

## Assessment of Impacts of Climate Change on Pastoralists in Selected Area of Ethiopia

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### Abstract:

*Climate change is the burning issue of the current world because it is considered to be one of the most serious threats to sustainable development, with adverse impacts expected on the environment, human health, food security, economic activity, natural resources and physical infrastructure. The Ethiopians, who live in the high lands, are engaged in mass actively in the combat against climate change. This fight against climate change is indicated by the people's involvement in soil and water conservation practices, which helps to maintain the existing climate as well as to accommodate favorable climate to the country, intending on minimizing the negative impacts of it. The objective of the present study was to examine the social, economic and environmental impacts of climate change based on their degree of existence and trends the impacts, to identify the adaptation strategies and mitigation measures and to find out the challenges to the adoption of those coping mechanisms of the pastoralists. To achieve these objectives descriptive survey method was employed and data was collected from 175 respondents using questionnaire and interviews. The identification and examination of the social, economic and environmental impacts of climate change is indicating that as they have likely occurrence, highly affecting the social, economic and environmental conditions of the pastoralists, besides the increasing trend of these impacts on the livelihood of the pastoralists. However, the pastoralists are unlikely practising the coping mechanisms due to their social, economic and political challenges.*

**Key words:** adaptation strategies, climate change, Ethiopia, pastoralists

## Introduction

Africa is one of the world's most vulnerable regions due to the fragility of its economies. The latest report of the Intergovernmental Panel on Climate Change (IPCC 2007; cited in WISP 2010) confirmed that in the 21<sup>st</sup> century, global warming would be more intense in Africa than in the rest of the world. Such changes will affect natural resources and all related production systems, including livestock. Climate changes are already being perceived in Africa and are influencing the way that agricultural producers operate. Individuals, communities and nations have coped with and adapted to climate variability for centuries, but the new changes may be of a magnitude and speed that overstretch traditional adaptive capacities.

Ethiopia is among those countries most vulnerable to climate risks in Africa (USAID 2011), and it is the historically prone country to extreme weather events, which was a reason for droughts that cause famine (World Bank 2010). Over the last decades, the temperature in Ethiopia increased at about 0.2° C per decade. Similarly, the increase in minimum temperatures is more pronounced with roughly 0.4° C per decade. Precipitation, on the other hand, remained fairly stable over the last 50 years when averaged over the country. However, the spatial and temporal variability of precipitation is high, thus large-scale trends do not necessarily reflect local conditions (Bread for All 2009).

Somali regional state where 86.1 percent of the total population is rural (FDRE Population Census Commission, 2008) is known by occurrences of drought leading to famine resulted from frequent weather changes (IIED 2006). Thus, as part of the region the study area also shares the problem; as in Geladi districts, the growth of *Birkeds* has meant the disruption of the previous patterns of wet and dry season grazing as a result of climate change (Somali Regional State 2011; Jama

Sugule and Robert 1998). However, the percentage of pastoralist proportion of the study area has different figure; i.e. 95 percent (DPPC 2004) from the region's profile.

The Ethiopians, who live in the high lands, are engaged in mass actively in the combat against climate change. This fight against climate change is indicated by the people's involvement in soil and water conservation practices, which helps to maintain the existing climate as well as to accommodate favorable climate to the country, intending on minimizing the negative impacts of it. Moreover, the low land pastoralists have got a typical attention by the government of Ethiopia; NGOs and development agencies have also increased their interventions in pastoralist areas, with a number of large back-to-back collaborative programs providing funds for ongoing activities and support (Flintan *et al.* 2011).

Climate change is real and happening and it can be understood by the effects of climate change. These effects of climate change like temperature and sea level rise, change of frequency, intensity and duration of rain fall, etc are few of them. Therefore, these all effects of climate change have their own impacts on the ecosystem, biodiversity, and human beings. At the same time, impacts are diverse and highly differentiated by regions. Regions themselves differ for their intrinsic adaptive capacity (Bosello *et al.* 2009).

The ability of human systems to adapt to and cope with climate change depends on factors such as wealth, technology, education, information, skills, infrastructure, access to resources and management capabilities (UNPFII 2007) and climate change affects rural poor communities which rely greatly for their survival on agriculture and livestock keeping that are amongst the most climate-sensitive economic sectors (IFAD 2009) in particular, because of their weak adaptive capacities (Bread For All 2009). The present study was carried out with an objective to assess the impact of climate change on pastoralists.

