

The Role of Local Government in the Adaptation and Mitigation of Climate Change in the Agricultural Sector in the Northern Region of Ghana

Richard Nalarb Yakubu¹

Abstract

Responding to the challenge of climate change through adaptation and mitigation require the participation of different stakeholders including individuals, civil society organisations and government. This study examined the role of local government in the adaptation and mitigation of climate change in one of the rain-fed agricultural regions of Ghana. The study employed a descriptive research design within the qualitative approach. The data was obtained through in-depth interviews with officials of the District Departments of Agriculture and complemented by document study. The study revealed that there was a high priority on promoting early maturing crop varieties, agriculture extension to farmers and fertilizer use in the districts as agricultural adaptation measures to climate change. On mitigation, reducing food losses was a high priority except in the Central Gonja district where it was rated moderate. The study however, identified inadequate number of Agriculture Extension Agents, insufficient finances as well as logistics and equipment as the main challenges faced by the District Departments of Agriculture in climate change response in the region. The study recommends that the District Departments of Agriculture in the various Metropolitan, Municipal and District Assemblies should be adequately resourced by the central government to undertake their core functions.

Keywords: Adaptation, mitigation, climate change, agriculture

1. Introduction

Most African countries economy including Ghana is fueled by agriculture due to its enormous contribution to Gross Domestic Product (GDP), food security and employment for majority of the population (Apata et al., 2016; Food and Agriculture Organization (FAO), 2015). At the same time, climate change has had a profound impact on the agricultural sector (Mendelsohn, 2008) and gradually a threat to food security and poverty alleviation (Asante & Amuakwa-Mensah, 2014). In Ghana, the agricultural sector is made up of subsistence smallholder farmers including women whose livelihood depends on the survival of the sector (Kuwornu et al., 2013; Arndt, Asante & Thurlow, 2015). However, the agricultural sector has been undesirably affected by climate change because the sector is vulnerable to the effects and impacts of climate change (Abdul-Razak & Kruse, 2017).

Agriculture is the major occupation and the main source of livelihood for people living in the Northern Region of Ghana (Musah & Oloruntoba, 2013). According to Ghana Statistical Service (2013), about 74 percent of the entire active labour force in the region is engaged in skilled agriculture, forestry and fishery. Besides Tamale Metropolis, skilled agriculture, forestry and fishery is the main driver of district economies in the remaining 25 districts. This is understandable given the fact that over two-thirds (69.7 percent) of the people in the region live in the rural setting. Farming or agriculture in the region is on a subsistence basis and as such, a greater portion of the land is left uncultivated. There are quite a few farmers who cultivate large acres of maize, yam and rice for commercial purposes. In general, acquisition of land for farming is not a problem in the region (Ghana Statistical Service, 2013).

¹University for Development Studies, Directorate of Academic Planning and Quality Assurance, P. O. Box TL 1350, Tamale.
Email: yanarichard@gmail.com

Although agriculture is the main occupation and a source of livelihood of the people in the region, it is at the same time rain-fed (Arndt, Asante & Thurlow, 2015). Since agriculture is fueled by rainfall in the region, the vulnerability of the sector to climate change and variability cannot be underestimated. Therefore, there is the need for conscious and concerted efforts from all and sundry to deal with the vulnerability of the region to climate change and variability. Efforts in this direction will not only salvage the region from food insecurity as a result of climate change but would also go a long way to sustain the livelihoods of the people.

The Government of Ghana has acknowledged that extreme weather conditions are likely to increase as a result of continual instability in weather variables. Researchers; Ontoyin (1993), Stephens (1996), Stutley (2010); and Mabe, Sarpong and Osei-Asare (2014) empirically established that climate change is evident in Ghana. Over the years, northern Ghana has experienced harsh weather conditions, climatic instability, and change. This has resulted in the exposure of the region to frequent floods with devastating effects on large areas of arable lands and infrastructure. Besides the floods, the region also experiences excessive rains during planting season, which adversely affect the growth of subsistence crops (maize, guinea corn and millet). Other daunting issues are persistent economic droughts, increasing temperature and declining precipitation, which are all attributed to climate change in the region (Stanturf et al. 2014; Yengoh et al., 2001). The impacts of climate change in the region are strongly felt by smallholder farmers whose livelihood depends on the utilization of natural resources. This has affected their income and access to food.

