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Response to the Effects of Drought Spell on Livelihoods of Agro-Pastoralists in Northern Ghana

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Abstract

Climate shocks remains a threat to the livelihoods of agro-pastoralists in Africa, given that crop and livestock farming in the continent are mainly rain-fed. Thus, erratic rainfalls and temperatures are environmental factors bedeviling agro-pastoralism. In Ghana, northern Ghana is the food basket of the country, with over 70% of the labour force engaged in agriculture, producing both crops and livestock. Unfortunately, this part of the country for a long time has suffered from the perennial floods and droughts. In the 2024 farming season, there was a prolong drought in northern Ghana spanning for almost 50 days. In response, the government of Ghana commissioned the registration of farmers for support. However, this support was mainly limited to crop lost, with little emphasis on livestock lost. In view of this, CLIP commissioned a study to assess the effect of the drought spell on agro-pastoralists' livelihoods in the five regions of northern Ghana. The objectives of the study are to examine agro-pastoralists drought experience, determine the perceived effect of the drought spell on agro-pastoralists' livelihoods, and identify and analyse agro-pastoralists' drought adaptation strategies. The study relied on primary quantitative and qualitative data. Quantitative data was collected through a survey with 745 agro-pastoralists using survey questionnaire, randomly selected from 22 districts from the five northern regions. Qualitative data was collected through interviews with 22 District Livestock Officers using unstructured interview guide and also interviews with the agro-pastoralists. Data was analyzed using descriptive statistics and presented in tables and charts. The results show that over 98% of agro-pastoralists experienced the drought for an average of 28 days and a maximum of 41 days, with agro-pastoralists in the Upper East region experiencing the longest drought periods of over 32 days. The results further showed that agro-pastoralists' livelihoods were severely impacted adversely by the drought. The effect of the drought on their livelihoods manifest in the form of reduced pasture availability, stunting and mortality of livestock, increased competition over water and crop residue, outbreak of diseases among livestock, increased cost of livestock feed, and reduced farm income. Though the government of Ghana registered some farmers affected by the drought for support, only 21% of agro-pastoralists interviewed were captured in this registration. Yet, the government's promised support targets crop lost, rather than livestock lost. Over 76% of agro-pastoralists are either not expecting any external support or not sure if there will ever be an external support for them to recover from the adverse effect of the drought. This renders their livelihoods more vulnerable to climatic shocks. Finally, the results showed that the main strategies adopted by agro-pastoralists to adapt to the effects of the drought spell are: buying more fodder for their livestock, migrating to other communities in search for pasture and water, and selling off some livestock. These strategies are not sustainable given that migrating to other communities has implications on farmer-herder relations, buying more fodder has cost implications for agro-pastoralists and selling off livestock may deplete the stock. Based on the prevailing drought spell effects on agro-pastoralists livelihoods, the policy implication is for governmental and non-governmental organisations to be intentional about the climate change effect on livelihoods of agro-pastoralists by setting up special funds to support agro-pastoralists during climate shocks such as drought and/or floods.

Keywords: Agro-pastoralists, dry spell, livelihoods, CLIP, Northern Ghana, climate change, adaptation

APBG: Agro-Pastoralists Based Groups; **AU:** African Union; **CAADP**: Comprehensive Africa Agriculture Development Programme; **CLIP:** Changing Lives in Innovative Partnerships; **ECOWAS:** Economic Committee of West African States; **FAO:** Food and Agricultural Organisation; **GLDPS:** Ghana Livestock Development Policy and Strategy; **GSS:** Ghana Statistical Service; **KI**: Key Informant; **MoFA**: Ministry of Food and Agriculture; **SRID:** Statistics, Research, and Information Directorate; **NGO:** Non-Governmental Organisation; SAP: Survey with Agro-Pastoralists; **SDG:** Sustainable Development Goals

1. Introduction

Agro-pastoralism is the most vulnerable group of resource dependent group to climate change induced drought across the world (Schrieks et al., 2024), due to widespread of hunger, livestock deaths, and crop failure. The effect of drought on agro-pastoralists are devastating, with most agro-pastoralists taking an average of 3 – 4 years to recover their herds from the effects of a single season's drought (Mauerman et al., 2023). In the Horn of Africa, over 36.1 million agro-pastoralists were affected by drought from 2020 – 2022 across Ethiopia, Somalia, and Kenya, resulting in the death of over 9.5 million livestock (World Bank, 2023). The International Rescue Committee (2023) reported that in East Africa alone, over 40 agro-pastoralists suffered near-famine and malnutrition due to the impact of drought. Thus, the drought incidence and its' effect of agro-pastoralism is not peculiar to Ghana. In Ghana, data is silent on the number of agro-pastoralists affected by climate change induced drought and how they adapt to this climate change (Alhassan et al, 2024a).

The high effect of drought on agro-pastoralists has attracted attention from international, regional and national organisations in supporting agro-pastoralist to respond to these perennial droughts (Alhassan et al., 2024b). For example, The FAO has implemented several initiatives to combat the impact of drought on agro-pastoralists in Africa, such as the Rapid Response and Mitigation Plans, Livelihoods and Food Security Support, Infrastructure and Water Access, and Community Resilience Programs (FAO, 2022). At the continental level, the African Union (AU)'s Policy Framework for Pastoralism in Africa and the AU Climate Change and Resilient Development Strategy and Action Plan (2022-2032), with focus on protecting pastoralists' livelihoods, improving access to resources, and promoting drought-adapted practices. These initiatives aligns with the broader goals of the AU Agenda 2063, which includes promoting sustainable agricultural development and climate adaptation measures across Africa. At the regional level, the Economic Community of West African States (ECOWAS) has implemented multiple initiatives to support agropastoralists affected by droughts and climate challenges. Two of the popular initiatives by ECOWAS is the Regional Climate Strategy and Action Plan (2022-2030) and the Regional Sahel Pastoralism Support Project (PRAPS-2). The aim of the RCS (2022–2030) was to build resilience and climate adaptability for the agricultural sector, while the **PRAPS-2** focuses on promoting animal health, sustainable rangeland management, and livestock trade with the aim of improving the productivity and resilience of pastoralists.

At the national level, the Government of Ghana drafted the Ghana Livestock Development Policy and Strategy (GLDPS) to address the issues affecting the development of the Ghana livestock sub-sector such as the excessive importation of livestock and livestock products especially poultry, increased incidence of emerging and re-emerging animal diseases, inadequate supply of vaccines and veterinary pharmaceuticals, inadequate livestock infrastructure, transhumance, financing , research and technology dissemination in the livestock industry.

In particular, the Vision of the livestock sector is a modernized, competitive and sustainable livestock industry culminating in a structurally transformed national economy and evident in food and nutritional security, employment generation, equity and poverty reduction while preserving the environment.

Chapter 7 establishes the goals as follows: 1) To enhance the supply of meat, livestock and dairy products from domestic sources, innovation, generation and utilization, capacity and entrepreneurship skills of livestock value chain actors. 2) To enhance access to livestock markets, services and value addition. These goals are consistent with those of the Livestock Development Strategy for Africa (AUC, 2015). The overall objective of the present Policy is to develop a competitive and more efficient livestock industry that increases domestic production, reduces importation of meat and livestock products and contributes to the improvement of the livelihoods of all livestock value chain actors and the national economy while protecting the environment, preserving livestock biodiversity and ensuring bio-security. Whereas the specific objectives are: 1) To support the existing livestock production systems for improving production, productivity and income of livestock producers, most of which are women and small scale farmers. 2) To strengthen overall animal health cover through early warning system, prevention, control and eradication of disease. 3) To support training, research and development initiatives on issues pertaining to livestock sector for improving livestock production, productivity and health as well as the profitability of the entire

livestock value chain. 4) To improve the production and productivity of livestock by promoting and disseminating technologies developed by the research system. 5) To promote conservation and genetic improvement of indigenous breeds of livestock. 6) To increase availability of feed and fodder resources to meet the requirement of various species of livestock to attain optimal productivity. 7) To encourage value addition of livestock products. 8) To create an enabling environment to attract investment and finance for improving livestock infrastructure, production, processing, value addition and marketing.

In the 2024 farming season, Northern Ghana was hard-hit with prolong drought, resulting in crop failure, reduced pasture and water for livestock. This is expected to adversely impact the livelihoods of agro-pastoralists in the region. The government of Ghana's response to combating the impact of drought on farmers' livelihoods in the previous years was not different from its' response in 2024, as it promised to assist almost 930, 000 registered farmers with a cash cushioning of GHS1000.00 (USD64.00). However, this cash-support is targeted at crop farmers, leaving pastoralists to their own faith. As an NGO that champions the advocacy for improved livelihoods for agro-pastoralists, Changing Lives in Innovative Partnerships (CLIP) commissioned this study to assess the likely effect of droughts, especially the 2024 drought on the livelihoods of agro-pastoralists in the five northern regions of Ghana (Northern, Savannah, North-East, Upper West and Upper East). The findings from this survey will provide empirical data to advocate for support from governmental and non-governmental organisations in ameliorating the climate shocks effects on livelihoods of agro-pastoralists. It will also guide stakeholders in revising and fully implementing the Ghana Livestock Development Policy and Strategy and other international initiatives on agro-pastoralism.

1.1 Objectives of the Study

The aim of this study was to assess the effects of drought on livelihoods of agro-pastoralists in Northern Ghana. The specific objectives of the study were to:

1) examine agro-pastoralists drought experience
2) determine the perceived effect of drought on agro-pastoralists' livelihoods
3) identify and analyse agro-pastoralists' strategies of adapting to drought

1.2 Relevance of the Study

This study is relevant at the global, continental, regional and national levels. At the global level, findings from this study are relevant to achieving selected SDGs. The findings will be relevant to achieving SDG 1 (No poverty). The findings will trigger policies aimed at improving the livelihoods of agro-pastoralists, reducing poverty in rural communities by increasing income opportunities and stabilizing the effects of climate shocks on agro-pastoralists' livelihood. It will also be relevant to achieving SDG 2 (Zero hunger) by promoting sustainable agricultural and pastoral practices. Thus, the research findings will trigger policies that enhance food security through the reliable supply of agro-pastoral product such as staple, meat, milk, and other livestock products. These policies will reduce hunger and malnutrition among households reliant on agro-pastoralism for sustenance. Finally, the findings are also relevant to SDG 13 (Climate Action) in that the findings on climate vulnerabilities of agro-pastoralists practices can inform policies on climate adaptation and mitigation. These policies will promote sustainable grazing and farming practices, reduces carbon emissions, and build resilience to climate shocks.

At the Continental Level, the research findings will be relevant to the AU agenda 2063 of Comprehensive Africa Agriculture Development Programme (CAADP), particularly its frameworks on pastoralism and livestock development. The findings will inform AU policies on the Support for Resilience and Climate-Smart Pastoralism, Improving Infrastructure and Trade Facilitation initiatives by the AU, and Transhumance Cultural Heritage Protection initiatives of the AU.

At the regional level, finding are important to ECOWAS Transboundary Migration and Grazing Rights, Disease Surveillance and Veterinary Coordination, Harmonized Market Regulations which allow transhumant herders better access to regional markets and strengthening the West African livestock value chain, etc. At the national level, the findings are relevant to improving the Ghana Livestock Development Policy and Strategy as well as the Government of Ghana flagship programs of Planting and Rearing for Food and Jobs.