## **Research Methodology**

Somali Region consists of nine administrative zones, 67 *Woredas* (administrative districts). Geladi is one of the six *Woredas* in warder (presently named as Dollo) zone of Somali regional State, found in the southern part of Dollo (Warder) zone, at 6°64' and 46°27'E'. It has a total area of 400km<sup>2</sup>. Its elevation above mean sea level ranges from 410-430m (DPPC, 2004). It is divided into ten (10) administrative centers, known as Qoloan, Enjiro, Degahcheb, Skuwes, Dqeyobor, Serahye, Berisadey, Durayale, Dudub, and Lebile.

Data required for the study was collected using questionnaire, interview and unpublished documents of the governmental offices. The pastoralists of the *Woreda* are living in ten administrative centers, *kebeles*. From these, three *kebeles* were selected using simple random sampling method. Within these three *kebeles* there are 311(DPPB, 2004 E.C.) households per housing unit. Therefore, the researcher selected a sample of 173 (55.6 percent) respondents at 5 percent margin of error and 95 percent confidence level, which were household leaders of the housing unit for questionnaire and ten respondents for interview. These respondents were selected using convenience non-probability sampling method since they were not registered.

## **Results and Discussion**

### **Land Use Pattern and Economic Activities**

The livelihood of the Ethiopian Somali depends mainly on livestock, complemented by rain fed and irrigated crop production (FDRE Population Census Commission 2008). Since the area has mono-agriculture, hence it experiences a single land use type, i.e. range land. Furthermore, the economic activities practiced in the study area include pastoralism (90 percent -95 percent) and small trade activities (5 percent -10

percent) (DPPC, 2004).

### **Pastoralists Understanding to the Changing Climate**

Table 1 depicts the response of the pastoralists to the questions regarding the understanding of climate change.

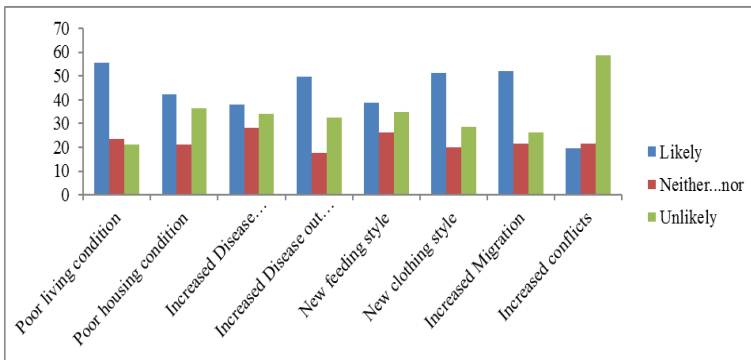
Studies of national climate trends since the 1960s show that mean annual temperatures in Ethiopia have increased by between 0.5 and 1.3°C between 1960 and 2006 (ACCRA briefs 2011) and estimated increases in temperature for an equivalent doubling of atmospheric CO<sub>2</sub> are around 1.5°C to 3.5°C for East Africa, depending on latitude. This would lead to high rates of evapo-transpiration being increased by ca 5% to 15% (Schulze, personal communication, 1989 cited in IPCC 1990). Likewise, a 2.5° C rise in global temperature would determine major losses: between 20 and 30 per cent of all plant and animal species assessed could face a high risk of extinction (IFAD 2009). The predictions on East African precipitation are controversial, and rainfall trends indicate weak rising trends in the arid lowlands of Southeastern Ethiopia (Jurya and Funk 2012).

Variables		Respondents	
		Frequency	Percentage
Do you feel the changing climate?	Yes	136	77.7
	No	39	22.3
Increased temperature	Yes	175	100.0
	No	-	-
Increased rainfall	Yes	57	32.6
	No	118	67.4
Increased wind blow	Yes	70	40.0
	No	105	60.0
Increased dry season	Yes	91	52.0
	No	84	48.0
Increased wet season	Yes	2	1.1
	No	173	98.9
Increased windy season	Yes	13	7.4
	No	162	92.6
Increased hot season	Yes	120	68.6
	No	55	31.4
Increased cold season	Yes	14	8.0
	No	161	92.0
Increased temperature variability	Yes	81	46.3
	No	94	53.7
Increased rainfall variability	Yes	93	53.1
	No	82	46.9
Increased wind variability	Yes	52	29.7
	No	123	70.3
Increased temperature intensity	Yes	102	58.3
	No	73	41.7
Increased rainfall intensity	Yes	8	4.6
	No	167	95.4
Increased wind intensity	Yes	8	4.6
	No	167	95.4

