

Climate Change and Adaptation in the Livestock Sector of Ethiopia

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Abstract

Livestock play a significant role in Ethiopian economy and the adverse impact of climate change directly and indirectly affected the local people. Paper intends to identify and map the vulnerable areas of Ethiopia towards the climatic variations and at the same time it will also estimates the livestock sector affected from the same. Paper also review the adaptation measures in livestock sector of Ethiopia. The study is based upon primary and secondary data sources. For this paper both descriptive as well as explanatory research methods were used in order to describe the vulnerability of the livestock sector to climate variability and change, and to explain how they adapt and cope with the changing environment. Study shows that annual temperature has increased by 1.4 °C and models also suggest that the average daily precipitation in Ethiopia quantity will lie around 1.97 mm in coming time that show the decrease the rainfall amount. Due to climate change induced hazards like recurring of drought leads the pastoralist's livestock's in to death and makes the pastoralist's to be more vulnerable. In Ethiopia, the farmer's as well as pastoralist's capacity to adapt to the changing climate is very limited due to lack of scientific knowledge, economic capacity and their dependency on natural resource. The majority of people adopted tree planting, water conservation and diversification of livelihood as a response to climate change.

Keywords: Climate Change, Livestock, Adaptation etc.

Introduction

Evidence from the Intergovernmental Panel on Climate Change (IPCC, 2007) is now overwhelmingly convincing that climate change is real and poor people are worst affected from this issue. As such the International Fund for Agricultural Development (IFAD) considers “climate change as one of the factors affecting rural poverty and as one of the challenges it needs to address” (*The IFAD Strategic Framework 2007-2010*).

It is true that climate change is a global phenomenon, but there are its negative impacts are definitely felt by poor people in developing countries such as Ethiopia. Ethiopia rely heavily on the natural resource base for their livelihoods. Rural poor strata rely heavily for their survival on agriculture and livestock as such is most climate-sensitive economic sectors. The IPCC predicts “by 2100 the increase in global average surface temperature may be between 1.8°C to 4.0°C. with increases of 1.5°C to 2.5°C, approximately 20 to 30 per cent of plant and animal species are expected to be at risk of extinction” It has many serious consequences for food security especially in developing countries (FAO, 2007). It is to be noted that the responses to climate change include the following points:

(I) Adaptation, to reduce the vulnerability of people and ecosystems to climatic changes, and (II) Mitigation, to reduce the magnitude of climate change which have impact in the long term. But it is to be noted that neither adaptation nor mitigation alone can cause all climate change impacts. Therefore, both are essential for reducing the impact of climate change.

Livestock is a significant contributor to economic and social development in Ethiopia at the household as well as national level. On a national level, livestock contributes an important amount to export earnings in the formal market. Livestock accounts for 15-17% of total Gross Domestic Product (GDP) and 35-49% of agricultural GDP. Livestock directly contributes to the livelihoods of more than half of Ethiopians. Ethiopia has the largest livestock herd in sub-Saharan Africa, with an estimated cattle population of 49 million, sheep population of 25 million and goat population of about 22 million. Hence, Livestock play a significant role in Ethiopian economy and the adverse impact of climate change directly and indirectly affected the local people.

Database and Methodology

The main purpose of the present study is to determine the climate change and adaptation in the livestock sector in Ethiopia. The study is based upon primary and secondary data sources. The data analyzed by different quantitative and qualitative techniques and maps and diagrams also used for interpretation.

The database required for the study would be:

- Published and unpublished reports, documents from various international organization, government, semi government and private sources.
- Relevant Maps and satellite imagery of study area.
- Newspaper and other weekly and monthly magazines.
- Relevant websites related to my research topic.

Primary Data Sources

Primary survey based on both direct observation and interview techniques carried out by self-administered questionnaire and personal interviews. Visual observation of phenomena, development activities.

- Informal interviews.
- Interview of selected experts and officials.
- General discussion with individuals to obtain their views, opinions and responses on various issues. The individuals will be chosen randomly.

Secondary Data Sources

Information collected from various departments associated with climate change and livestock sector.

- Government department and educational institutions of Ethiopia: Addis Ababa University, Civil Service University, Addis Ababa, National Meteorological Agency (NMA, Ethiopia), Central Statistical Agency (CSA, Ethiopia), Ethiopian Mapping Agency (EMA, Ethiopia) etc.
- International organizations such as *United Nations Framework Convention on Climate Change (UNFCCC)*, *Intergovernmental Panel on Climate Change (IPCC)*, *International Livestock Research Institute (ILRI)*, *African Union (AU)*, *Intergovernmental Authority on Development (IGAD)*, *International Centre for Agricultural Research in the Dry Areas* etc.
- NGO's and local institutions: Climate Change Forum (Addis Ababa, Ethiopia).

During the Ethiopian visit primary as well as secondary data collected from above mention organizations. I observed various perspective related to livestock and climate change and also met concern person which interview is useful for by research analysis.

