

Research Application Summary

The impact of climate variability and change on domestic livestock in Adansi North District of Ghana

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Abstract

Livestock forms an important component of livelihood and food security strategies of smallholder farmers, particularly in Africa. However, changing climate such as rising temperature, erratic rainfall, and spread of pests and diseases threaten the livestock sector. Nevertheless, in Ghana, the livestock sector has not received the needed attention in climate change impact discourse and research. Understanding the implications of changing climate on livestock activities of smallholder farmers is critical to minimizing climate change impact on food security and livelihood among the poor. This study adopted a qualitative descriptive case study approach to explore the lived experience of fifteen (15) district agriculture officers and twenty six (26) smallholder livestock farmers, on climate change and livestock in the rural Adansi North District of Ghana. Data collection instruments included semi structured interview and non-participant observation. The study analyzed data manually through thematic analysis. Participants indicated that changes in rainfall and temperature have great negative impact on livestock. The major impact of climate change on livestock include rampant spread of pests and disease, resulting in deaths of livestock, reduction in quality of meat, changes in growth pattern, loss of weight and unrest. The study shows that participants face challenges in feeding their livestock due to lack of fodder caused by extreme weather events. The study recommends that the capacity of existing institutions particularly in rural communities should be strengthened while new institutions should be established with focus on livestock. There is also the urgent need to intensify veterinary education and improve extension service delivery in rural communities. Moreover, mass education and training of farmers should be intensified to build their capacity.

Keywords: Africa, agriculture officers, domestic livestock, erratic rainfall, livelihood, pests and diseases, rising temperature

Resume

Le bétail constitue un élément important des stratégies de subsistance et de sécurité alimentaire des petits exploitants agricoles, en particulier en Afrique. Cependant, les changements climatiques tels que la hausse des températures, l'irrégularité des précipitations et la propagation des parasites et des maladies menacent le secteur de l'élevage. Néanmoins, au Ghana, le secteur de l'élevage n'a pas reçu l'attention nécessaire dans le discours et la recherche sur l'impact du changement climatique. Comprendre les implications du changement climatique sur les activités d'élevage des petits exploitants agricoles est essentiel pour minimiser l'impact du changement climatique sur la sécurité alimentaire et les moyens de subsistance des pauvres. Cette étude a adopté une

approche qualitative descriptive d'étude de cas pour explorer l'expérience vécue de quinze (15) agents agricoles de district et de vingt-six (26) petits éleveurs, sur le changement climatique et l'élevage dans le district rural d'Adansi North au Ghana. Les instruments de collecte de données comprenaient des entretiens semi structurés et des observations non participantes. L'étude a analysé les données manuellement par le biais d'une analyse thématique. Les participants ont indiqué que les changements de précipitations et de températures ont un impact négatif important sur le bétail. L'impact majeur du changement climatique sur le bétail comprend la propagation rampante des parasites et des maladies, entraînant la mort du bétail, la réduction de la qualité de la viande, les changements dans le modèle de croissance, la perte de poids et l'agitation. L'étude montre que les participants sont confrontés à des difficultés pour nourrir leur bétail en raison du manque de fourrage causé par des événements climatiques extrêmes. L'étude recommande de renforcer la capacité des institutions existantes, en particulier dans les communautés rurales, et de créer de nouvelles institutions spécialisées dans l'élevage. Il est également urgent d'intensifier l'enseignement vétérinaire et d'améliorer la prestation des services de vulgarisation dans les communautés rurales. En outre, l'éducation et la formation de masse des agriculteurs devraient être intensifiées pour renforcer leurs capacités.

Mots clés : Afrique, agents agricoles, bétail domestique, précipitations irrégulières, moyens de subsistance, ravageurs et maladies, hausse de la température.