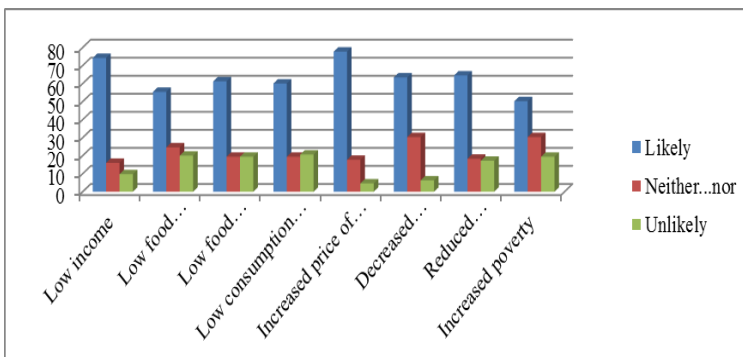
**Table: 1. Pastoralists understanding to climate change**

### Impacts of climate change

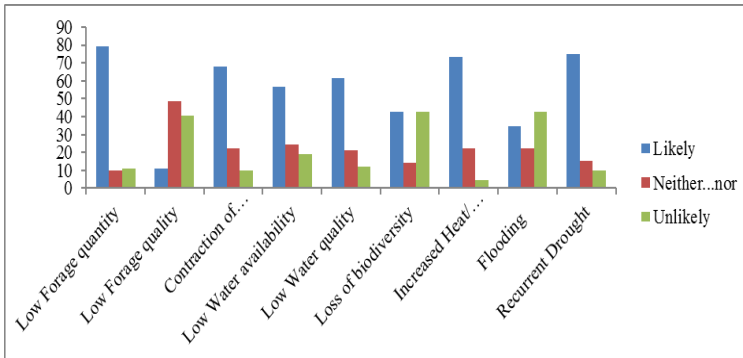
The living condition, housing condition, disease outbreaks, disease distribution, feeding style, clothing style, migration and conflict under social condition, income, food availability, food accessibility, consumption level, price of goods and services, livestock yield, livestock number and poverty under economic condition and forage quantity, forage quality, pastoral zone, water availability, water quality, loss of biodiversity, heat, flooding, and drought, are all present environmental conditions. The impacts of the changing climate are treated under three categories: social, economic and environmental impacts, because climate change has the potential to create a wide range of biophysical, social and economic impacts (Bordt and Smith 2008). The impacts are depicted in Table 2 and Figures 1,2 and 3.



**Figure 1 Social impacts of climate change on pastoralists**



**Figure 2 Economic impacts of climate change on pastoralists**



**Figure 3 Environmental impacts of climate change on pastoralists**

Likelihoods	Likely	Unlikely
Impacts on	Living condition	Conflict
	Housing	Forage quality
	Disease out breaks	Flooding
	Disease distribution	
	Feeding style	
	Clothing style	
	Migration	
	Income	
	Food availability	
	Consumption level	
	Price of goods and services	
	Food accessibility	
	Livestock yield	
	Livestock number	
	Poverty	
	Forage quantity	
	Pastoral zone	
	Water availability	
	Water quality	
	Loss of biodiversity	
Heat		
Drought		

**Table 2 Likelihood of climate change impacts**

The response to the social and economic traits portrays the increasing trend of the impacts on the pastoralists' environment. Because the study area is a dry land (arid and/or semi-arid) and dry lands are characterized as experiencing high



temperatures, low and erratic precipitation, minimal cloud cover and small amounts of plant residues act as surface cover to minimize radiation impact (Woodfine 2009). Researchers found that the Boran perceives changes in the frequency and intensity of drought conditions over the last several decades. The Boran also recognizes the need to adapt to these shifts, and along with the government and NGOs that work in the region, are undertaking a number of climate change adaptation strategies. Some of these traditional and new responses to drought are likely to interact with the potential implementation of IBLI in both complementary and conflicting ways. Still, there are significant opportunities for IBLI to reduce exposure to risk while supporting existing veterinary services and rangeland management (Mathew *et al.* 2012).

## **Summary and Conclusion**

The effects of the changing climate are imposing impacts upon the social, economic and environmental conditions of the pastoralists affecting their livelihoods causing poor living, housing, and health conditions, by reducing the number at the same time of the production of livestock, on which the life of the pastoralists is highly dependent. Similarly, this reduction in the assets/properties of the pastoralists is a result of lowering the carrying capacity of their environment where the animals depend for forage, i.e. the pasture land resulted from the effects of the changing climate. Pastoralism is one of the cultural and economic assets of the earth. Nevertheless, its continuous existence is being threatened by the continuous changing of the climate. Therefore, policy and decision makers as well as international and national organizations should turn on their faces towards those endangered and historically marginalized parts of the world societies in terms of social, economic and political conditions.