Methods

Researchers use different methods to conduct their research. Whether to use qualitative or quantitative or both depend on the objective of the study to be conducted. Qualitative research is used in many areas of human geography. In a broad sense, qualitative research is concerned with elucidating human environments and human experiences within a variety of conceptual frameworks to reveal what has previously been considered unknowable like feelings, attitudes, perceptions and cognition, and hence to verify, analyse, interpret, and understand human environments and experiences of all types.

In this paper method's used both descriptive as well as explanatory research, in order to describe the social factors that make the pastoralists vulnerable to climate variability and change, and to explain how their vulnerability is changing and how they adapt and cope with the changing environment at the local context and also to explain how their system of adaptation practices are changing. To achieve these, different methods of qualitative data collection are used: interviews, focus group discussions, and observation. I used these different methods, for instance interview and focus group discussion, to answer the same question in different ways (methods) or from different angles, so that it helps me to

find a different opinion or answer. Similarly, using these three different methods of qualitative research helps me to corroborate one source and method with another, and enhance the data quality, in the form of triangulation.

Result

Study established that mean annual temperature has increased by about 1.4°C between 1960 and 2016, an average rate of 0.29°C per decade. The annual average temperature between 2070 - 2099 will lie around 26.92°C. According to the country's First National Communications to the UNFCCC, temperature across the country could rise by between 0.5 and 3.6 degrees Celsius by 2070. Temperature observations show increasing trends in the frequency of hot days and hot nights. Annual mean rainfall ranges in Ethiopia from about 2000 mm (South West) to about 100mm (North East Lowlands of Afar). Present average precipitation is 2.04 mm per day. On a country aggregate level average precipitation 1.97 mm per day models suggest that the average daily rainfall amount will lie around 1.97 mm between 2070 - 2099. Decreases in rainfall amount will be exacerbated by higher evaporation rates associated with the increasing temperatures. Projections of precipitation are more uncertain than projections on temperature and considerable regional variations exist. According to the country's First National Communications to the UNFCCC, precipitation is expected to decrease in the northern regions, while southern areas could see an increase of as much as 20%. So, decrease rainfall and increase temperature is associated with drought.

Due to climate change induced hazards like recurring of drought leads the pastoralist's livestock's in to death and makes the pastoralist's to be more vulnerable. The declining trend of rainfall in distribution and amount reduce the accessibility of water from time to time which means the pastoralist are more sensitive to the impacts of climate change. This leads the communities to be poorer and reduce their adaptive capacity.

Based on study in Ethiopia, pastoralist and agropastoral communities are more vulnerable to shocks and drought due to the fact that they live in the arid and semi-arid areas where precipitation is erratic. women were active members who were responsible to feed the household members, by collecting water from distance area, collecting fuel wood from forest, preparing food for her family, feeding and keep her children. Whereas children are also vulnerable due to less capacity to have resilience from the incoming disease, drought, and also, they cannot move long distance to search food or cannot cope from the incoming hazards. The elderly people are old, physically weak and face some health problems due to their Ageing. In addition, pastoral elderly group are not working like younger people and can move with their livestock from place to place. At the same time agropastoralist elderly group also cannot take hard work like farming due to their age and weak health status condition. This has led pastoralist and agropastoralist elder group faced the survival of high risks and shocks effects more than youngsters and adults.

Based on primary data most of the people believe that drought make the pastoralist and agropastoralist community to be exposure for vulnerability by making crop damages, loss of pasture, spread of human and animal diseases and deaths, lack of irrigation, migration; as the area is vulnerable. Other cause include flood, shortage of drinking water etc.

