and use of extension services by region

Indicators	Regions		Overall	N
	Brong Ahafo	Northern		
Use of extension services by households (%)				
Seed multiplication	29.5	39.1	34.6	260
Crop production (fertilizer and seed use)	73.8	68.1	70.8	260
Insurance advice	1.6	2.9	2.3	260
Crop marketing	4.1	6.5	5.4	260
Postharvest handling and storage	18.0	17.4	17.7	260
Soil fertility testing and management	4.1	5.8	5.0	260
Livestock production	9.0	1.5	5.0	260
% household received extension service	7.5	10.3	8.8	2957
% household that actively sought extension service	52.4	54.4	53.5	260
% household implemented advice	79.5	84.8	82.3	260
% household paid for extension service	6.6	2.2	4.2	260
Main extension service providers by number of activities				
Government agent	82.0	53.6	66.9	260
NGOs	6.6	40.6	24.6	260
Farmers organization	0.8	0.7	0.8	260
Processing and marketing enterprise	0.0	0.7	0.4	260
Private individual/firm	0.8	2.9	1.9	260
Other farmer(s)	0.8	0.00	0.4	260
Radio	4.9	2.2	3.5	260
Others	0.8	0.7	0.8	260

Source: ISSER – Ghana Baseline Data (AGRA), 2016

extension advice the least is soya bean households (76.1%). Payment for extension services was dominated by maize (5.3%) and rice (5.3%) households. Most cassava households did not pay for extension services. Less than 2 percent of cassava households paid for extension services.

The top three extension services received by households are crop production (fertiliser and seed use), seed multiplication, and postharvest handling and storage. However, the share of these services vary by target crops. For example, the break down for maize farmers is 67.1, 40.8 and 25.0 percent for crop production (fertiliser and seed use), seed multiplication, and postharvest handling and storage respectively. For rice farmers, the break down is 77.2, 24.6 and 8.8 percent for crop production (fertiliser and seed use), seed multiplication, and postharvest handling and storage respectively.

Government agents and NGOs are the major providers of extension services. Government agents provided extension services to about 59, 85, 56 and 69 percent of maize, cassava, rice and soya bean households respectively. While NGOs provided services to about 37, 3, 35, and 21 percent of maize, cassava, rice and soya bean households respectively.

Table 47: Awareness and use of extension services by target crop

Indicators	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean		
Use of extension services by households (%)						
Seed multiplication	40.8	30.0	24.6	40.3	34.6	260
Crop production (fertilizer and seed use)	67.1	75.0	77.2	65.7	70.8	260
Insurance advice	4.0	0.0	1.8	3.0	2.3	260
Crop marketing	5.3	5.0	7.0	4.5	5.4	260
Postharvest handling and storage	25.0	15.0	8.8	19.4	17.7	260
Soil fertility testing and management	9.2	0.0	3.5	6.0	5.0	260
Livestock production	5.3	8.3	1.8	4.5	5.0	260
% household received extension service	9.9	7.4	7.9	10.2	8.8	2957
o/w						
% household that actively sought ext. service	60.5	36.7	66.7	49.3	53.5	260
% household implemented advice	84.2	76.7	93.0	76.1	82.3	260
% household paid for extension service	5.3	1.7	5.3	4.5	4.2	260
Main extension service providers by number of activities						
Government agent	59.2	85.0	56.1	68.7	66.9	260
NGOs	36.8	3.3	35.1	20.9	24.6	260
Farmers organization	0.0	0.0	1.8	1.5	0.8	260
Processing and marketing enterprise	0.0	0.0	0.0	1.5	0.4	260
Private individual/firm	2.6	0.0	3.5	1.5	1.9	260
Other farmer(s)	2.6	3.3	1.8	0.0	1.9	260
Radio	2.6	5.0	3.5	3.0	3.5	260
Others	1.3	0.0	0.0	1.5	0.8	260

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.8 Awareness and application of agronomic practices

Farmers' awareness and application of agronomic practices is presented in Table 48. The results show that although more than half of farmers in our sample are aware of the agronomic practices presented, very few of them are actually applying these practices.