2. Methodology

2.1 Introduction

This chapter presents the methodology employed in the study to achieve its research objectives. The chapter presents a description of the study area, sample size determination and sampling procedure, methods of data

collection and analysis, as well as ethical considerations and a declaration of conflict of interest by CLIP and the research team.

2.2 Description of the Study Area

The study was conducted in Northern Ghana, where CLIP has most of its operational activities. Northern Ghana is in the Guinea Savannah Ecological Zone located within a semi-arid climatic region and is the food basket of Ghana with the highest percentage of its active labour force engaged in agriculture (GSS, 2019). Since 2019, Northern Ghana now consists of five regions; Northern, North-East, Savannah, Upper West, and Upper East Regions (Ghana Statistical Service, 2021). The annual average minimum and maximum temperatures of the region are 14^0C at night and 40^0C during the day, respectively (GSS, 2014). Over 60% of the active labour force are engaged in agriculture, and 90% of agriculture in Northern Ghana is rain-fed (FAO, 2024; Ghana Statistical Service, 2014).

The main crops cultivated in Northern Ghana include rice, maize, groundnuts, yam, soybeans, and cowpea. Livestock such as cattle, sheep, goats, guinea fowls, and fowls are reared by households in Northern Ghana (GSS, 2014). Northern Ghana accounts for over 40 percent of the national poverty, with 6 out of 10 persons in Northern, Savannah, and North–East regions being poor while 8 out of 10 persons and 9 out of 10 persons in Upper East and Upper West regions respectively are reported to be poor (GSS, 2019). Figure 2.1 presents a map of Ghana showing northern Ghana where the study was conducted.

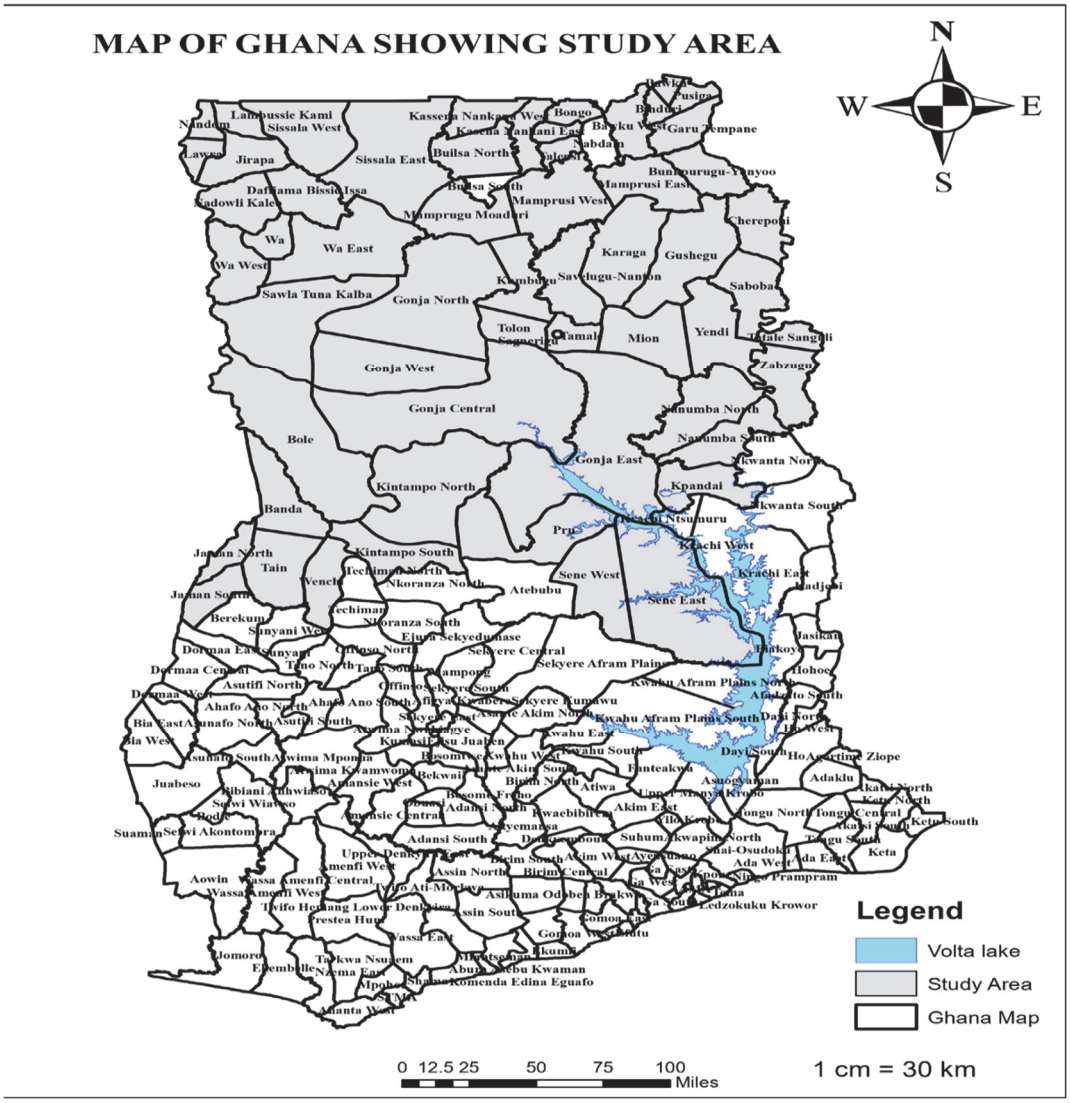

Figure 2.1. Map of Ghana Showing the Study Area

2.3 Sample Size Determination and Sampling Procedure

In sampling respondents for a survey data, the required sample size for a small population (>1000) is often 20-30%; for a medium population (1000 – 10,000), a sample size of 278 is sufficient; and for a large population (>10,000), the required sample size is 400 – 500 to achieve a 95% confidence level and ±5% margin of error (Krejcie & Morgan, 1970). In this study, we aimed for 99% confidence level and a ±5% margin of error. The sample size for the study was calculated using the following sample size formular:

$$n = \frac{Z^2 * p * (1-p)}{e^2} \tag{1}$$

Where n denotes the required sample size for the study, Z denotes Z-value (2.58 for 99% confidence level), p denotes the estimated proportion of the population with the characteristic (use 0.5 if unknown), e desired margin of error (5% = 0.05).

For finite populations like this case, we adjusted the sample size using the following equation (2):

$$n' = \frac{n}{1 + \frac{n-1}{N}} \tag{2}$$

Where N is the population size for the study area (582, 635, refer to Table 1). The computed sample size from equation 1 (665) is not different from the adjusted sample size (664). Thus, the minimum number of respondents to ensure a representative sample and generalization of the findings is 665. To account for a situation where some sampled respondents fail to participate in the survey, the sample size was further adjusted to 745 to ensure that the final number of respondents who consent and participate in the survey does not fall below the minimum threshold of 665.

A multi-stage sampling technique was employed to select the 745 respondents for the study. In the first stage, the five regions in Northern Ghana were purposively selected because these regions in Ghana have the highest number of agro-pastoralists in Ghana and are the most vulnerable to climate change shocks, especially, the 2024 drought. In the second stage, agro-pastoralists concentrated districts in each region were identified and randomly selected. Eight districts were selected from the Northern Region (Gusheigu, Karaga, Kpandai , Mion, Yendi, Taatali/Sanguli, Nanumba South, and Nanumba North), five districts from the Savannah Region (North Gonja, Bole, West Gonja, East Gonja, and Central Gonja), three districts from the Upper West region (Wa West, Lambussie, and Wa East), three districts from the North-East Region (Mamprugu-Moaduri, Cheriponi, and East Mamprusi), and one district from the Upper East Region (Garu). Given that agro-pastoralists do not usually have an isolated community but scattered across several communities in each district, enumerators consulted with the district assemblies' staff to identify key agro-pastoralists settlements and communities. A mini census was conducted to list all agro-pastoralists in the identified communities for sampling. Based on the total number of agro-pastoralists listed in each district, proportionate sampling was used to allocate the number of agro-pastoralists to be selected from each district. Finally, simple random sampling was used to select the required number of agro-pastoralists to constitute the final sample. Selected respondents were later visited by the enumerators to explain the purpose of the study, sought their consent, and then interview a household head or any household member who was 18 years or above, willing to talk to the research team and had adequate information about the household.

Quality data was collected through key informant interview with District Livestock Officers. These officers were purposively selected and interviewed because they have more information regarding the intensity of drought in their areas, the effects on drought on pastoralists and government drought interventions for agro-pastoralists. Enumerators also solicited for some qualitative responses from agro-pastoralists during the survey interview, Table 2.1 presents the population and sample distribution by region.

Table 2.1. Target Population and sample Size Distribution

Region	Number of Agro-Pastoralists	Number of Sampled Agro-pastoralists Households
Northern, Savannah and North-East	297, 743	443
Upper West	98, 036	60
Upper East	186, 856	242
Total Households	**582, 635**	**745**
Key informants		**21**

Source: SRID, MoFA (2022) and Authors' Computation, 2024

Note: Data for Northern, Savannah and North-East Regions were aggregated in the SRID, MoFA (2022) report.

2.4 Data Collection and Analysis Methods

The study collected both quantitative and qualitative data. The quantitative data was to assess the extent of the drought effects and how agro-pastoralists will adapt to the impact of the drought on their livelihoods. Both quantitative and qualitative data were collected through primary sources. The quantitative data was collected through a survey with agro-pastoralist using questionnaire programmed into a KoboCollect and administered using tablets. Qualitative data was also collected through interview with District Livestock Officers at the Department of Agriculture using unstructured interview guide. The qualitative data was to triangulate the quantitative responses and also provide explanation to the quantitative results.

Before the survey, enumerators were recruited by CLIP. Most of these enumerators were previously trained by CLIP as Community Watch Relays to report issues of farmer-herder relations at the community level to CLIP for redress. In other districts where CLIP had no existing network, the District Department of Agriculture was contacted to appoint personnel for the data collection exercise. A total of 38 enumerators were employed and trained for the survey. The enumerators were trained online for three days. In the first day, enumerators were trained on the content of the survey questionnaire as well as the unstructured interview guide. In the second day, enumerators were trained on how to administer the soft survey questionnaire using tablets. Enumerators were allowed to pilot both the survey questionnaire and unstructured interview guide in the third day and submit for the CLIP research team to assess the quality of data. Those who had issues with their data were contacted and further explained what was expected in the data collection.

The quantitative data from the survey was analyzed using descriptive statistics such as means, and percentages presented in Tables and chats. The qualitative data was analysed using content and thematic analysis approach. The qualitative results explained the quantitative results but also triangulate the quantitative results.

2.5 Ethical Considerations and Declaration of Interest

This study was fully funded by Foreign, Commonwealth and Development Office (FCDO) under the SAPSOC 4 project led by Acting for Life and implemented by CLIP with no conflict of interest. It must be stated that the views expressed in this report are the personal opinion of the author(s) and does not represent the official position of CLIP, Acting for Life or its donors.

All sampled agro-pastoralists were first visited by the research team to explain the purpose of the study, its benefits and sought for the consent of the respondent. A verbal consent contained in the KoboCollect questionnaire was read to each respondent by the enumerator and sought for the consent of the respondent before administering the questionnaire. Respondents were never coaxed to participate in the survey, but willingly agreed to participate in the survey. Respondents could also stop participating in the survey at any point in the interview process, or skip any question they deem private or uncomfortable responding to. They also consented to publishing results emanating from their responses. The consent form is in the first page of the questionnaire attached in appendix A. To ensure confidentiality of respondents, sampled respondents were interviewed at their private homes without the presence of anybody. Also, to ensure anonymity of respondents, data were analysed in aggregates, without mentioning any respondent's name and/or location. Also, all personal attributes which could identify respondents were deleted from the data during the data cleaning to ensure that no respondent could be identified in the future.