In the agricultural sector, adaptation is needed in view of the direct effects and impacts of climate change on the sector. Adaptation measures such as crop diversification, early warning systems implementation, insurance instruments, and improved management of water resources to mention but a few are needed in the agricultural sector (Bréchet et al., 2013). The mitigation of the sector to impacts of climate change is equally needed while reducing human activities such as slash and burn method and forest clearance for large-scale farming that contribute to climate change.

The local governments, particularly the district assemblies in Ghana have the prime responsibility for the overall development of local communities within their geographical boundaries. District Assemblies have been empowered by the 1992 Constitution of Ghana and that of the Local Government Act, Act 462 of 1993 to plan and develop areas within their geographical demarcation (Adu-Gyamfi, 2014). The role of local government with the power to make decisions regarding development at the local level has further been strengthened by the provision that “measures should be taken by parliament to enhance the capacity of local government authorities to plan, initiate, coordinate, manage and execute policies in respect of matters affecting local people” (Crawford, 2004, p.8).

In line with the above constitutional provisions, district assemblies as development agents are expected to play a lead role in initiating interventions to assist the residents to adapt as well as mitigate the effects and impacts of climate change on their life and property. This is important because climate change has affected food security, health and ecological diversity in most districts particularly in the northern region of Ghana. Although many studies have been conducted in the area of climate change, the role of local government in climate change adaptation and mitigation has less been explored. It is against this backdrop that this study seeks to understand the role of the decentralised District Departments of Agriculture under the Metropolitan, Municipal and District Assemblies (MMDAs) in climate change adaptation and mitigation in the agricultural sector in the northern region of Ghana.

2. Methodology

The study employed a descriptive research. According to Bhattacharjee (2012), descriptive research is intended to make a thorough observation as well as taking comprehensive details of the phenomenon of interest that is being studied including its unique characteristics. The case study method was adopted within the remit of the qualitative approach to research. A case study encompasses an organized way of collecting sufficient data about a specific event, person, social setting or group in order to enable a researcher to have an in-depth understanding of the operations or function of the phenomenon of interest (Berg, 2001).

The sampling method that was adopted is the purposive sampling technique which is a non-probability sampling technique. In the use of this sampling method, the researcher uses his or her judgment or knowledge to identify or select the subjects that are suitable for soliciting the needed data from the population. Even though this method has some shortcomings such as the problem of generalization of the results, the strength of the use of the technique lies in its ability to identify or select individuals with certain attributes that have the potential to provide detailed and reliable information for the study.

In this vein, the researcher purposely selected thirteen (13) out of the 26 MMDAs in the northern region of Ghana for the study. This was based on the deprived nature of some of the districts as well as human activities that predisposes the districts to the impacts and effects of climate change. The District Departments of Agriculture were visited and in-depth interviews were held with District Directors of Agriculture or in their absence, Agriculture Extension Agents using semi-structured questionnaires. To be able to identify the premium placed on each adaptation and mitigation measure, the officials were asked to indicate the level of priority (low, moderate and high) for each of the measures they were pursuing in their respective districts. The in-depth interviews were complemented by document study to ascertain the veracity of the responses. The locations of the districts in the northern region that were selected for the study is presented in the map below (see the triangles on the map).