More specifically, about 57 percent of our sample are aware of the twenty-two (22) agronomic practices presented. The regional breakdown indicates farmers in the Northern Region are more aware of the agronomic practices presented than farmers in the Brong Ahafo Region are. About 60 percent of farmers in the Northern Region are aware of agronomic practices compared to 55 percent in the Brong Ahafo Region. Use of fallowing (93.4%), inorganic fertilisers (93.2%) and crop rotation (92.4%) are well known among the farmers. The least known agronomic practices are use of lime (13.2%), use of inoculum (19.8%) and terracing (27.4%).

The application of these agronomic practices by farmers is very low. On average, 12 percent of farmers said they applied these practices on their farms. There is not much difference in the use of these practices across regions. The Brong Ahafo Region recorded 12.2 percent while the Northern Region recorded 12.5 percent. The most applied agronomic practice by farmers is slash and burn (52.8%). This is followed by inorganic fertiliser application and minimum tillage with 42.1 percent and 34.6 percent of farmers applying them respectively. The least applied agronomic practices are use of lime (0.5%), terracing (0.7%) and afforestation (1.5%).

The awareness and application of agronomic practices by target crop are presented in Table 49. From the results, rice-cultivating households have the highest percentage of awareness of the 22 agronomic practices while soya bean cultivating households have the lowest percentage of awareness of agronomic practices. The average percentage of awareness by rice cultivating households is 60.5 percent. The second is maize cultivating households with 59.5 percent of maize cultivating households aware of the agronomic practices. The third and fourth are cassava (56.3%) and soya bean (53.3%). About 14.9% of soya bean cultivating households apply the agronomic practices they are aware of. Rice cultivating households (11%) apply the agronomic practices they are aware of the least.

Table 48: Awareness and application of agronomic practices by region

Indicators	Awareness of agronomic practices (%)				Application of agronomic practices (%)			
	Brong Ahafo	Northern	Overall	N	Brong Ahafo	Northern	Overall	N
Terracing	23.7	31.8	27.4	2957	1.6	0.0	0.7	809
Mulching/cover cropping	71.5	75.9	73.5	2957	27.1	16.1	22.0	2173
Minimum tillage	59.3	68.5	63.4	2957	36.9	32.2	34.6	1875
Wind breaks	50.2	56.9	53.2	2957	2.2	3.0	2.6	1574
Contour farming	37.7	34.5	36.3	2957	2.8	0.9	2.0	1073
Crop rotation	91.7	93.2	92.4	2957	23.9	28.1	25.8	2732
Water pans/planting basins	28.6	44.9	36.0	2957	2.6	5.3	4.1	1063
Grass strips	29.5	45.4	36.7	2957	0.4	2.5	1.6	1084
Afforestation	85.0	69.3	77.9	2957	1.7	1.3	1.5	2304
Agro forestry (legumes trees)	45.5	45.9	45.7	2957	4.9	0.8	3.0	1351
Agro forestry (other trees)	48.2	42.9	45.8	2957	10.1	0.5	6.1	1354
Gabions/storm bands	29.8	48.8	38.4	2957	0.6	1.8	1.3	1135
Cut-off drains/soil bounding	54.8	49.7	52.5	2957	3.7	14.8	8.4	1552
Fallow	96.3	90.0	93.4	2957	17.2	20.1	18.4	2763
Composting	71.2	86.7	78.2	2957	8.9	11.0	10.0	2311
Use of inorganic fertilizers	89.2	98.2	93.2	2957	26.4	59.5	42.1	2757
Use of green manure fertilizers	75.3	60.8	68.8	2957	10.8	3.7	8.0	2033
Use of farm yam manure	77.2	83.7	80.1	2957	10.4	9.7	10.1	2369
Slash and burn	75.7	77.1	76.3	2957	62.4	41.4	52.8	2256
Growing legume crops	59.7	65.4	62.3	2957	13.4	19.4	16.2	1842
Use of inoculum	10.5	31.2	19.8	2957	1.2	2.2	1.9	586
Use of lime	7.4	20.2	13.2	2957	0.0	0.7	0.5	389
Average percentage	55.4	60.0	57.5		12.2	12.5	12.4	