3. Results of Data Analysis

3.1 Introduction

This Chapter presents the results of the data analysis and discussions. The chapter presents results of the socio-demographic characteristics of respondents, respondents' sources of livelihoods, drought experience and its perceived effects on their livelihoods, and agro-pastoralists strategies of adapting to the effects of the drought on their livelihoods.

3.2 Socio-Demographic Characteristics of Respondents

This section presents results on the socio-demographic characteristics of agro-pastoralists. These socio-demographics characteristics are either categorical or continuous variables. The categorical socio-demographic variables considered in this report include location of respondents, sex, educational level, ethnicity, membership with agro-pastoralists-based group and their perceived effectiveness, marital status, religion, place of birth of respondents. The continuous socio-demographic variables considered in this report are age, household size, dependency ratio, and household labour force.

The results revealed that most survey respondents are in the Upper West (242), Northern (195), North-East (140) and Savannah regions (108). The reason is that these regions have more agro-pastoralists, especially transhumant herders. The results further indicate that Lambussie (120) had the highest number of interviewed agro-pastoralists. Figure 3.1 presents the distribution of survey respondents by region and Table 3.1 presents the distribution of respondents by district.

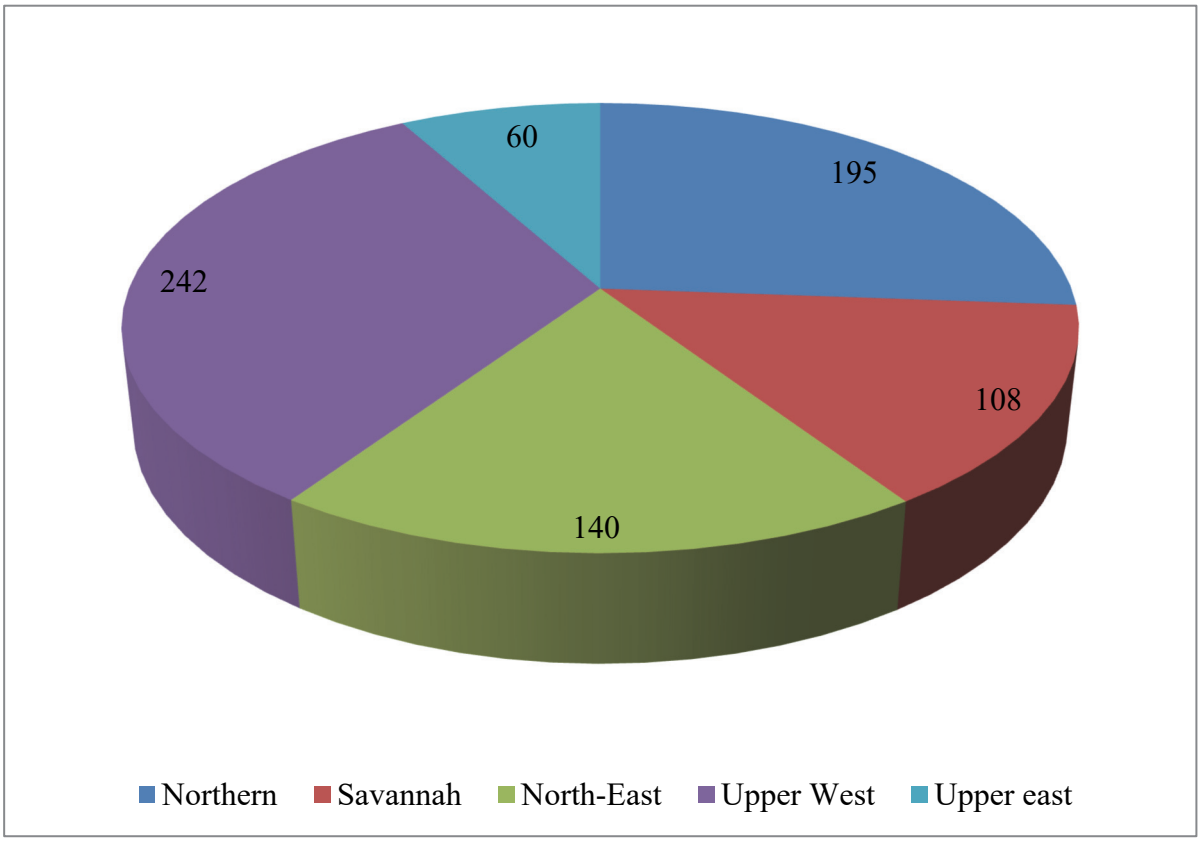

Figure 3.1. Regional Distribution of Survey Respondents

Table 3.1. Distribution of Survey Respondents by District

Region	District	Number of Respondents	% of Respondents
	Gusheigu	64	8.6%
	Kpandai	20	2.7%
	Mion	38	5.1%
Northern	Karaga	19	2.6%
	Nanumba North	21	2.8%
	Nanumba South	16	2.2%
	Yendi	17	2.3%
	North Gonja	21	2.8%
	Bole	30	4.0%
Savannah	West Gonja	20	2.7%
	Central Gonja	21	2.8%
	East Gonja	16	2.2%
	Mamprugu Moaduri	27	3.6%
North-East	Cheriponi	70	9.4%
	East Mamprusi	43	5.8%
Upper East	Garu	60	8.1%
	Wa West	81	10.9%
Upper West	Lambussie	120	16.1%
	Wa East	41	5.5%
Sample Respondents		745	100.0%

The results show that 92.5% of agro-pastoralists interviewed were male compared to only 7.5% female respondents. The reason is that agro-pastoralism is a male dominated occupation, not only in Ghana, but across Africa and the world. Upper East has the highest percentage of female respondents with 31.7% of agro-pastoralists being female. On the other hand, Savannah Region has the highest proportion of male agro-pastoralists with 99.1% of the respondents from the region being males. In terms of educational level, majority of the agro-pastoralists interviewed (79.6%) had no formal education while only 3.2% of agro-pastoralists interviewed had tertiary level of education. It was revealed that agro-pastoralists who had higher educational attainment own livestock and hire other herders to take care of the livestock rather than herding the livestock themselves. Educated agro-pastoralists are often wealthy urban based business men/women who own cattle and hire uneducated Fulbe group as caretakers of their herds. Fulbe has herding as their traditional occupation. This has been confirmed in this study with 52.8% of agro-pastoralists interviewed belonging to the Fulbe/Fulani ethnic group, with Upper West Region having the highest proportion of Fulbe agro-pastoralists (78.1%).

Most authors have regarded agro-pastoralism to be dominated by people who claim faith to the Islamic religion. Results from this study is not contrary to this perception with 88.5% of agro-pastoralists interviewed belonging to the Islamic religion, with only 7.3% of agro-pastoralists interviewed being Christians. Savannah Region has the highest proportion of agro-pastoralists (99.1%) being Muslims. The results further revealed that 95.8% of agro-pastoralists interviewed are married and Savannah Region has the highest proportion of married agro-pastoralists (99.1%) than other regions. In terms of social network, only 33.6% of agro-pastoralists interviewed belong to an Agro-Pastoralist-Based Group (APBG). Agro-Pastoralists Based Groups provide social support to members and also advocate for the collective interest of its members, especially when members are affected by shocks such as drought. However, among the agro-pastoralists who belong to Agro-Pastoralists Based groups, only 33.2% of them think that the Agro-Pastoralists Based groups are effective in seeking for support from both governmental and non-governmental organizations to assist members adapt to climate shocks such as the recent drought in Northern Ghana.

Given that agro-pastoralists are often on the move in search of pasture and arable land, we solicited for respondents' place of birth. The results revealed that only 40.9% of agro-pastoralists interviewed were born in the community they are currently living, while 13.2%, 12.4%, 10.5% and 23.0% were born outside their community but within the district, outside the district but within the region, outside the region but within Ghana, and outside Ghana respectively. This suggests that almost 60% of agro-pastoralists interviewed migrated to their current community, either in search for pasture for their herds, arable lands for crop cultivation or other push or pull factors that might have induced their migration. The results further revealed that North-East Region (76.4%) has the highest proportion of agro-pastoralists born within their communities while Savannah Region (27.8%) has the least proportion of agro-pastoralist born within the community they are living. Table 3.2 presents results on the categorical socio-demographic characteristics of survey agro-pastoralists.

Table 3.2. Categorical Socio-demographic Characteristics of Survey Respondents

Variable	Region					Combined Sample
	Northern	Savannah	North-East	Upper West	Upper East	
Total number of respondents	195 (26.2)	108 (14.5)	140 (18.8)	242 (32.5)	60 (8.1)	745 (100)
Sex: Male	180 (92.3)	107 (99.1)	131 (93.6)	230 (95.0)	41 (68.3)	689 (92.5)
Female	15 (7.7)	1 (0.9)	9 (6.4)	12 (5.0)	19 (31.7)	56 (7.5)
Educational level:						
None	165 (84.6)	71 (65.7)	99 (70.7)	218 (90.1)	40 (66.7)	593 (79.6)
Primary	8 (4.1)	3 (2.8)	3 (2.1)	9 (3.7)	13 (21.7)	36 (4.8)
Middle/JSS/JHS	8 (4.1)	15 (13.9)	12 (8.6)	7 (2.9)	5 (8.3)	47 (6.3)
O Level/SSS/SHS	6 (3.1)	1 (0.9)	14 (10.0)	4 (1.7)	2 (3.3)	27 (3.6)
Tertiary	5 (2.6)	9 (8.3)	8 (5.7)	2 (0.8)	0 (0.0)	24 (3.2)
Others	3 (1.5)	9 (8.3)	4 (2.9)	2 (0.8)	0 (0.0)	18 (2.4)
Ethnicity						
Akan	0 (0)	0 (0)	13 (9.3)	0 (0)	0 (0)	13 (1.7)
Dagomba/Mamprusi/Nanumba	61 (31.3)	2 (1.9)	21 (15.0)	0 (0)	0 (0)	84 (11.3)
Konkomba/Basari	23 (11.8)	0 (0)	24 (17.1)	0 (0)	0 (0)	47 (6.3)
Dagaati/Wala	0 (0)	0 (0)	0 (0)	18 (7.4)	0 (0)	18 (2.4)
Sissala	0 (0)	1 (0.9)	0 (0)	33 (13.6)	0 (0)	34 (4.6)
Gonja	0 (0)	35 (32.4)	0 (0)	0 (0)	0 (0)	35 (4.7)