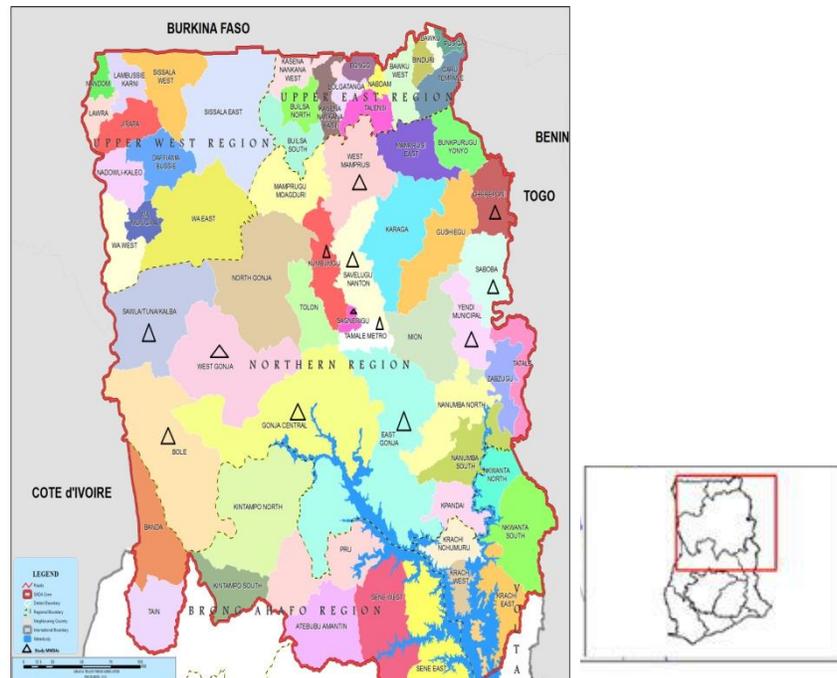


Figure 3: Map showing the location of Study MMDAs (Source: Modified from Government of Ghana, 2015)

In terms of data analysis, the data collected from the field was analyzed qualitatively with the use of the 2010 Microsoft Excel spreadsheet packages. It is important to mention that there is no linear way of doing a qualitative analysis of data. The bottom line in qualitative data analysis is to make sense out of the data or to understand the phenomena of interest in the social setting of the study (Bhattacharjee, 2012). Since doing qualitative data analysis is not a straightforward process, a series of stages were adopted in analyzing the data collected from the field. The stages were cyclical and iterative in that there were backward and forward processes in the analysis. To start with, there was data cleaning. At this stage, the data collected was edited to minimize errors and to complete all uncompleted statements during the filling of the interview questionnaire with the main intention of maintaining the original ideas or responses given by the respondents. After this, the data was inputted into 2010 Microsoft Excel spreadsheet packages to ease the analysis. The priority level of each adaptation and mitigation measure was then sorted and further interpretation made to come out with a meaningful write-up.

3. Results and Discussion

The study conducted in selected Metropolitan, Municipal and District Assemblies (MMDAs) was to ascertain the state of climate change adaptation and mitigation interventions in relation to the agricultural sector. In this vein, the decentralised District Departments of Agriculture functions were first sought and the study revealed that the department is expected to perform the following specific functions: offer extension agriculture services to farmers; implement government agricultural programmes; collaborate with other organisations such as NGOs to achieve the objectives of government programmes in the agricultural sector; enhance food security in the country; promote the nutritional status of citizens; and enhance farmers' access to information. Following the outlined functions, the district Departments of Agriculture were vigorously implementing climate change interventions in the agricultural sector.

The subsequent sections below elaborate adaptation and mitigation measures and their level of priority deployed by the district Departments of Agriculture to minimized the effects and impacts of climate change in the region.

3.1 Climate Change Adaptation Measures

The study across the selected districts showed that multiplicities of adaptation measures were pursued to assist smallholder farmers adapt to climate change effects and impacts. The study revealed that there were convergences as well as differences in the level of priority of the adaptation measures that were pursued in the selected districts. The study found that agricultural adaptation measures such as agricultural extension services, promoting early maturing crop varieties and fertilizer use were of high priority among all the studied districts. Apart from the Tamale Metropolis, Sagnarigu and Bole districts that piloted crop insurance with some farmers, none of the other districts have done so. Even in these three districts, the measure was unsuccessful because farmers must keep records of rainfall in their crop fields to provide a proof that the crops failed because of drought. This would enable the insurance companies in the processing of claims of the affected farmers. On the contrary, farmers do not have access to rain gauges hence making the entire strategy difficult to implement. For the avoidance of doubt, the specific climate change adaptation measures implemented in the selected districts in the agricultural sector in terms of priority are shown in table 1.