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 49: Awareness and application of agronomic practices by target crop

Agronomic Practice	Awareness of agronomic practices						Application of agronomic practices					
	Target Crop Group				Overall	N	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean			Maize	Cassava	Rice	Soybean		
Terracing	30.8	25.1	29.8	23.5	27.4	2957	0.4	1.5	0.5	0.7	0.7	809
Mulching/cover cropping	75.6	70.9	72.0	75.9	73.5	2957	15.7	28.8	16.5	27.2	22.0	2173
Minimum tillage	67.9	63.3	65.0	56.5	63.4	2957	33.8	43.7	21.7	39.7	34.6	1875
Wind breaks	54.5	51.6	55.5	51.3	53.2	2957	3.8	1.7	1.2	3.9	2.6	1574
Contour farming	39.6	37.4	36.8	30.4	36.3	2957	3.0	2.3	0.8	1.5	2.0	1073
Crop rotation	92.7	90.1	93.4	93.7	92.4	2957	29.4	19.9	22.6	32.1	25.8	2732
Water pans/planting basins	41.2	30.4	43.0	28.9	36.0	2957	3.8	0.4	4.8	8.5	4.1	1063
Grass strips	37.4	32.7	44.4	32.1	36.7	2957	2.1	0.4	1.6	2.4	1.6	1084
Afforestation	77.2	85.3	73.9	74.1	77.9	2957	2.2	1.2	1.1	1.7	1.5	2304
Agro forestry (legume)	48.2	47.5	51.9	33.6	45.7	2957	1.4	6.2	0.8	4.1	3.0	1351
Agro forestry (other trees)	43.9	53.2	50.3	33.7	45.8	2957	0.6	13.7	1.1	7.7	6.1	1354
Gabions/storm bands	41.2	30.9	46.3	35.6	38.4	2957	1.6	0.0	2.4	0.9	1.3	1135
Cut-off drains	51.4	56.8	57.9	42.4	52.5	2957	7.9	4.4	10.5	13.0	8.4	1552
Fallow	93.6	97.0	91.9	90.5	93.4	2957	22.0	18.3	13.5	19.7	18.4	2763
Composting	80.6	72.4	83.3	76.8	78.2	2957	7.8	6.5	10.9	15.5	10.0	2311
Use of inorganic fertilizers	93.1	90.7	95.9	93.6	93.2	2957	45.1	22.6	52.5	50.2	42.1	2757
Use of green manure	70.8	73.6	69.1	60.0	68.8	2957	4.6	12.9	9.2	3.6	8.0	2033
Use of farm yam manure	80.7	74.8	86.1	79.4	80.1	2957	10.3	12.4	10.6	6.4	10.1	2369
Slash and burn	76.8	77.8	74.1	76.3	76.3	2957	50.3	64.1	41.2	54.2	52.8	2256
Growing legume crops	68.6	57.5	68.0	54.5	62.3	2957	14.8	8.4	16.8	27.7	16.2	1842
Use of inoculum	24.6	11.1	25.7	18.5	19.8	2957	1.1	0.0	1.6	5.0	1.9	586
Use of lime	18.6	7.9	15.9	10.2	13.2	2957	0.0	0.0	0.9	1.5	0.5	389
Average percentage	59.5	56.3	60.5	53.3	57.5	2957	11.9	12.2	11.0	14.9	12.4	1699

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

In an attempt to understand factors underpinning the wide disparity between awareness of agronomic practices (57%) compared to the relatively lower application (12%), qualitative interviews examined factors that determine the application of agronomic practices. Almost all farmers (87%) understood agronomic practices in economic terms; one cohort of agronomic practices required the purchase of farm input(s) to enable its application, a discussant in a male FGD of maize farmers is quoted in this regard

“...as for that one we know, yes! but you need money to be able to buy the lime and apply it. Not all of us can afford the medicine and those other teachings (extension service education on agronomic practices) that you need to buy medicines to be able to apply them...” - BFMM 4, thematic framework.