Introduction

Climate change is one of the contested global development challenges for the contemporary world. Although climate change is a global challenge, it has serious implications particularly in developing economies of Africa due to extreme climate events such as floods, droughts, rising temperature and erratic rainfall, coupled with overdependence on agriculture which is sensitive to climate change (IPCC, 2018). Consequently, a large part of literature has focused on exploring climate change impact particularly on agriculture in Africa. According to Thornton and Geber (2010), while the impact of climate change on agriculture has gained dominance in the literature, most of the studies have focused on crop production, with little or no attention on livestock, which serves as an important food security and livelihood strategy particularly among the poor. Similarly, the African Union (2010) opines that although livestock contribute significantly to African economies, the contribution of the sector is undervalued.

In Ghana, the livestock sector contributes about 7.3% to agriculture gross domestic product (MOFA, 2013). Livestock keeping, in Ghana and Africa alike, is an important livelihood strategy for rural farmers and an asset and insurance during scarcity or difficult times. Livestock also forms an important component of agriculture and complements agricultural activities of smallholder farmers. Nevertheless, climate change threatens the livestock sector, which may hinder the sector from contributing effectively to socio-economic growth and development in Ghana and Africa, with dire consequences particularly on smallholder farmers who depend largely on livestock activities as important food security and livelihood strategies. Pursuant to the importance of livestock to smallholder farmers, and the scarcity of research on domestic livestock in Ghana, this qualitative descriptive study was carried out to explore the impact of climate change on domestic livestock in the natural settings of smallholder livestock farmers in the rural Adansi North District of Ghana. To achieve this objective, the study posed the research question: to what extent does climate change affect livestock in the Adansi North District? This study is very important, as

Ghana is just 30% self-sufficient in animal product (MOFA, 2004), which calls for the need to intensify livestock production and reduce climate change impact on the sector.

Materials and Methods

The study adopted a qualitative descriptive case study to explore and understand how climate change affects domestic livestock, from the natural setting or world of the participants. The approach facilitated the collection of in-depth information from the perspective, lived experience and the meaning participants attach to climate change and livestock. Yin (2004) posits that the strength of case study is its ability to collect in-depth information from the natural setting of participants.

The study was conducted in the rural Adansi North District of Ghana. As a rural district, agriculture is the main economic activity and it provides employment to about 77% of the active labour force of the population in the district. Aside from being a rural area threatened by climate change, the Adansi North District is highly vulnerable since the area is characterized by low income and high poverty, high dependency rate and large household size (GSS, 2014). In addition, the district has high extension-farmer ratio of 1:3500, which far exceeds the national ratio of 1:300 (GSS, 2014). Notwithstanding high vulnerability of the district, there is scarcity of climate change research in the district.

Purposive sampling technique was applied to select 15 District Agriculture Officers (DAOs) and 26 smallholder livestock farmers (household heads). The district population census data which served as the sampling frame revealed that about 15% of smallholder farmers are engaged in livestock, with an average stock of 10-20 per household. Different inclusion and exclusion criteria were used for the different segments of the study participants. For DAOs, the inclusion criteria were: the years of employment/station in the district (five years and more), contact with farmers (regular visit to farmers to provide advice, technical support etc.) and consent to participate in the study. In the case of smallholder farmers, household heads who agreed to be interviewed and had ten or more domestic livestock were included in the study.

Semi structured in-depth interview guide and non-participant observation were the means through which data were collected. The interview guide allowed the researchers to collect detailed information from the words of the participants, and probed emerging themes or information. In addition, the use of semi structured interview guide allowed flexibility in the asking of questions. The non-participant observation also allowed the researchers to observe the natural setting of the respondent. Telephone and face to face interviews were conducted based on the preference of participants, and the study adhered to ethical principles such as informed consent, voluntary participation anonymity, and confidentiality.

Thematic analysis of data was conducted. Prior to the analysis, the tape recorded interviews were transcribed from local language (Twi) to English and the transcript was perused consistently to identify themes and draw patterns. The meanings the participant attach to their world of climate change and livestock are reported in verbatim quotes. The initials: DDO represents District Development Officer, AEA is for Agriculture Extension Agent while HH stands for Household head (farmer).