Table 1: Priority of climate change adaptation measures in the agricultural sector by districts

Climate Change Adaptation Measures	Priority of adaptation measures by the Districts													
	Tamale Metro	Yendi Municipal	Savelugu/ Nanton	Bole	Central Gonja	Chereponi	East Gonja	Kumbungu	Saboba	Sagnarigu	Sawla/Tuna/Kalba	West Gonja	West Mamprusi	
Promoting early maturing crop varieties	High	High	High	High	High	High	High	High	Mode.	High	High	Mode.	High	
Agriculture extension service to farmers	High	High	High	High	High	High	High	High	High	High	High	High	High	
Marketing networks	Mode.	Mode.	Mode.	Low	Low	Low	Mode.	Mode.	High	High	Mode.	Mode.	Mode.	
Off-farm income generating initiatives	High	Mode.	High	Low	Mode.	Low	Mode.	High	Low	High	Mode.	Mode.	Low	
Improvement of land tenure system	Low	High	High	Low	Low	Low	Low	Mode.	Mode.	Mode.	Mode.	High	low	
Crop insurance	Low	-	-	Low	-	-	-	-	-	Mode.	-	-	-	
Better water management	High	High	High	High	Mode.	Mode.	Mode.	Mode.	Mode.	High	Mode.	High	High	
Irrigation Development	Mode.	Mode.	Mode.	Low	Low	Low	Mode.	High	High	High	low	low	Low	
Fertilizer use	High	High	High	Mode.	High	High	High	High	High	High	High	High	High	
Drought tolerant crop varieties	High	High	High	High	Mode.	Mode.	Mode.	High	Mode.	High	High	High	High	
Integrated crop and pest management	Low	High	Mode.	Low	Low	Mode.	High	High	Mode.	High	High	High	Mode.	
other (compost making, crop rotation)	-	-	-	High	-	-	-	-	-	-	-	-	High	

Source: Field Survey, June 2017

3.2 Climate Change Mitigation Measures

On the aspect of mitigation of climate change, the districts have equally implemented some mitigation measures. Although the districts are all pursuing the mitigation measures, differences exist in their level of priority. Apart from the Central Gonja district where reducing food loss was a moderate priority, all the other twelve districts indicated high priority. The respondents stated that food losses are not only a loss to farmers alone but also a threat to food security in the region and hence the need to minimize it. Food losses further serve as a disincentive to investment by smallholder farmers in the agricultural sector and thus, the need to consider the measure seriously. In the case of fertilizer and agrochemical management, there was a convergence in high priority with the exception of Savelug/Nanton Municipality where the measure received moderate priority. The specific agricultural mitigation measures to climate change in the selected districts are shown in the table 2.

Table 2: Priority of climate change mitigation measures in the agricultural sector by districts

Climate Change Mitigation Measures	Priority of Mitigation measures by the Districts													
	Tamale Metro	Yendi Municipal	Savelugu/ Nanton	Bole	Central Gonja	Chereponi	East Gonja	Kumbungu	Saboba	Sagnarigu	Sawla/Tuna/Kalba	West Gonja	West Mamprusi	
Reducing food losses (harvest and post-harvest losses)	High	High	High	High	Mode	High	High	High	High	High	High	High	High	
Fertilizer and agrochemical management	High	High	Mode	Mode	High	High	High	High	High	High	High	High	High	
Climate-friendly livestock management	High	Mode	High	Mode	Low	Mode	Mode	High	Mode	High	Mode	Low	Mode	
Forest and grassland conservation initiatives	Low	Low	High	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	
Promoting low-emission farming system (organic farming)	Mode	Mode	Low	High	Low	Low	Low	Mode	Mode	Mode	Low	Low	Low	
Increasing carbon content in the soil (plant residue/manure)	Low	Low	Mode	High	Low	Mode	Low	Mode	Mode	Low	Mode	Low	Mode	
Other (watershed protection)	-	-	-	-	-	-	-	-	-	-	-	-	Mode	

Source: Field Survey, June 2017

4.0 Challenges of District Departments of Agriculture in Climate Change Adaptation and Mitigation

The study sought to understand the challenges that had impeded the work of the District Departments of Agriculture in limiting the effects and impacts climate change on smallholder farmers in the districts. The study found that there were inadequate staffs, funding gaps and insufficient working logistics and equipment. In particular, the study revealed that there were shortages of Agricultural Extension Agents (AEAs) in all the districts except Tamale Metropolis. Besides the inadequate staff at post, funding of climate change programmes, lack of motorized means of transport and logistics for the few staff at post were the main specific challenges identified by the study. The specific challenges of each district are presented in table 3.