The other group of agronomic practices did not require the purchase of any farm input and was solely based on application knowledge. This was the preference of most farmers (83%).

“...I do the one I can afford to do, like some of the teachings (extension service education on agronomic practices) you do not need any money to buy anything to practice it, those ones are simple to do...” - NRF 3, thematic framework.

Farmer's preference for knowledge based agronomic practices is in congruence with quantitative results that indicate slash and burn and minimum tillage as the first and third most practiced agronomic practices.

9.9 Crop Yields

We report crop yields computed as total output on plot as a ratio of cultivated size of plot, and measured in metric tonnes per hectare (MT/Ha) in Table 50. As mentioned in Section 9.1, we report two sets of plot areas, reported and adjusted(calculated using the ratio of farmer-reported to measured plot area.). Since crop yield is calculated as a ratio of plot size, we also compute two sets of yield figures using the different cultivated plot areas. The yield calculated with the adjusted size is presented in the parentheses in Table 50 and Table 51. Since reported plot sizes are larger than the adjusted, yield is larger is more conservative for farmer-reported sizes and is discussed in the report.

Overall, the yield for maize is 2.3MT/Ha, cassava yield is 7.9MT/Ha, rice yield is 3.1MT/Ha, and soybeans is 1.6MT/Ha. Comparing crop yields across regions, we find that households in the Brong Ahafo Region generally reported higher yields for maize and cassava, whilst their counterparts in the Northern Region generally reported higher yields for rice and soybeans.

Table 50 Crop Yields by Region

Crops	Region			N
	Brong Ahafo	Northern	Overall	
Maize Yield (MT/Ha)	1.7 (2.3)	1.6 (2.2)	1.6 (2.3)	2707 (2750)
Cassava Yield (MT/Ha)	6.6 (8.9)	1.8 (2.5)	5.8 (7.9)	1791 (1845)
Rice Yield (MT/Ha)	1.2 (1.7)	2.5 (3.4)	2.3 (3.1)	917 (948)
Soybeans Yield (MT/Ha)	0.7 (0.9)	1.1 (1.6)	1.1 (1.6)	705 (713)

Note: Yields calculated with adjusted plot sizes in parentheses Crops listed in first column refer to actual crops grown by households

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Crops yields by region indicated that in the Brong Ahafo Region soybean had the lowest crop yield per hectare (0.9 MT/Ha). Separate key informant interviews and Focus Group Discussions on soybeans revealed an episode of a failed soybean project that was initially introduced some parts of the Brong Ahafo Region a couple of years prior to data collection. The discussed project purportedly encouraged farmers to cultivate soybean in commercial quantities with a promised competitive market price.

“...when you ask around the farmers will tell you. They convinced farmers to plant soybean that some foreign company was going to buy the harvest. I cultivated three acres, and they did not show up again, you see? So... and later some other people came with some very low price and farmers were already disturbed and refused to sell their produce because the price was simply bad...” - BAG 3, thematic framework.

Disaggregating crop yields into target crop groups in Table 51 shows that households selected for rice and cassava reported relatively higher yields for maize compared to those selected for maize. We also note that households selected for maize reported a relatively higher yield of rice compared to those selected for rice. Furthermore, households selected for maize and those selected for rice reported relatively higher yield for soybeans compared to their counterparts selected for soybeans. For cassava, we find that households selected for cassava reported higher yields for cassava compared to those selected for the other target crops.

Table 51 Crop Yields by Target Crop Groups

Crops	Target Crop Group					N
	Maize	Cassava	Rice	Soybean	Overall	
Maize Yield (MT/Ha)	1.5 (2.5)	1.8 (2.1)	1.9 (2.6)	1.3 (1.9)	1.6 (2.3)	2707 (2750)
Cassava Yield (MT/Ha)	4.3 (9.3)	6.9 (5.8)	4.2 (5.7)	6.1 (8.5)	5.8 (7.9)	1791 (1845)
Rice Yield (MT/Ha)	3.0 (2.0)	1.5 (4.0)	2.3 (3.1)	1.8 (2.5)	2.3 (3.1)	917 (948)
Soybeans Yield (MT/Ha)	1.2 (0.4)	0.3 (1.7)	1.2 (1.7)	1.0 (1.5)	1.1 (1.6)	705 (713)