Kusasi	0 (0)	0 (0)	0 (0)	0 (0)	27 (45.0)	27 (3.6)
Frafra/Gruni	1 (0.5)	0 (0)	2 (1.4)	0 (0)	0 (0)	3 (0.4)
Fulbe/Fulani	105 (53.9)	62 (57.4)	29 (20.7)	189 (78.1)	8 (13.3)	393 (52.8)
Others	5 (2.6)	8 (36.4)	51 (36.4)	2 (0.8)	25 (41.7)	91 (12.2)
Membership with Agro-Pastoralists Based group (APBG)	81 (41.5)	40 (37.0)	26 (18.6)	82 (33.9)	21 (35.0)	250 (33.6)
APBG support for members (Yes)	109 (55.9)	31 (28.7)	57 (40.7)	33 (13.6)	17 (28.3)	247 (33.2)
Marital Status:						
Married	185 (94.9)	107 (99.1)	130 (92.9)	236 (97.5)	56 (93.3)	714 (95.8)
Divorced	1 (0.5)	0 (0)	0 (0)	0 (0)	1 (1.7)	2 (0.3)
Widow/Widower	4 (2.1)	0 (0)	0 (0)	1 (0.4)	3 (5.0)	8 (1.1)
Single	5 (2.6)	1 (0.9)	10 (7.1)	5 (2.1)	0 (0)	21 (2.8)
Religion:						
Christianity	7 (3.6)	0 (0.0)	26 (18.6)	5 (2.1)	16 (26.7)	54 (7.3)
Islam	175 (89.7)	107 (99.1)	106 (75.7)	231 (95.5)	40 (66.7)	659 (88.5)
African Tradition	13 (6.7)	1 (0.9)	8 (5.7)	6 (2.5)	4 (6.7)	32 (4.3)
Place of Birth:						
Within community	71 (36.4)	30 (27.8)	107 (76.4)	68 (28.1)	29 (48.3)	305 (40.9)
Within district	28 (14.4)	34 (31.5)	11 (7.9)	19 (7.9)	6 (10.0)	98 (13.2)
Within the region	32 (16.4)	5 (4.6)	4 (2.9)	42 (17.4)	9 (15.0)	92 (12.4)
Outside region but in Ghana	31 (15.9)	13 (12.0)	9 (6.4)	14 (5.8)	11 (18.3)	78 (10.5)
Outside Ghana	33 (16.9)	26 (24.1)	8 (5.7)	99 (40.9)	5 (8.3)	171 (23.0)
Others	0 (0.0)	0 (0.0)	1 (0.7)	0 (0.0)	0 (0.0)	1 (0.1)

Note: Figures in parenthesis are in percentage.

The study further assessed agro-pastoralists' age, household size, dependency ratio and labour force availability to agro-pastoralists. The results show that the average age of respondents in the combined sample is 42.8 years. Though, this average age is higher than the international youth age limit of 24 years and the Ghana youth policy's youth age limit of 35 years, the results suggest that agro-pastoralists are energetic to undertake the agro-pastoral activities which are labour intensive. Upper West Region has the least average age of respondents (40.91 years) compared to the other regions. The average household size for the combined sample is 10.56 persons. This is higher than the average household size of 3.6 persons in Ghana (Ghana Statistical Service, 2022). The average household size for Northern (10.98), Savannah (11.10), North-East (11.46), Upper West (9.57), and Upper East (10.13) persons are higher than the average household size of 6.0, 5.1, 6.3, 5.1, and 5.1 persons for rural communities in these regions respectively (GSS, 2021, pp 34).

The results further revealed that the average labour force for the combined sample is 4.86 persons with a dependency ratio of 1.41. Thus, there are more dependents than active labour force among agro-pastoralists households to meet the labour requirement for agro-pastoral activities. The results show that no region had a dependency ratio of less than 1. The implication is that there are more dependents than labour force in all five regions. This suggests that for all agro-pastoralists households, fewer labour force to undertake agro-pastoral activities to meet the need of more dependents and the impact of drought on agro-pastoralists livelihoods can be devastating. Table 3.3 presents the continuous socio-demographic characteristics of agro-pastoralists.

Table 3.3: Continuous Socio-demographic Characteristic of Survey Respondents

Variable	Region					Min	Max	Combined Sample
	Northern	Savannah	North-East	Upper West	Upper East			
Age	43.87 (12.22)	47.07 (11.82)	42.14 (11.16)	40.91 (12.06)	41.02 (10.52)	19	70	42.82 (11.94)
Household size	10.98 (3.96)	11.10 (3.63)	11.46 (4.17)	9.57 (3.84)	10.13 (3.88)	2	22	10.56 (3.97)
Dependency ratio	1.37 (0.91)	1.57 (1.09)	1.31 (0.66)	1.46 (0.93)	1.24 (0.84)	0	7	1.41 (0.90)
Labourforce	5.05 (2.29)	4.86 (2.30)	5.33 (2.38)	4.40 (2.59)	4.95 (2.57)	0	13	4.86 (2.45)
Drought Duration	26.71 (9.28)	31.71 (4.83)	27.14 (8.00)	26.90 (8.32)	32.33 (3.33)	0	41	28.03 (8.09)

Note: Figures in parenthesis are in percentage.

3.3 Livelihood Strategies of Respondents

Agro-pastoralists interviewed are engaged in one or more livelihood activities. Agro-pastoralists are engaged in farming, nomadic herding, sedentary herding, transhumant herding, formal employment, or trading. The results show that Upper West Region has the highest number of respondents with nomadic herding (146 respondents) and sedentary herding (57 respondents) as their main occupation while Northern Region has the highest number of respondents with farming (95 respondents) as their main livelihood. The results further show that in the combined sample, 34%, 32% and 27% of agro-pastoralists have farming, nomadic herding and sedentary herding as their main livelihoods respectively. The remaining 7% had trading, formal employment or transhumant herding as their main source of livelihood. Figures 3.2 and 3.3 present respondents' main economic activities (livelihoods) by region and combined sample respectively.

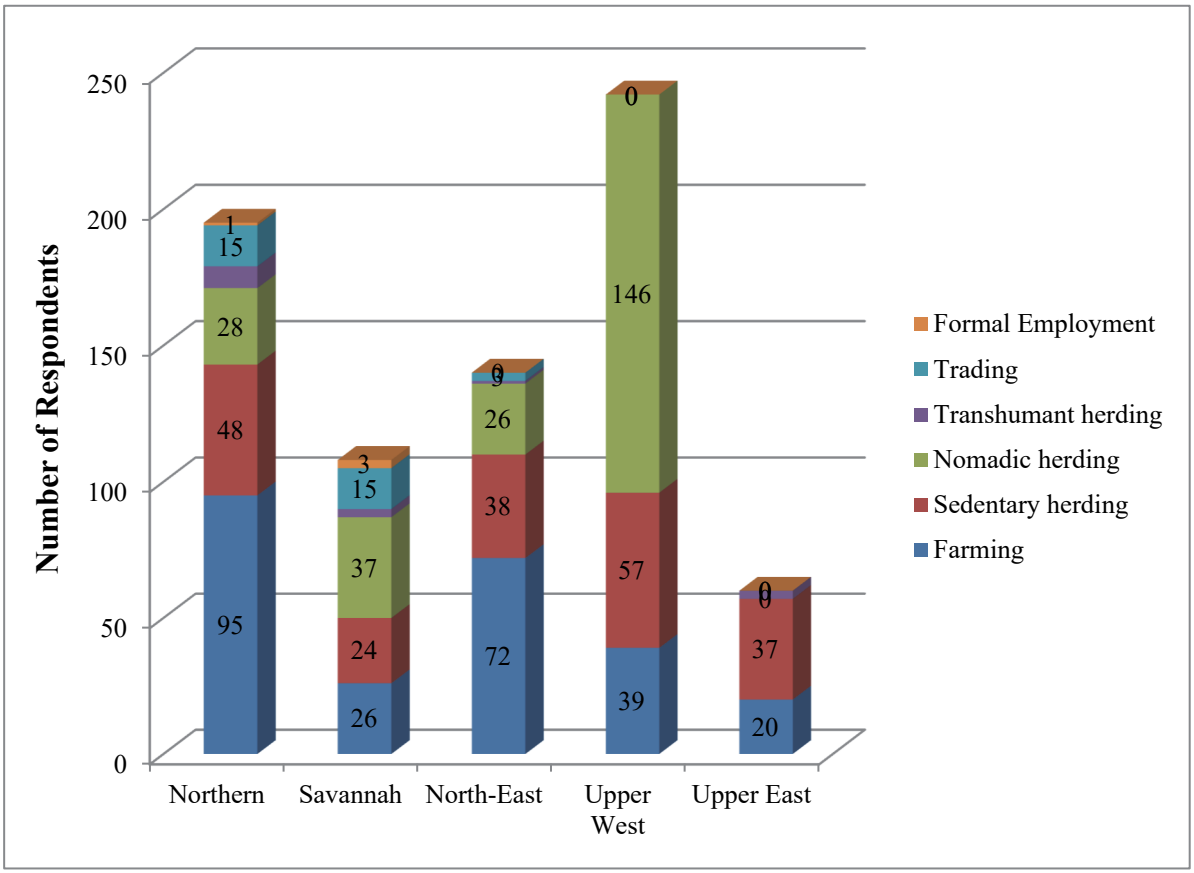

Figure 3.2: Main Economic Activities of Respondents by Region

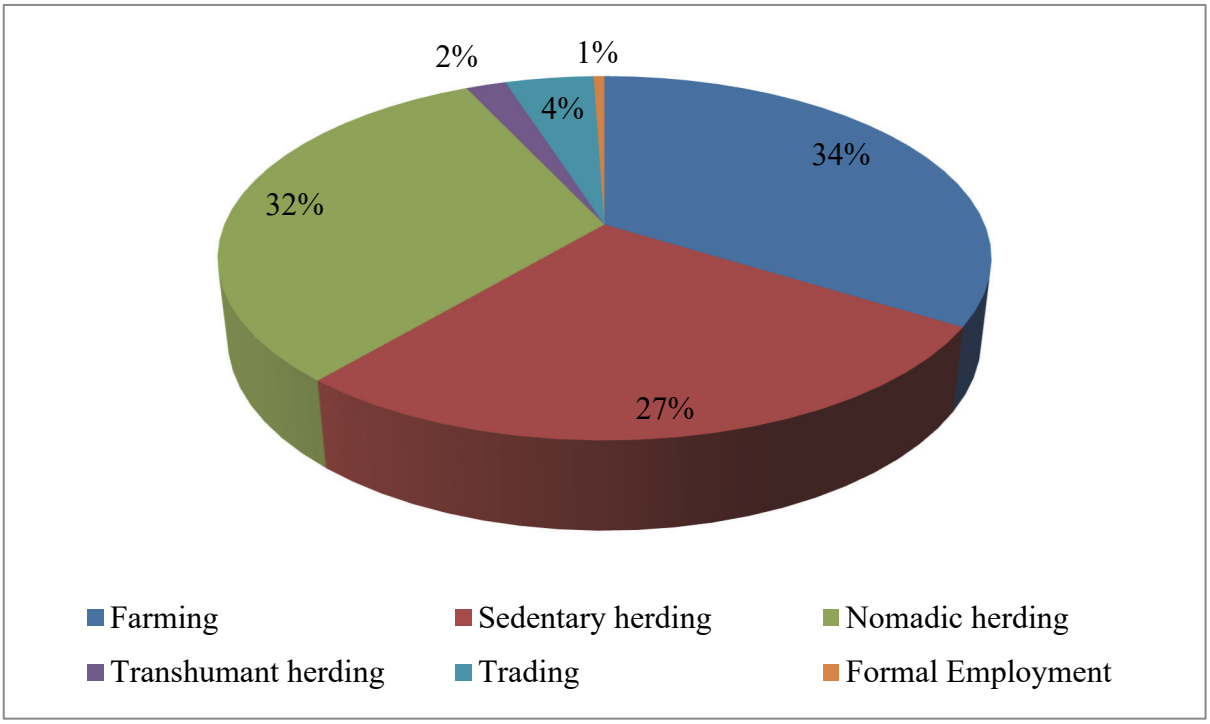

Figure 3.3. Main Economic Activities of Respondents for Combined Data

Among the respondents who own livestock, the results show that 88.7% of respondents own cattle while 70.0%, 77.5%, and 69.4% of respondents own goats, sheep and fowls respectively. Thus, the major livestock in the five

northern regions are cattle, goat, and sheep. These livestock requires large pasture as feed and water to survive, and are greatly affected especially during dry season or shocks such as drought. Hence, households who depend on livestock for livelihood, stand to suffer when they are hit with climatic shocks such as drought, as in this case.