Table 3: Challenges of District Departments of Agriculture in climate change adaptation and mitigation in the agricultural sector in the Northern Region

Name of District	Human	Financial	Logistics and Equipment
Tamale Metro	-	No financial support to carry out programmes	Lack of logistics
Yendi Municipal	Inadequate AEAs to oversee the 4 zones. The municipal directorate required 24 AEAs but currently has 10.	No funding from central government for 5 years now and funds to work are from NGOs projects.	Lack of means of transport and staff use their personal motorbikes for official work.
Savelugu/Nanton Municipal	Not all the AEAs have knowledge on climate change	Inadequate funds for implementation of climate change programmes	Overused motorbikes and inadequate impress to buy fuel.
Bole	Limited number of AEAs	Inadequate funds for implementation of planned climate change activities.	Lack of means of transport.
Central Gonja	Inadequate AEAs and lack of capacity development	Inadequate funds for implementation of climate change activities	Lack of means of transport and relevant logistics to work.
Chereponi	Inadequate AEAs	Inadequate funds to implement planned activities	Lack of means of transport
East Gonja	Inadequate AEAs	Inadequate financial support from central government	Lack of means of transport and relevant logistics and equipment
Kumbungu	The district only has five (5) AEAs which is woefully inadequate	Funds for implementation of climate change activities are inadequate	Lack of means of transport. Relevant logistics are not available such as moisture meter, and rain gauges for work
Saboba	Inadequate AEAs. Seven more AEAs are needed.	Inadequate funds for implementation and delay in fund disbursement.	Inadequate logistics but thanks to USAID for the provision of motorbikes
Sagnarigu	Inadequate knowledge, skills, and personnel on climate change adaptation and mitigation	Inadequate funding to implement climate change related activities	Lack of equipment and logistics to implement activities
Sawla/Tuna/Kalba	The standard AEA farmer ratio is 1:1500 but each AEA is handling more than the required standard in the district	No funding from government for 5 years and funds to work are from NGOs projects	Lack of means of transport for general agricultural activities
West Gonja	Inadequate AEAs	Financial situation worsened by the decentralisation and the District Assembly is not ready to release funds for agricultural activities	Unserviceable vehicle but sufficient motorbikes due to the implementation of USAID funded project Resiliency in Northern Ghana (RING)
West Mamprusi	Low staff strength. Only 8 staff are available out of 24 required	No fuel allowance and funding for agricultural activities	Lack of means of transport for agricultural activities

Source: Field Survey, June 2017

5.0 Conclusion

The central governments should create the enabling environment that would allow the District Departments of Agriculture to carry out their devolved functions.

The study found that although the District Departments of Agriculture were supposed to play a lead role in climate change adaptation and mitigation in the region, they were hampered by non-honouring of the budget, inadequate staff as well as working logistics and equipment. This situation was further aggravated by knowledge gaps on adaptation and mitigation of climate change by some of the officials. Therefore, the government as the main development agent should show a commitment not only topolicy but in practice to tackle climate change by allocating funds specifically for climate change activities in the region.

6.0 Recommendations

In line with the findings of the study, the study recommends that the District Departments of Agriculture should be adequately resourced in terms of human, financial as well as working logistics and equipment to undertake their core functions. As a matter of urgency, the central government should lift the embargo on employment to enable the District Departments of Agriculture to employ qualified Agricultural Extension Agents (AEAs). The availability of AEAs with the right mix of skills could assist smallholder farmers to adapt to climate change in order to improve their yield in the region. The central government should further budget and allocate funds that are meant for climate change activities in the region. Similarly, the central government should ensure the provision of motorized means of transport such as motorbikes and in some few cases vehicles and other logistics that will facilitate the work of the District Departments of Agriculture. It is expected that with the provision of means of transport and equipment to AEAs could facilitate the dissemination of knowledge and technology to smallholder farmers to be able to adapt and mitigate the eminent effects and impacts of climate change in the agricultural sector in the region.

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