Note: Yields calculated with adjusted plot sizes in parentheses. Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Crops listed in first column refer to actual crops grown by households

Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.10 Pre-harvest Crop Losses

Table 52 displays the distribution of pre-harvest crop losses by region. Overall, the mean pre-harvest losses reported for maize is 33.3%;16.1% for cassava, 29.6% for rice, and 24.7% for soybean. Except for soybeans, we observed that households in the Northern Region generally reported higher pre-harvest crop losses compared to those in the Brong Ahafo Region.

Table 52: Pre-Harvest Crop Losses by Region

Crops	Region			N
	Brong Ahafo	Northern	Overall	
Maize (%)	31.4	35.9	33.3	1374
Cassava (%)	15.7	20.0	16.1	353
Rice (%)	28.7	29.9	29.6	354
Soybeans (%)	-	23.2	24.7	200

Note: Crops listed in first column refer to actual crops grown by households

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 53 shows that households selected for rice reported relatively higher average pre-harvest crop losses for maize and cassava compared to their counterparts selected for the other target crops. In comparison to households selected for other target crops, those selected for maize reported relatively higher average pre-harvest crop losses for rice and cassava.

Table 53: Pre-Harvest Crop Losses by Target Crop Group

Indicators	Target Crop Group				Overall	N
	Maize	Cassava	Rice	Soybean		
Maize (%)	31.3	33.2	39.6	30.1	33.3	1374
Cassava (%)	11.1	15.9	21.8	19.3	16.1	353
Rice (%)	32.5	24.1	32.1	20.6	29.6	354
Soybeans (%)	27.9	-	25.2	23.6	24.7	200

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Crops listed in first column refer to actual crops grown by households
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.11 Post-Harvest Storage, Crop Sales, Processing and Market Price Information

9.11.1 Post-Harvest Crop Storage

We find from Table 54 that overall, 74.9% of households stored their crops in various forms after harvest. Comparing across region, a higher proportion of households (85.9%) in the Northern Region reported post-harvest crop storage compared to those in the Brong Ahafo Region (66.2%). We observed that, overall, a comparatively higher proportion (67.4%) stored their crops in bags at home/farm, followed by silos at home/farm (32.2%). We however noted some regional differences in the type of storage used by households. It is evident that a higher proportion of households in the Brong Ahafo Region used silos at home/farm for storing their crop, while a higher proportion of those in the Northern Region used bags at home/farm for crop storage. Additionally, we find that overall, 10.1% of households use chemicals for storage; and a higher proportion of households (11.7%) in the Brong Ahafo Region reported having used chemicals for storage compared to those in the Northern Region (8.0%).

Table 54 Post-Harvest Crop Storage by Region

Indicators	Region			N
	Brong Ahafo	Northern	Overall	
% of households that stored crop after harvest	66.2	85.9	74.9	2,210
% of households that stored crop in:				
Silos at home/farm	51.2	13.6	32.2	2,210
Bags at home/farm	48.4	85.9	67.4	2,210
Other storage	0.4	0.5	0.4	2,210
% of households that store crops with chemicals	11.7	8.0	10.1	1,647

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Across target crop groups, we observe that a higher proportion of households (84.3%) selected for soybeans reported having stored their crops after harvest, followed by those selected for rice (80.2%); while households selected for cassava reported the least proportion (63.4%). Also, the highest proportion of households that reported having stored crops in silos at home/farm is highest for those in the cassava group, while those in the rice group reported the highest proportion for those who stored crops in bags at home/farm. In addition, compared to households selected for the other target crops, a relatively higher proportion of households selected for rice reported having stored crops with chemicals.