In terms of regional distribution, even though over 80% of agro-pastoralists in all regions own cattle, Savannah (92.6%) and Upper West (97.5%) Regions had more agro-pastoralists owning cattle. On the other hand, most agro-pastoralists in Upper East Region (96.7%) own fowls. Thus, agro-pastoralists in Savannah and Upper West Regions are more affected by drought than the other regions. Table 3.4 presents agro-pastoralists' livestock ownership by region while Figure 3.4 presents agro-pastoralists' livestock ownership for the combined sample.

Table 3.4. Agro-Pastoralists Livestock Ownership by Region

Type of livestock	**Region**				
	Northern	**Savannah**	**North-East**	**Upper West**	**Upper East**
Cattle	163 (83.6)	100 (92.6)	114 (81.4)	236 (97.5)	48 (80.0)
Goat	137 (70.3)	75 (69.4)	81 (57.9)	173 (71.5)	57 (95.0)
Sheep	127 (65.1)	76 (70.4)	107 (76.4)	220 (90.9)	47 (78.3)
Fowls	130 (66.7)	72 (66.7)	73 (52.1)	184 (76.0)	58 (96.7)
Duck	13 (6.7)	3 (2.8)	7 (5.0)	2 (0.8)	4 (6.7)
Pigs	9 (4.6)	0 (0.0)	18 (12.9)	0 (0.0)	6 (10.0)
Others	6 (3.1)	9 (8.3)	0 (0.0)	5 (2.1)	13 (21.7)

Note: Figures in parenthesis are in percentage.

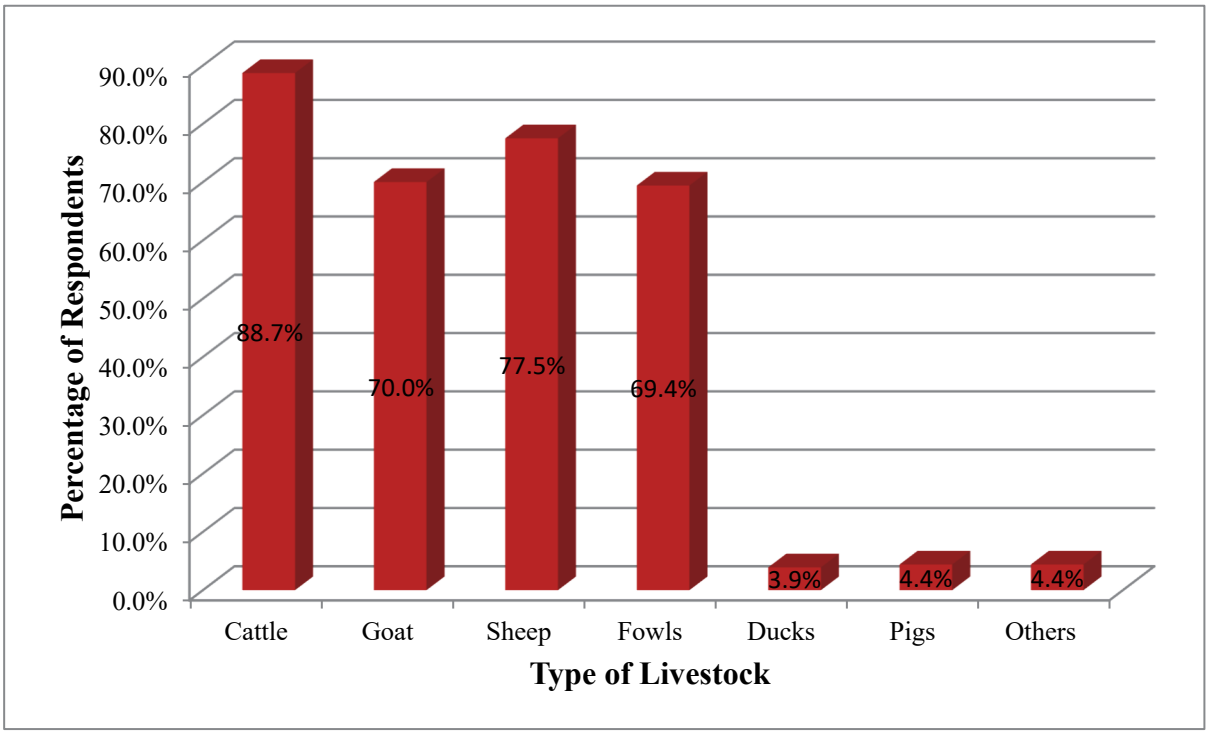

Figure 3.4. Livestock Owned by Agro-pastoralists in Combined Sample

3.4 Agro-Pastoralists' Drought Experience and Perceived Effects on Livelihoods

The effect of climate change in Northern Ghana manifest in the form of floods due to excess rains, drought and high temperatures emanating from prolong absence of rain. This is not peculiar to Northern Ghana, but, is a common climatic phenomenon in most African countries, especially in the Sahelian region. In this study, Over 98% of all respondents reported that they experienced drought in the 2024 farming season. At least, 96% of agro-pastoralists in each region reported experiencing drought in the 2024 farming season. The average drought period is 28.03 days with a maximum drought period of 41 days. The results indicate that agro-pastoralists in Upper East Region (32.33 days) and Savannah Region (31.71 days) experienced the longest drought period in the 2024 farming season. Figure 3.5 presents drought experience among agro-pastoralists by region and the combine sample.

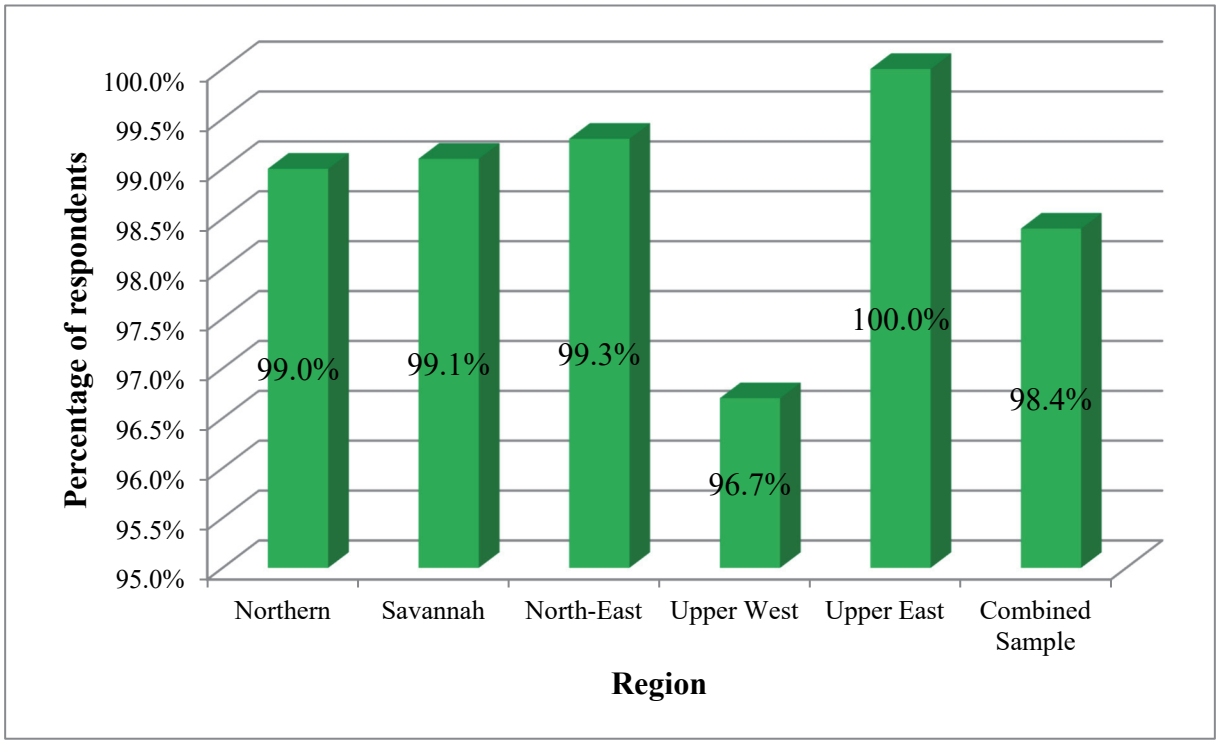

Figure 3.5. Agro-Pastoralists Experience of Drought in the 2024 Farming Season

Respondents were also asked of the severity of the drought impact on their livelihoods. The results show that in the combined sample, over 61% of agro-pastoralists' livelihoods were adversely affected very severely with additional 35.5% of agro-pastoralist been severely impacted by the drought. In terms of disparity in drought impact on livelihoods by region, the results show that the livelihoods of over 73%, 79% and 88% of agro-pastoralists in Northern, North-East and Savannah Regions were adversely impacted very severely. Figure 3.6 presents results of the severity of drought effect on agro-pastoralists livelihoods by region and the combined sample.