Results and Discussion

Rainfall and spread of diseases. The spread of livestock diseases was reported to be rampant in the district. DDO3 revealed that: ‘...for the major livestock in the district the implication of climate change on them is the spread of diseases’. ‘In the case of livestock, there are rampant diseases among livestock due to the changes in climate’ (DDO4). ‘...the animals get affected during the course of the year and this may be associated with the changes in weather’ (AEA2). The spread of diseases was reported to be common during the raining season. According to HH3: ‘livestock diseases become very rampant during the raining season’. ‘...diseases are too common in the raining season’ (HH15). While livestock such as goat and sheep experience rampant disease during the raining season, fowl diseases are not very common during the raining season. Some participants revealed that poultry diseases become very common when approaching Christmas. ‘The spread of diseases among chicken is very rampant when approaching Christmas and during this period, the weather is mostly dry’ (HH22). The spread of pests and diseases in livestock has been reported in previous studies (Kabubo-Mariara, 2008a; 2008b; African Union, 2010).

The kind of diseases differed among livestock. According to DDO3 ‘foot root is very common in ruminants such as cattle, sheep and goats. Animals in this condition attract houseflies and ticks, particularly the *Amblyomma* species. The presence of ticks on the animal toxify the blood vessel of the animal which leads to a disease called heart water. Apart from the ectoparasites, the animals also get endoparasites particularly worms. Due to the raining season, worm infestation also becomes very high in the animals. The eggs/larvae of the worms can multiply very fast in the animal which creates problems for the animals. ...there are times that the quantity of worms in the animal exceeds 25. Tapeworm, roundworms, liver flukes among others affect animals. The liver fluke as the name indicates, affects the liver of animal’.

In the case of fowl, it was revealed that ‘...apart from the commercial ones which are not really affected by the changes in the climate, the local ones mostly sleep on trees and when beaten by excessive rainfall some of them die. Most of the time too when the rainfall is about retreating, most fowls get what we call Newcastle disease. During this time, almost a whole village can lose their birds particularly chicken and turkey. However, ducks and guinea fowls are a bit resistant’ (DDO3).

Although pigs are relatively resistant to climate change compared to cattle, sheep, and goats, they are affected by changes in climate too. According to DDO3 ‘when we go to mono-grass like pigs, since they are mostly confined, the change in climate does not really affect them. However, the source of feeding becomes a problem to the owners because when it rains and where you store your feed in not a very good condition, the feed can go bad or grow moldy. At other times, water mixes with the feed and therefore the farmer has no option than to quickly feed the pigs with the feed available to prevent it from being destroyed by the rainfall. Aside the feeding problem, when rains get into their confinement, the piglets get suffocated and die. This is because while the mother pig likes water, the piglets do not like water and therefore the presence of water in their confinement kills them’.

Severity of spread of livestock diseases. Participants described livestock diseases to be very

severe and threatening. 'The diseases spread very fast and are very severe' (HH19). 'You can go to bed and by the time you wake up you will notice that many of your livestock have been infested by diseases' (HH7). 'The spread of disease is endemic and very destructive' (DDO1). HH5 responded that: 'you should have been here to see the number of goats and sheep affected by diseases and you will understand the situation. As for poultry I do not want to comment. It is very serious and worrying if you have livestock'. Others considered livestock diseases to be normal or seasonal. '...the normal fowl diseases I mostly experience' (HH15). 'The outbreak is seasonal ...the normal chicken disease is common here' (AEA2).