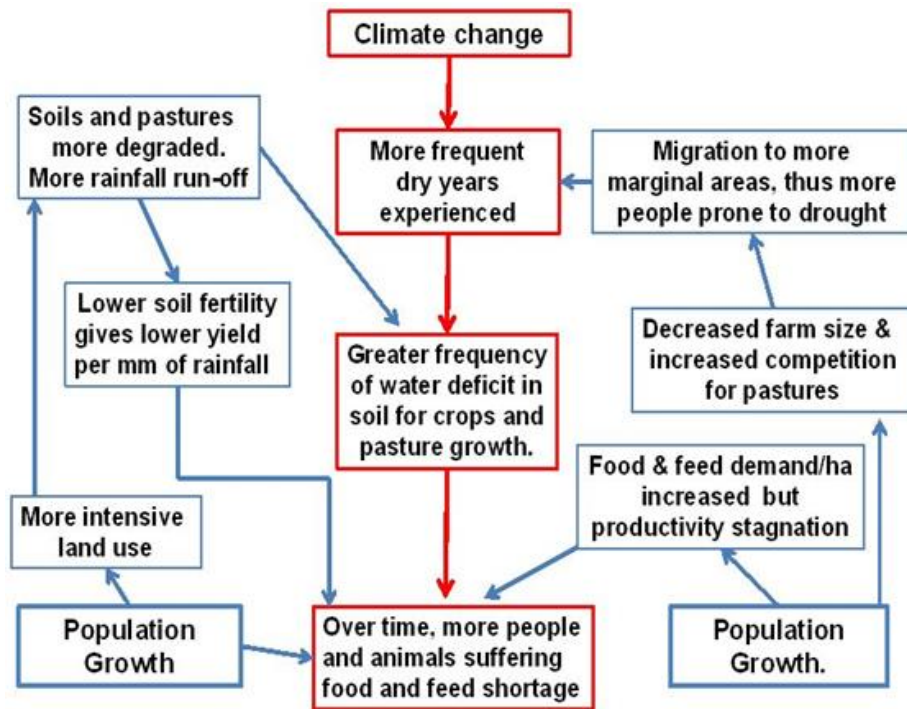


Figure 01: Climate change impact analysis in Ethiopia (www.intechopen.com, 2017).

Study explored that climate change directly affect livestock and agriculture sector and these sectors are indirectly linked with many natural resources such as water, forest, grassland etc. In general, in Ethiopia, the farmer's as well as pastoralist's capacity to adapt to the changing climate is very limited due to lack of scientific knowledge about adaptation measures, lack of technology adaption, economic capacity and their dependency on natural resource which is extremely sensitive to climate change.

The majority of people adopted tree planting and water conservation as a response to climate change. Most of Communities believe that their own strategies and future plans can have a big impact on their ability to cope with future climate changes. Although the most important adaptation to drought and reduced quality of rangelands was to increase mobility, interviews indicated that such mobility was also becoming more difficult and less viable. Water conservation through rain water harvesting is also a good adaptive measure by farmers. Many water developments for pastoral areas is commonly seen as a failure because of the concentration of animals and the rapid degradation of land around few water points. Herd as well as diversification of livelihood is also use as a adaptive measures in Ethiopia.

Discussion

The Ethiopian Government itself and with the help of international organizations has put in place a number of policies, strategies and programmes aimed at reducing the vulnerability of the country to climate variability and changes. The Ethiopian government has committed to building a Climate Resilient Green Economy that aims to ensure economic development with adaptive measures to climate change. Analysis suggests two areas where further effectiveness gains may be sought. The first concerns how best to secure the active participation of all stakeholders in the policy process so as to maximise the likelihood of active implementation of climate change programmes and projects. Second, the present policy is silent on how it will promote transparency in climate finance delivery, which is a generally-held principle of public administration. So, the implementation of all policy is more important for coping this climate change issue.

Major Recommendations

The purpose of this study is to examine the adaptation strategies to climate change in livestock sector in Ethiopia. Based on the findings or result, the following recommendations are made.

- Strengthening the pastoralists and agropastoralists understanding on the variability nature of rainfall, temperature and seasonal fluctuation of rainfall in Ethiopia.
- Rehabilitation of the Existing Livelihood Strategies and livelihood Resources in the Area.
- Improvement in the Accessibility of Market in the Area
- Strengthening the Self-Adaptation Strategies of the pastoralist and Agropastoralist communities in Planned Way
- Provision of Adequate Veterinary Services for livestock
- Improvement of Infrastructure in Water Sectors and strengthening the existing Soil and water Conservation Related Adaptation Strategies in the Area
- Improve awareness of and analytical foundations of sustainable land management policies and practices
- Develop/strengthen climate-related surveillance systems (as part of overall monitoring system)
- Increase awareness of health-related climate vulnerability and increase capacity to incorporate adaptation in to the health care system.

Conclusion

The study has addressed some research questions. Regarding these, the research had attempted to argue that the rainfall, temperature and seasonal variation in Ethiopia with time and space. Moreover, there are shift in rainy season and intense rainfall in the area resulted in climatic variability and affected the pastoralist's communities whose main livelihoods are dependent on rainfall and hence has deteriorated the livestock in the area study.

Another research question has attempted to deal with major adaptation strategies employed in livestock sector to overcome the climate change. Regarding this, communities have employed various adaptation strategies related to livestock and joint adaptation mechanisms to curve the climate variability shocks because of the increased in erratic nature of rainfall and recurrent drought. The major livestock related adaptation strategies in Ethiopia were increasing number of livestock's food stocking during good rainy seasons and enough pasture, increasing livestock mix and destocking followed by cattle fattening at the period of drought. Furthermore, communities have addressed the problem of water resource in their area by digging small ponds, hand dug wells and Birkas both for consumption and watering of their livestock. Communities have employed migration as one of the adaptations mechanisms to curve lack of water and shortage of pasture in the area of the study.

The adaptation mechanisms employed in the study area were mainly self-adaptation and only for survival of communities; not strong and less reasonable because most of the adaptation strategies employed communities are directly as well as indirectly to be subject of rainfall in the study area. The adaptation strategies they involved in are determined by the household's adaptive capacity and asset base in addition to their poverty, lack of access to basic services, lack of access to the market, poor infrastructures, natural resource depletion, poorly developed education, drought, and conflict. If these constraints or challenges have been solved by government with the help of international, regional and local institutions, the study areas have also potentials for better adaptation to climate change.

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