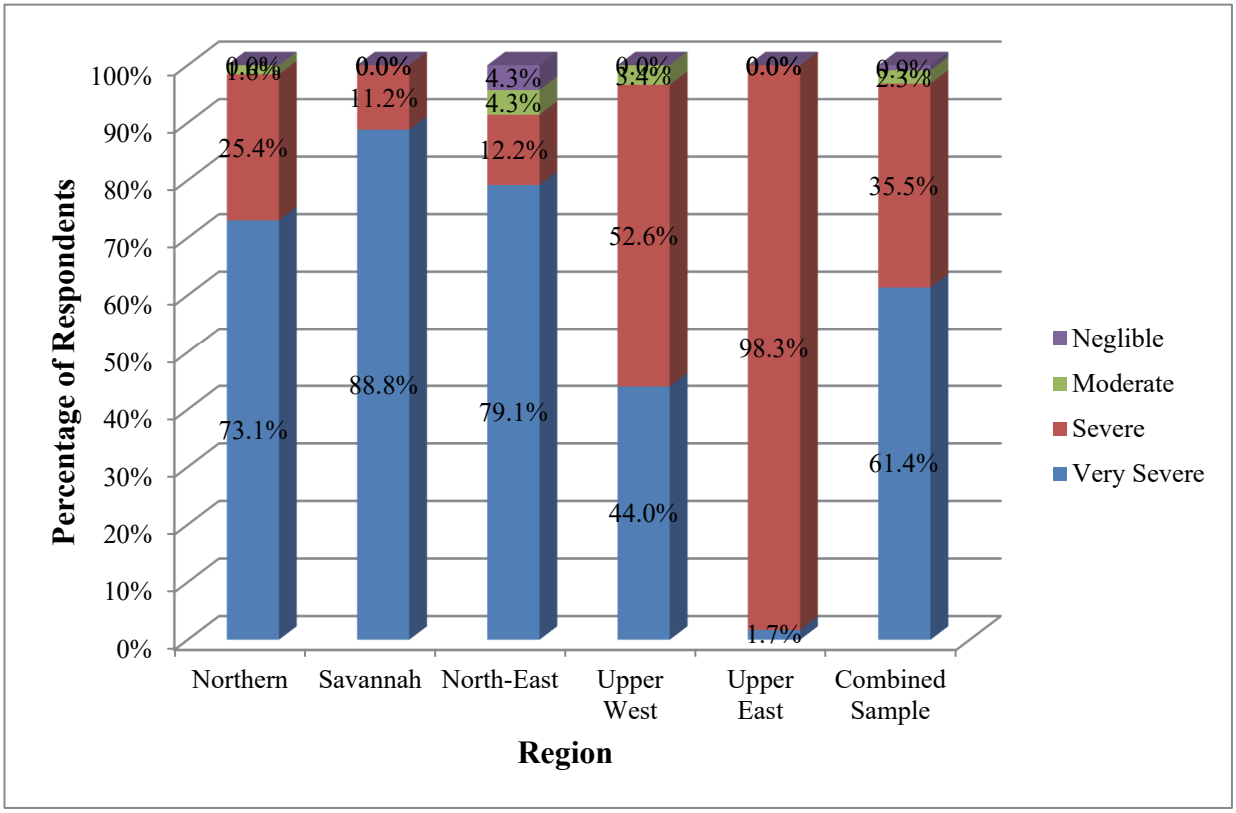

Figure 3.6. Severity of Drought Effect on Agro-Pastoralists' Livelihoods

The severe effect of the drought reported by agro-pastoralists was confirmed by most District Livestock Officers. In an interview with a Livestock Officer, he revealed that:

> *"The drought effect on agro-pastoralists' livelihood was very severe to the extent that all crops that were cultivated died as a result of the drought and even water to drink was also a serious challenge for people, and worst for livestock. The effect will even be felt more during the dry season because the water bodies did not collect enough water for livestock use beyond the rainy season. Pasture will also dry up soon, thereby reducing available pasture for livestock" (KI 11, 26/10/2024).*

In order to ascertain how agro-pastoralists' livelihoods were impacted by drought, respondents were asked during the survey to respond to the effect of drought on selected livelihood activities. The results show that 84.4% of agro-pastoralists interviewed reported a reduction in available pasture for their livestock due to the drought, with more agro-pastoralists from Upper East Region (96.7%) reportedly been more affected than the other four regions. With the exception of Savannah Region, over 80% of agro-pastoralists in Northern, Upper West, and North-East Regions reported a reduction in available pastures for their livestock. This means that the livelihoods of over 90% of livestock dependent agro-pastoralists (refer to Table 3.5) will be severely and negatively affected due to reduced source of pasture for the livestock. In period of drought, grasses dry up. This reduces available pasture for herd. Also, streams, rivers, dams and other natural sources of water for livestock dry up, making it difficult for agro-pastoralists to access water for their livestock. This insufficient pasture and water availability for livestock can lead to stunting growth among livestock.

The results show that about 56.4% of agro-pastoralists in the combined sample reported stunting growth among their livestock due to the drought situation. This was more severe in the Upper East Region where over 98% of agro-pastoralists interviewed reported stunting growth among their livestock. Prolong stunting among livestock can lead to livestock morbidity, retarding livelihoods of agro-pastoralists. In the combined sample, over 66% of agro-pastoralists reported experiencing outbreak of diseases and mortality among their livestock within the drought period, with Upper East Region recording the highest proportion of agro-pastoralists with reported animal mortality (96.7%) and disease outbreak (81.7%). This disease outbreak was attributed to the sudden high temperatures experienced by livestock, as reported by agro-pastoralists.

The existing competition for water and arable land for pasture and crop cultivation between crop farmers and pastoralists heighten in period of drought. The results show that over 60% of agro-pastoralists reported increased competition for water and crop residue for livestock among agro-pastoralists. Most pastoralists depend on crop residue and natural water bodies for their livestock, especially cattle. However, the prolong drought caused most water bodies to dry up, thereby increasing pressure on the few available water bodies as source of water for both people and livestock. Also, there was a reduction in residue of crops such as cowpea, groundnuts, rice straw, etc. which is available after harvest and serve as the main source of livestock feed. However, due to drought, most crop farmers ploughed back their crops for late planting, reducing the quantity of crop residue available to feed livestock. Increase competition for water and crop residue was high among agro-pastoralists in the Upper East Region, with over 81% of respondents in the study reporting the incidence of increased competition for water and crop residue due to the drought. An agro-pastoralists respondent during the survey interview said that:

> *"Due to the drought, there will be no enough water for the animals and grass as well, so the animals are not going to get enough pasture to feed on" (SAP 08, 08/10/2024).*

A District Livestock Officer in supporting the effect of the drought on agro-pastoralists livelihood during an interview indicated that:

> *"Due to the drought, a lot of animals will not get enough pasture and by so doing, it will lose its weight and the market value too will reduce. And some of them will fall sick and may probably die because there is no enough pasture." (KI 09, 20/10/2024).*

In view of the increased competition for crop residue due to drought, most agro-pastoralists resort to buying other feed for their livestock, resulting in increased cost of feeding livestock. The results show that over 47% of agro-pastoralists interviewed reported increased cost of feeding their livestock during the drought season, and Upper East Region being the hardest hit with over 76% of respondents reporting increased cost of feeding livestock. Thus, Upper East Region is most negatively impacted by the drought with most agro-pastoralists reporting reduced pasture, increased stunting and mortality of livestock, as well as cost of feeding livestock.

Most pastoralists depend on livestock milk for income and food. However, the drought affected the quantity of milk produced from livestock, especially cattle, with almost 62% of agro-pastoralists interviewed reporting a reduction in milk production due to the drought. Dairy cattle produce more milk when they have enough feed. Thus, the reduction in livestock feed due to drought had a negative impact on milk production from livestock. The results further showed that over 50% of agro-pastoralists reported reduced income due to the drought. Most agro-pastoralists depend on crop and livestock products for income. Hence, a reduction in livestock production and crop yield due to drought, undoubtedly affect their income. For example, two agro-pastoralists in responding to the effect of the drought on their livelihoods during an interview said that:

> *"Inadequate rangeland has negatively impacted the animals' reproduction and low milk production to cater for the young ones. Again, some of the animals have been sold to buy grains for the family" (SAP 29, 07/10/2024).*

> *"Milk production wasn't much for the calves during the drought period because the cattle couldn't get enough pasture to feed. We, the herders, don't get milk like before, which affects our income and food security because we depend on the milk for food and sell it for income since our cattle owners usually allow us to use the milk as our compensation for taking care of the cattle" (SAP 041, 09/10/2024).*

Finally, the drought has resulted in the increased cost of livestock products with 31.5% of respondents reporting increase in the cost of livestock products such as meat, eggs, etc. It should be stated unambiguously that this is not a major effect of the drought given that less than one-third of respondents reported increase in the cost of livestock products. Agro-pastoralists perceived drought effects on their livelihoods are presented in Table 3.5.

Table 3.5. Perceived Effects of Drought on Agro-Pastoralists Livestock

Type of Effect	Region					Combined Sample
	Northern	Savannah	North-East	Upper West	Upper East	
Reduced pasture availability	170 (87.2)	82 (75.9)	112 (80.0)	207 (85.5)	58 (96.7)	629 (84.4)
Stunting of livestock	112 (57.4)	17 (15.7)	65 (46.4)	167 (69.0)	59 (98.3)	420 (56.4)
Increase competition with farmers for water and crop residue	146 (76.4)	57 (52.8)	92 (65.7)	103 (42.6)	49 (81.7)	450 (60.4)
Outbreak of diseases	116 (59.5)	74 (68.5)	97 (69.3)	161 (66.5)	49 (81.7)	497 (66.7)
Animal mortality	114 (58.5)	60 (55.6)	99 (70.7)	162 (66.9)	58 (96.7)	493 (66.17)
Increased cost of livestock feeding	66 (33.9)	48 (44.4)	78 (55.7)	115 (47.5)	46 (76.7)	353 (47.4)
Decreased production of milk	120 (61.5)	66 (61.1)	71 (50.7)	159 (65.7)	45 (75.0)	461 (61.9)
Reduced income	90 (46.2)	67 (62.0)	73 (52.1)	101 (41.7)	46 (76.7)	377 (50.6)
Increase cost of livestock products	53 (27.2)	34 (31.5)	58 (41.4)	63 (26.0)	27 (45.0)	235 (31.5)
Others	10 (5.1)	2 (1.9)	0 (0.0)	7 (2.9)	1 (1.7)	20 2.7)

Note: Figures in parenthesis are in percentage.

3.5 Agro-Pastoralists' Drought Adaptation Strategies

Once agro-pastoralists are affected by the drought, they need to adopt strategies to cope and/or adapt to the effects of the drought on their livelihoods. First, respondents were asked during the survey if they are expecting any external assistance to help cope or adapt to the effect of the drought. The results show that while over 40% of respondents were not expecting any external assistance to cope with or adapt to the drought effect on their livelihoods; only 22.6% of respondent are expecting external assistance to help them cope or adapt to the effect of the perennial drought on their livelihoods while 36.5% of respondents are not sure of any external support to cope or adapt to the effect of drought on their livelihoods.

In terms of agro-pastoralists' expectation for external assistance, only 22.3% and 20.4% of respondents are expecting assistance from the Ghana Government and non-governmental organizations respectively to assist them cope or adapt to the effects of the drought on their livelihoods. Less than 5% of respondents expect support from their family, friends, Agro-Pastoralists Based Organizations or Civil Society Organizations to cope or adapt to the drought effect on their livelihoods. Thus, agro-pastoralists with expectation for external assistance, are mainly looking to the government and NGOs for support to cope with or adapt to the drought effects on their livelihoods. Results on agro-pastoralists expectation on external support and source of these external supports to help them cope or adapt to the effect of drought on their livelihoods are similar across all five regions.