## **BIBLIOGRAPHY:**

- Bordt, M and Robert Smith. 2008. "Measuring the Impacts of Climate Change; Are Central Statistical Offices Prepared to Track the Impacts of Climate Change?" Environment Accounts and Statistics Division Statistics Canada. Conference on Climate Change and Official Statistics Oslo, Norway, 14-16 April 2008.
- Bosello, F., Carlo Carraro, and Enrica De Cian. 2009. "An Analysis of Adaptation as a Response to Climate Change". COPENHAGEN CONSENSUS ON CLIMATE. Copenhagen Consensus Center Copenhagen Business School Solbjerg Plads DK-2000 Frederiksberg, Denmark.
- Bread for All. 2009. "Climate Risks and Development Projects: By Marius Keller". Assessment Report for a Community-Level Project in Guduru Oromiya, Ethiopia.
- DPPC. 2004. "Qorshaha Waxaadobka Shan Sano EE (2003-2007 E.C)." Ahmed Farah, Xafiska DPPC Dagmada Galaadi (unpublished).
- FDRE Population Census Commission. 2008. "Summary and Statistical Report of the 2007 Population and Housing Census". United Nations Population Fund (UNFPA), Addis Ababa.
- Flinton, F., Beth, C., and Shauna, L. 2011. "Pastoral Women's Thoughts on Climate Change". Voices from Ethiopia; Future Agricultures Costrium at the Institute of Development Studies, University of Sussex and Feinstein International Center of Tufts University.
- IFAD. 2009. "Livestock and climate change, Livestock Thematic Papers Tools for project design by Hiara Calvosa." International Fund for Agricultural Development Via Paolo di Dono, 44 00142 Rome, Italy.
- IIED. 2006. "Sustainable Development Opinion; Climate Change and Pastoralists: Investing in People to Respond To Adversity". By Ced Hesse and Lorenzo Cotula, 3

Endsleigh Street, London, UK.

- IPCC, 2007. "Climate change 2007 synthesis report". An Assessment of the Intergovernmental Panel on Climate Change
- Jama, S., and Robert, W. 1998. "Changing Pastoralism in the Ethiopian Somali National Regional State, South East Range Land Project (SERP)." United Nations Development Program Emergencies group for Ethiopia.
- Jurya, M.R. and Funk, C. 2012. "Climatic trends over Ethiopia: regional signals and drivers". *International journal of climatology* University of Zululand, kwadlangezwa, Zululand, South Africa; Department of Physics, University of Puerto Rico, Mayagüez, Puerto Rico Department of Geography, United States Geological Survey, University of California, Santa Barbara, CA, USA. *Int. J. Climatol.* 33: 1924–1935 (2013) 15 August 2012 (wileyonlinelibrary.com) DOI: 10.1002/joc.3560, pp 1927.
- IPCC. 1990. "Climate Change." *The IPCC Impacts Assessment*, by WJ. McG. Tegart, G.W. Sheldon and D.C. Griffiths. Report prepared for IPCC by Working Group II. World Meteorological Organization/ United Nations Environmental Program/ IPCC. Australian Government Publishing Service Canberra, Commonwealth of Australia.
- Matthew Hurst, Nathan Jensen, Sarah H. Pedersen, Asha Sharma and Jennifer A. Zambriski. 2012. "Changing Climate Adaptation Strategies of Boran Pastoralists in Southern Ethiopia." Working Paper no. 15 CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)
- Somali Regional State. 2011. "Climate Change: Impacts, Vulnerabilities and Adaptation Strategies in Somali Region, Regional Program of Plan to Adapt to Climate Change." Environmental Protection and Energy and

- Mines Resources Development Agency. Jigjiga, Ethiopia.
- UNPFII, 2007. "Climate Changes an Overview." Department of Economic and Social Affairs, Division for Social Policy and Development, United Nations.
- USAID. 2011. "Climate Change and Conflict in Pastoralist Regions of Ethiopia; Mounting Challenges, Emerging Responses." By Jeffrey Stark, Katsuaki Terasawa, and Mersie Ejigu; USAID CMM Discussion paper no. 4
- Woodfine, A. 2009. "Using sustainable land management practices to adapt to and mitigate climate change in sub-saharan Africa resource". Guide Version 1.0.Terrafrica, Regional Sustainable Management.
- World Bank. 2010. "Economics of adaptation to Climate Change, Ethiopia". World Bank Group 1818 H Street, NW Washington, DC 20433.