Impact of diseases on livestock. Participants revealed that the spread of diseases affect livestock in several ways. A vast majority of respondents revealed that death is the most common challenges when livestock are affected. 'Goat, sheep and chicken die when affected by disease' (HH12). 'I know that once the animal is affected it will certainly die' (HH2). 'Death of livestock becomes very common during the raining season as result of diseases' (AEA6). Others believe the spread of diseases affect the feeding pattern of livestock. 'When livestock get infected by diseases they mostly do not feed well even when you personally feed them (HH1)'. It was also revealed that the affected livestock become restless. 'When a livestock get affected it becomes restless and moves up and down' (DDO3).

To others, diseases affect the movement of livestock. 'There are times that the animal can lie at a particular place for a very long time without moving' (HH25). There is also loss of weight in livestock. 'The spread of diseases, restlessness, poor feeding and movement cause the animal to lose weight particularly cattle, sheep and goat' (DDO3). The quality of meat also get affected. 'The quality of meat of cow, sheep and goat reduces due to diseases. The meat of cow become pale and unhealthy for eating' (DDO3). Some participants also revealed that the spread of diseases lead to watery nose of livestock which make them unattractive for consumption. These findings are consistent with existing studies (Kabubo-Mariara, 2008a; 2008b; African Union, 2010).

Abundant fodder. Rainfall may not be entirely bad for livestock. Participants revealed that rainfall comes with abundance of fodder to feed livestock. 'When the raining season starts, plants grow and green leaves become common' (HH10). "There is enough feed for livestock during the raining season" (HH9). 'The village is very green during the raining season and this makes food available for livestock' (HH7). The abundance of fodder makes livestock feeding very easy. 'It is easy to feed livestock where there is plenty of green leaves and plants in the community. I do not have to worry about feeding my goats and sheep. I don't have to go out to look for what they will eat. The grass is green and the bushes are fresh for them' (HH16). However, a participant cautioned that: 'farmers have to be more cautious in selecting feed for their livestock during the raining season because there are times green leaves have worms and other parasites on them which may pose danger to livestock' (DDO3).

Temperature and livestock. Apart from rainfall and the associated spread of diseases, temperature changes also affect livestock. Participants had mixed reactions about temperature and livestock. Majority of participants indicated that the spread of diseases among livestock reduces during the dry season when temperature is high as advanced in the quote '...during the dry season, the animals become very healthy with reduced infestation by diseases and parasites. Livestock such as cow, goat and sheep gain weight during the dry season and they look very attractive'

(DDO3). However, feeding of livestock is very challenging in the dry season as revealed by some participants. ‘When the temperature is very high particularly in the dry season, leaves wither and dry up. Feeding livestock becomes very difficult for livestock farmers’ (AEA9). Participants also reported scarcity of water during the dry season. ‘Water bodies dry up during the dry season. We sometimes have to travel far distance to get water for household activities. So getting water for livestock is a big problem in the dry season’ (HH13). Scarcity of water for livestock has received significant attention in the literature (Kabubo-Mariara, 2008a; 2008b; African Union, 2010).

Conclusion

Using descriptive qualitative case study, the study explored the lived experience of smallholder livestock farmers in the Adansi North District to understand how climate variability and change affects livestock. The study revealed that climate variability and change has significant impact on livestock with a corresponding impact on food security and livelihood of smallholder livestock farmers. The major impact of climate change on livestock include rampant spread of pests and disease, resulting in deaths of livestock, reduction in quality of meat, changes in growth pattern, loss of weight and unrest. The study shows that participants face challenges in feeding their livestock due to lack of fodder caused by extreme weather events. These impacts are not limited to only rural communities but extend to the national scale as Ghana’s economy is agrarian. Thus, climate change poses serious threat to Ghana’s efforts to increase its self-sufficiency in animal products. The study recommends the intensification of climate change education and training for farmers to build their resilience capacity. In addition, veterinary education, institutions, policies and programs should be strengthened with a focus on livestock particularly in rural communities. Further studies are needed to: understand how the impact of climate change on livestock affects smallholder livestock farmers; explore adaptation strategies of smallholder livestock farmers; and better understand the phenomenon in Ghana with a wider population.

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