In the second quarter of 2024, the Government of Ghana registered farmers in Northern Ghana through the Ministry of Food and Agriculture to compensate them for the 2024 drought effects. However, the results show that only 21.3% of agro-pastoralists interviewed in the combined sample were captured in the survey to benefit from the support expected from the Government of Ghana, with North-East Region having the highest proportion of respondents (47.9%) who reported to have been registered for these support from the government. The result show

that over 86% of respondents who expect external support anticipate these support to cover both crop and livestock losses. These results are not very different among respondents from the five northern regions under study. Figure *3.7 presents results agro-pastoralists who were captured in the MoFA registration for Government of Ghana Support*

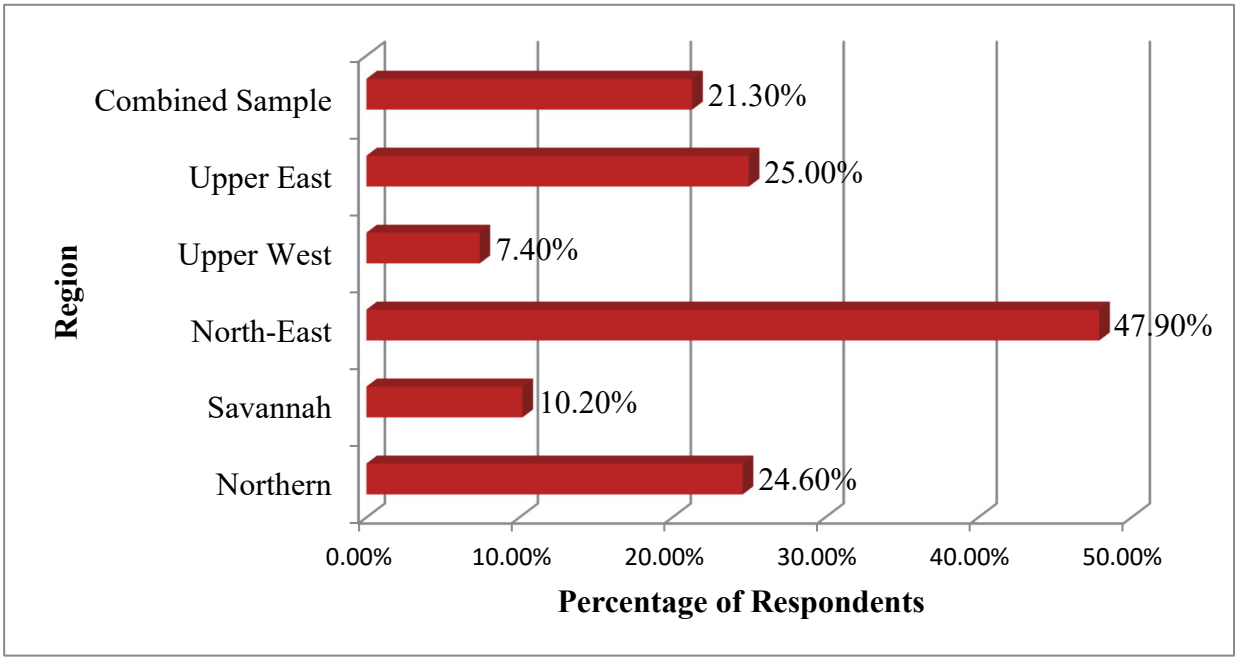

Figure 3.7. MoFA Registration of Farmers for Government Drought Support

Government's support to farmers for flood and/or drought are often targeted at crop lost, neglecting livestock. This makes livestock farmers more vulnerable to climatic shocks such as drought than crop farmers. Responding to the government's registration of farmers for support, a District Livestock Officer stated that:

> *"I have not registered livestock farmers who suffered the 2024 drought to benefit from the government's support. Over the years, the government's support mostly targets crop farmers and neglect livestock farmers and this question can best be explained by the high authorities" (KI 05, 20/10/2024).*

Similarly, another district officer in charge of livestock during an interview stated that:

> *"Government has a plan to support farmers affected by the drought spell. However, the support targets crop farmers. I am not aware of any government support for livestock farmers. In this current registration, the government has not given us the go ahead to register livestock farmers. However, most of the crop farmers are also into animal production. Hence, we only recorded the number of livestock owned by the farmers but not the number of livestock lost due to the drought" (KI 10, 24/10/2024).*

These results show that there is no clear plan targeting livestock farmers in adapting to the effect of floods and/or drought. Thus, as much as livestock farmers are exposed to climatic shocks (eg. floods and drought), there are no external support mechanisms to boost their adaptive capacities, thereby rendering than more vulnerable to the effects of climate change, than crop farmers and other land users. Table 3.6 presents external assistance to agro-pastoralists.

Table 3.6. External Assistance to Agro-Pastoralists

Adaptation Strategy	Region					Combined Sample
	Northern	Savannah	North-East	Upper West	Upper East	
Expectation of external assistance to adapt to the effect of the drought						
No	58 (29.7)	75 (69.4)	42 (30.0)	112 (46.3)	18 (30.0)	305 (40.9)
Yes	66 (33.9)	22 (20.4)	44 (31.4)	21 (8.7)	15 (25.0)	168 (22.6)
Not Sure	71 (36.4)	11 (10.2)	54 (38.6)	109 (45.0)	27 (45.0)	272 (36.5)
Sources of External Assistance to Agro-Pastoralists						
Family	17 (8.7)	3 (2.8)	6 (4.3)	2 (0.8)	0 (0.0)	28 (3.8)
Friends	18 (9.2)	3 (2.8)	5 (3.6)	3 (1.2)	1 (1.7)	30 (4.0)
Government	66 (33.9)	22 (20.4)	43 (30.7)	20 (8.3)	15 (25.0)	166 (22.3)
NGOs	58 (29.7)	19 (17.6)	42 (30.0)	18 (7.4)	15 (25.0)	152 (20.4)
CSO	9 (4.6)	14 (13.0)	2 (1.4)	6 (2.5)	0 (0.0)	31 (4.2)
Agro-pastoralist-based Organizations	11 (5.6)	9 (8.3)	5 (3.6)	10 (4.1)	0 (0.0)	35 (4.7)
What type of loss will the assistance cover						
Crops loss only	4 (6.1)	4 (18.2)	1 (2.3)	0 (0.0)	2 (13.3)	11 (6.6)
Livestock loss only	7 (10.6)	0 (0.0)	0 (0.0)	1 (4.8)	3 (20.0)	11 (6.6)
Both crops and livestock loss	55 (83.3)	18 (81.8)	43 (97.7)	20 (95.2)	10 (66.7)	146 (86.9)

Note: Figures in parenthesis are in percentage.

Drought has been a perennial climate shock bedeviling agro-pastoralists' livelihoods and the 2024 drought is just one of the climate shocks experienced by agro-pastoralists in Northern Ghana. Hence, agro-pastoralists have been adapting to climate shocks such drought by adopting adaptation strategies. Key informant interviews and household survey revealed that agro-pastoralists reported adopting such strategies as buying of fodder for herd, migrating to other communities, reducing feeding for livestock, night grazing, selling some of the livestock, engaging other strategies or doing nothing. Agro-pastoralists could adopt one or more strategies to cope with or adapt to the effect of the drought. The results showed that 46.2% of agro-pastoralists interviewed in the combined sample reported buying fodder for their livestock, with all respondents from the Upper East Region adopting this strategy. Buying fodder for livestock increases the cost of feeding livestock compared to where there is enough natural pasture for livestock grazing.

The results further show that over 40% of respondents reported that they will migrate to other communities in

search for water, pasture for livestock and arable land for crop cultivation. In the Northern Region, more than 50% of agro-pastoralists interviewed reported that they will migrate to other communities to cope with or adapt to the effect of the drought. The migration of agro-pastoralists will lead to increased competition for water and arable land for crop cultivation and pasture for livestock. This implies that the receiving or destination communities need to be sensitized and resourced to accommodate these migrant agro-pastoralists. The results further show that over 23% of agro-pastoralists will reduce feeding for livestock and also engage in night grazing. Reducing livestock feed or feed rationing will reduce livestock weight and also has health implications. On the other hand, sending livestock for night grazing will most likely cause crop damage, thereby worsening the existing adverse effect of the drought on livelihoods of crop farmers as well as increasing the existing farmer-herder feud. Reducing livestock feed is predominant among agro-pastoralists in Upper East Region.

Other agro-pastoralists who are unable to buy fodder for their livestock and do not want to risk losing their livestock, reported selling some of the livestock as a strategy to adapt to the effect of the drought. In the combine data, over 44% of respondents reported selling off some of their livestock due to the drought. This is predominant among agro-pastoralists in the Upper East Region (60.0%) and Upper West Region (50.0%). Finally, almost 13% of respondents did not adopt any strategy to cope with or adapt to the effect of the drought on their livelihoods. Thus, their livelihoods' are left to the mercy of nature and the 'survival of the fittest' syndrome. Table 3.7 presents agro-pastoralists' drought adaptation strategies.

Table 3.7. Agro-Pastoralists Drought Adaptation Strategies

Adaptation Strategy	Region					Combined Sample
	Northern	Savannah	North-East	Upper West	Upper East	
Buy fodder	85 (43.6)	45 (41.7)	59 (42.1)	95 (39.3)	60 (100)	344 (46.2)
Migrate to other communities	98 (50.3)	63 (58.3	63 (45.0)	72 (29.8)	8 (13.3)	304 (40.8)
Reduce cattle feeding	66 (33.9)	8 (7.4)	52 (37.1)	17 (7.0)	34 (56.7)	177 (23.8)
Night grazing	15 (7.7)	26 (24.1)	46 (32.9)	81 (33.5)	5 (8.3)	173 (23.2)
Sell some herd	66 (33.9)	54 (50.0)	54 (38.6)	121 (50.0)	36 (60.0)	331 (44.4)
Others	15 (7.7)	3 (2.8)	5 (3.6)	13 (5.4)	1 (1.7)	37 (5.0)
Do nothing	22 (11.3)	11 (10.2)	19 (13.6)	44 (18.2)	0 (0.0)	96 (12.9)

Note: Figures in parenthesis are in percentage.

4. Conclusions and Implications of Findings

4.1 Conclusions from the Study

This study was CLIP response to the 2024 drought spell's effect on the livelihoods of agro-pastoralists livelihoods in Northern Ghana. The study sought to examine agro-pastoralists' drought spell experience, the effect of the drought spell on their livelihoods, and the strategies they adopt to adapt to the effects of the drought spell. In pursuance of these objectives, the study interviewed 745 agro-pastoralists using survey questionnaire and 22 District Livestock Officers using unstructured interview guide. Based on the findings from the results generated from the data, the following conclusions are drawn:

- Almost all agro-pastoralists experienced the 2024 drought spell, for an average of 28 days and at most 41 days. Agro-pastoralists in the Upper East Region experienced the longest drought period with 32 days without rain.
- The effect of drought on agro-pastoralists' livelihoods is very severe and manifest in the form of reduced pasture availability, stunting and outbreak of diseases among livestock, livestock mortality, increased competition for water and pasture and reduced income among agro-pastoralists.
- The effect of drought on livelihoods varies by geographical location and agro-pastoralists in Upper East Region are the most adversely impacted by the 2024 drought.
- Majority of agro-pastoralists (almost 80%) are not expecting any external support to help them cope/adapt to the effect of the drought on their livelihoods. This hinders their adaptive capacity and renders them more vulnerable to climate shocks.
- Only one out of five agro-pastoralists was captured in the government of Ghana farmer registration for support to cushion agro-pastoralists in ameliorating the effects of the drought on their livelihoods. Thus, few agro-pastoralists stand the chance of benefiting from the promised support from the Government of Ghana to avert the effect of the drought on their livelihoods. Hence, most agro-pastoralists are left to their faith to cope/adapt to the impact of the drought, making their livelihoods more vulnerable to the impact of climate shocks such as the 2024 drought.
- There is limited available external support to help agro-pastoralists adapt to the effect of drought.
- The main strategies adopted by agro-pastoralists in adapting to the effects of drought spell are to buy fodder for their livestock, migrate to other communities in search for pasture and water, and selling off some of their livestock. These are not sustainable adaptation strategies.

4.2 Policy Implications

Policy implications of the above conclusions from the findings are not far fetch.

- Given that most agro-pastoralists were not captured in the government registration of farmers for support and most agro-pastoralists are not expecting any external support to help them adapt to the drought effect on their livelihoods, the Ghana Livestock Development Strategy and Policy need to be revised to consider setting up funds aim at supporting agro-pastoralists to respond to climate shocks such as floods, drought and outbreak of epidemic, and other shocks.
- Civil Society Organisations (CSO), Non-Governmental Organisations (NGO), International Organisations and other Think Tanks should advocate for the funding support and projects aimed at strengthening the resilience and adaptive capacity of agro-pastoralists to cope/adapt to the adverse effects of climate shocks.
- Policy response to drought adaptation should consider difference in location. This is based on the findings that most agro-pastoralists in the Upper East Region are more affected by the drought than agro-pastoralists from other region.