Table 55 Crop Storage by Target Crop Group

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybeans	Overall	
% of households that stored crop after harvest	73.4	63.4	80.2	84.3	74.9	2,210
% of households that stored crop in:						
Silos at home/farm	30.6	42.6	19.3	36.8	32.2	2,210
Bags at home/farm	69.2	56.6	79.9	63.2	67.4	2,210
Other storage	0.2	0.8	0.8	0.0	0.4	2,210
% of households that store crops with chemicals	9.4	10.4	11.6	9.2	10.1	1,647

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops.

Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.11.2 Crop Sales

Overall, the highest quantity of crop sales (0.9) is reported for rice (0.7), followed by maize; while the lowest quantity is reported for cassava (0.3 MT). Across region, except for rice, households in the Northern Region reported relatively higher sales volumes of crops compared to their counterparts in the Brong Ahafo Region (see Table 56). For the target crop group, Table 57 shows that except for cassava, households selected for rice reported higher sales volumes of crops compared to their counterparts selected for the other target crops.

Table 56: Quantity of Crop Sold by Region

Indicators	Region			N
	Brong Ahafo	Northern	Overall	
Mean quantity sold of:				
Maize (MT)	0.7	0.8	0.7	1470
Cassava (MT)	0.2	0.5	0.3	100
Rice (MT)	1.1	0.9	0.9	276
Soybeans (MT)	0.1	0.5	0.5	271

Note: Crops listed in first column refer to actual crops grown by households
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 57: Quantity of Crop Sold by Target Crop Group

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybeans	Overall	
Mean quantity sold of:						
Maize (MT)	0.7	0.6	0.9	0.7	0.7	1470
Cassava (MT)	0.4	0.2	0.3	0.3	0.3	100
Rice (MT)	0.6	0.5	1.2	0.7	0.9	276
Soybeans (MT)	0.4	-	0.7	0.5	0.5	271

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops. Crops listed in first column refer to actual crops grown by households
 Source: ISSER – Ghana Baseline Data (AGRA), 2016

9.12 Sources of Market Price Information

Households in the sample revealed having obtained market price information from various sources. The main source of market price information reported by the majority of households (89.1%) is market traders (Table 58). We find that across region, a relatively higher proportion of households (96.3%) in the Northern Region reported having received market price information from market traders compared to their cohorts in the Brong Ahafo Region (88.0%). We find in Table 59 that, compared to households selected for the other target crops, a higher proportion of households selected for soybeans received market price information from market traders.

Table 58 Source of market price Information by Region

Indicators	Region			N
	Brong Ahafo	Northern	Overall	
% of households that received market price information from:				
Market traders	88.0	96.3	89.7	1,285
Private aggregators	4.9	0.0	3.9	1,285
Other farmers	4.2	2.6	3.9	1,285
Other sources	2.9	1.1	2.5	1,285

Source: ISSER – Ghana Baseline Data (AGRA), 2016

Table 59 Source of Market Price Information by Target Crop Group

Indicators	Target Crop Group					N
	Maize	Cassava	Rice	Soybeans	Overall	
% of households that received market price information from:						
Market traders	87.5	90.1	87.5	93.6	89.7	1,285
Private aggregators	4.4	4.1	3.4	3.2	3.9	1,285
Other farmers	4.7	3.8	6.3	1.4	3.9	1,285
Other sources	3.4	2.0	2.8	1.8	2.5	1,285

Note: Crops listed in first row (maize, cassava, rice, soybean) refer to farmer households for whom those are dominant crops

Source: ISSER – Ghana Baseline Data (AGRA), 2016

10. Conclusion

The results of this survey outline the practices of farmer households in Brong Ahafo and the Northern regions of Ghana and their productivity and welfare. They discuss decisions at all stages of production pre- and post-harvest and how demographic characteristics, such as gender and age, household size and culture impact them. The quantitative results show how farmers perform against the key indicators, while providing context for observed results using qualitative data, backed by a thematic framework analysis. It is observed that:

- ◆ Farmer households are majority illiterate, male-headed, with fairly young members. This demographic has impacted decision-making, production, land use and ownership and food security. Household structures are formed by cultural norms regarding marriage, inheritance and community. These differ between the focus regions and could cause interventions related to farm decisions (especially around crop choices and input use), to have varying effects or rates of impact.
- ◆ Farming is the number one source of income for majority of the farmers. Very few engage in economic activity outside of the farm. Furthermore, even the most common non-farm activities are linked to farming, through the trade of agricultural produce or hiring out casual labour. It is rare that farmers are salary earners or employers for salary earners. Labour is hired at a casual daily or hourly rate.
- ◆ Food security is sustained by the consumption of staple crops grown locally in the region. Tubers and cereals are standard for most households. However, a third of households, experience food shortages at some point during a 12-month period, which is still a significant share.
- ◆ Credit access is low for households in both regions and still very informal. Majority source loans from neighbours, local collaborative funding sources and moneylenders within the community. Very few use financial institutions such as commercial banks. In fact, few own a bank account to begin with.
- ◆ There is a gender gap in terms of household empowerment with regard to production and income use. Some female members, especially in some Northern communities, are unable to claim ownership of land, even if they are responsible for its cultivation. However, households as a group are able to claim the produce off plots and are jointly involved in its consumption. Females spend more time performing domestic duties and less time on leisure and productive or income-earning activities than men do.
- ◆ Household plots are large in both regions, with majority owning at least two plots. Often household heads assign additional plots to spouses for use, although produce is consumed jointly. Northern plots are characterised by poor soil quality (as assessed by the farmers) compared to those in Brong Ahafo, given their respective ecological zones. As a result, the successes of interventions geared toward soil improving input and agronomic practices are likely to vary between the two regions, yet their importance to farmers cannot be ignored.
- ◆ Farm labour is mostly sourced from households, especially in the Northern region, where households are larger, compared to those in the Brong Ahafo.

- ◆ Input use, especially chemical use, is high for farmer households. They access these inputs mainly from agrodealers. Interestingly, when observed at the regional level, agrodealers are a more popular source for Brong Ahafo households than Northern ones, who rely mostly on markets for chemicals. In additions, more than half of the households use hybrid seed varieties, especially for maize. Some, though aware of the improved varieties, do not use them because they are unable to recycle hybrid seeds. Buying new seeds every year adds to their cost, making it an unattractive input for them. Additionally, improved varieties for crops like cassava are not patronized as much as maize varieties, because local consumers are able to taste differences in the cassava, when used for the widely consumed dish, *fufu*, for which it is used.
- ◆ Farm mechanization is limited for most households, given small-scale nature of production. Most use tractors or animal draught for ploughing and clearing land. The rest of the farming activities, like planting and fertilizer application are still labour intensive. Tractor use is very high on Northern plots, compared to Brong Ahafo plots, due to the large average plot sizes in the region, the soil quality, which is more compact and difficult to till manually, and the cost of labour. Farmers complain that labour costs for the operation of animal draughts are higher than that of tractor services.
- ◆ The exchange of farm innovation and skills through FBOs and extension services is limited among the sampled households. Very few are members of FBOs and are unaware of opportunities for extension assistance and demonstration.
- ◆ Agronomic practices are widely practiced. The most common methods are tied to preserving or improving soil quality. Most households apply fertilizer and engage in fallowing, composting and mulching.
- ◆ Yields recorded vary by crop and region. Brong Ahafo households record higher average yields for maize and cassava, while Northern households record higher average yields for rice and soybean. Soybean yields are very low in Brong Ahafo due to what farmers call “a failed project” in the region. Farmers were introduced to the crop but, after 5 years, they were unable to sell produce or access seeds. Soybean production will benefit from a ready market and adequate pricing, to encourage interest in the cultivation of the target crop.
- ◆ Post-harvest crop losses are highest for grains/cereals, in this case rice and maize. Farmers mostly store produce on their own, either in silos or bags at home or on their farms. They rarely use chemicals to protect or preserve the grain. Sale of crops is concentrated in markets, where most farmers access pricing information.

We recommend that AGRA take into account these key observations in the course of developing programs and policies aimed at increase farmer productivity and welfare. It is especially important to understand how cultural norms and financial constraints affect the adoption of certain inputs and farm innovations.

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