References

African Union Commission. (2015). *The Livestock Development Strategy for Africa 2015-2035*. Nairobi, Kenya. https://faolex.fao.org/docs/pdf/au196356ENG.pdf

Alhassan, S. I., Kyereh, B., & Osei-Tutu, P. (2024). Stakeholders' evaluation of a farmer-herder conflict research project in the Ashanti Region of Ghana. *Sustainable Agriculture Research, 13* (2), 84–100. https://doi.org/10.5539/sar.v13n2p84

Alhassan, S. I., Kyereh, B., Pouliot, M., & Derkyi, M. A. A. (2024). Effect of farmer–herder conflict adaptation strategies on multidimensional poverty and subjective wellbeing in Ghana. *African Journal of Agricultural and Resource Economics, 19* (2), 181–213. https://doi.org/10.53936/afjare.2024.19(2).11

FAO. (2022). *Drought in the Horn of Africa: Revised rapid response and mitigation plan to avert a humanitarian catastrophe – January–December 2022* (First revision). Rome. https://doi.org/10.4060/cc0638en

FAO. (2024). *Ghana at a glance*. https://www.fao.org/ghana/fao-in-ghana/ghana-at-a-glance/en/

Ghana Statistical Service. (2014). *Ghana Living Standards Survey Round 6 (GLSS 6): Poverty profile in Ghana (2005-2013)*. Accra, Ghana: Author.

Ghana Statistical Service. (2019). *Ghana Living Standard Survey Round 7: Main report*. Accra, Ghana: Author.

Ghana Statistical Service. (2021). *Ghana 2021 Population and Housing Census: Population of regions and districts. General report, Volume 3A*. Accra, Ghana: Author.

https://statsghana.gov.gh/gssmain/fileUpload/pressrelease/2021%20PHC%20General%20Report%20Vol%203A_Population%20of%20Regions%20and%20Districts_181121.pdf

International Organization for Migration. (2023, February 23). *DTM Horn of Africa Drought 2022: Human mobility snapshot (January–December 2022)*. IOM, East and the Horn of Africa. https://dtm.iom.int/reports/horn-africa-drought-2022-human-mobility-snapshot-january-december-2022

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30* (3), 607–610.

Mauerman, M., Ross, C., Nébié, E. I., Anderson, W., Jensen, N., & Chelanga, P. (2023). The long-term impact of multi-season droughts on livestock holdings and pastoralist decision-making in Marsabit, Kenya. *Journal of Arid Environments, 211*, 104928. https://doi.org/10.1016/j.jaridenv.2022.104928

Schrieks, T., Botzen, W. J. W., Haer, T., & Aerts, J. C. J. H. (2024). Drought risk attitudes in pastoral and agro-pastoral communities in Kenya. *Journal of Behavioral and Experimental Economics, 108*, 102143. https://doi.org/10.1016/j.socec.2023.102143

Statistics, Research, and Information Directorate of Ministry of Food and Agriculture. (2022). *Facts and figures: Agriculture in Ghana, 2021*. Accra, Ghana: Ministry of Food and Agriculture. file:///E:/%C2%A0/CLIP%20Job/Drought%20Data/Literature/MoFA%202022_Facts%20and%20Figures.pdf

World Bank. (2023, September 1). *Financial inclusion builds resilience of pastoralists to drought*. https://www.worldbank.org/en/news/feature/2023/09/01/financial-inclusion-builds-resilience-of-pastoralists-to-afe-drought

Appendices

Appendix A: Households Level Questionnaire

Consent of Respondent

This study is conducted by Changing Lives in Innovative Partnerships (CLIP), under its Agro-pastoralism project. The purpose of this study is to assess the effect of the 2024 drought on livestock production and livelihoods of agro-pastoralists in Northern Ghana and identify possible measures to address these effects. The findings from this survey will provide empirical data to support CLIP advocacy for support from governmental and non-governmental organisations in ameliorating the drought effects on livelihoods of agro-pastoralist. This study is fully funded by CLIP with no conflict of interest in the outcome of the findings.

In view of this, you have been randomly selected to participate in this survey. However, your participation in this survey is voluntary and you have the right **TO** or **NOT TO** participate in the survey. Your participation in this survey will only require your time, but no associated cost. CLIP cannot assure you of any direct material benefit for your participation. However, responses from this survey will be used as the basis to advocate for stakeholders support for agro-pastoralist to remedy the likely effect of the drought on their livelihoods. Thus, CLIP would appreciate your time for participating in this survey.

This survey is expected to last for about 25 minutes. It will solicit responses on your demographic characteristics, sources of livelihoods, perceived effect of the 2024 drought on your livestock and livelihoods, your strategies of adapting to these effects, and available support for pastoralists.

Anonymity of respondents is guaranteed in this survey. Findings from this survey would be treated confidentially and analysis of data generated would be based on aggregates of all responses, without mentioning individual respondents' names. To show your consent to participate in this survey without any condition, kindly select yes, otherwise, you can select no if you don't consent to participate in this survey. Yes [ ] No [ ]

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Name of Enumerator: _____

A. Households Identification

1. Name of Respondent:
2. Phone Number:
3. Region: Northern [ ] Savannah [ ] North-East [ ] Upper West [ ] Upper East [ ]
4. District: Northern (Karaga, Mion, Yendi, Gusheigu, Tatale/Sanguli, Nanumba North, Nanumba South, Kpandai), Savannah (East Gonja, Central Gonja, North Gonja, West Gonja, Bole), North-East (Cheriponi, East Mamprusi, Yonyo, Mamprugu-Moagduri), Upper West (Lambuisie, Wa East, Wa West), and Upper East (Bawku West, Garu)
5. Name of community: _____

B. Socio-Demographic Characteristic:

6. Sex of respondent? Male [ ] Female [ ]
7. Age of Respondent in years? [ ]
8. Household size: Please record the number of household members within the following age groups Below 15years [ ] 15 – 59 years [ ] 60+ years [ ]
9. Educational level of household head? None [ ] Primary [ ] Middle school/JSS/JHS [ ] O Level/SSS/SHS [ ] Post-Secondary [ ] Tertiary [ ]
10. Marital Status of household head? Single [ ] Married [ ] Window [ ] Divorce [ ] Others [ ]
11. Religion of respondent? Christian [ ] Islam [ ] African Traditional Religion [ ]
12. Where were you born? Within this community [ ] Within the district [ ] within the region [ ] Outside the region but Ghana [ ] Outside Ghana [ ] Others [ ] Specify:_____
13. What is your ethnicity? Akan [ ] Dagomba [ ] Mamprusi [ ] Konkomba [ ] Dagaati/Wali [ ] Sissala [ ] Ewe [ ] Gonja [ ] Bimoba [ ] Gruni/Frafra [ ] Fulbe [ ] Other [ ] Specify: _____
14. Do you belong to any farmer or pastoralist group? Yes [ ] No [ ]
15. Do you think farmer/pastoralist groups are putting enough effort into seeking support from both government and NGOs to assist you adapt to the effect of the drought? Yes [ ] No [ ]

C. Livelihood

16. What are your major economic activities? (Tick all applicable).

Farming [ ] sedentary herding [ ] Nomadic herding [ ] Transhumance herding [ ] Trading [ ] Formal employment [ ] Mining works [ ] Arts work [ ] Others [ ] Specify: _____

17. Which of these activities in (14) above is your major economic activity? (Tick only one applicable).

Farming [ ] sedentary herding [ ] Nomadic herding [ ] Transhumance herding [ ] Trading [ ] Formal employment [ ] Mining works [ ] Arts work [ ] Others [ ]

18. What livestock do you have? (Tick all applicable and state their numbers)

Cattle [ ] Goat [ ] Sheep [ ] Fowls [ ] Ducks [ ] Pigs [ ] Others [ ] Specify: _____

D. Drought Experience and Expected Effects

19. Did you experience drought in your community within the 2024 farming season? Yes [ ] No [ ]
20. How long did the drought last? [ ] Months [ ] Weeks [ ] Days
21. How severe was the drought? Very severe [ ] Severe [ ] Moderate [ ] Negligible [ ]
22. What is the expected effect of the drought on your livestock production/livelihood? (Tick all applicable)

    Reduced pasture availability [ ] Stunting of livestock [ ] Increase competition with farmers for water and crop residue [ ] Outbreak of diseases [ ] Animal mortality [ ] Increased cost of

livestock feeding [ ] Decreased production of milk [ ] Reduced income [ ] Increase cost of livestock products [ ] Others [ ] specify: _____

23. Please, estimate the number of your livestock affected by the drought? [ ]

E. Adaptation Strategies

24. How do you intend to adapt to the effect of the drought? (Tick all applicable)

Buy fodder [ ] Migrate to other communities [ ] Reduce cattle feeding [ ] Night grazing [ ] Sell some herd [ ] Do nothing [ ] Others [ ] Specify

25. Were you captured in the MoFA registration of farmers for government assistance for farmers affected by drought? Yes [ ] No [ ]
26. Do you expect any external assistance to help you adapt to the effects of the drought? Yes [ ] No [ ] not sure [ ]
27. If yes to question (26), what are these eternal sources? (Tick all applicable)

    Family [ ] Friends [ ] Government [ ] NGOs [ ] CSO [ ] Farmer-based organisations [ ] Others [ ] Specify: _____

28. If yes to question (26), what will loss will the assistance cover?

    Crop loss only [ ] Livestock loss only [ ] Both crop and livestock loss [ ] others [ ] Specify: _____

F. Qualitative data (Record responses into the space provided):

29. Narrate how the drought is likely to affect your pastoral activities this year.

    ……
    …….

30. How would you adapt to the effects of the drought on your pastoral activities and livelihood.

    ……
    ……

31. Any other comment from respondents:

……
……

32. I would like to take a picture of you and/or your livestock to show evidence of drought effect on your livelihoods. Do you agree? (Seek for respondent's consent before taking picture) Yes [ ] No [ ]

END OF INTERVIEW

THANK YOU

Appendix B: Key Informant Interview Guide (MoFA officers and Leaders of Agro-Pastoralist-based organisations)

1. Name of Organisation and district: ……
2. Position of Respondent: …….
3. Did you experience drought in your district within the 2024 farming season? Yes [ ] No [ ]
4. If yes, how severe was the drought? ……..
5. Does government plan to support farmers affected by the drought damage? Yes [ ] No [ ]
6. If yes, what is the nature of this government's support for farmers?
7. Does these government support targets only crop farmers or both crop farmers and pastoralists?
8. Are there other supports from NGOs to farmers to address the effects of drought on their livelihoods? Yes [ ] No [ ]

9. Are pastoralist listed to benefit from the support from NGOs? Yes [ ] No [ ] Why, if no. ……
10. In your view, how do you think the drought situation will impact the livelihood of pastoralists and their livestock?
11. How can pastoralists adapt to the effects of the drought?
12. Have you registered crop farmers to benefit from this government support? Yes [ ] No [ ]
13. Have you registered livestock farmers to benefit from this government support? Yes [ ] No [ ]
14. If yes, which livestock are covered under the government support
15. If no, why are livestock farmers not covered under the government support programme?