
Climate Change and Incidence of poverty among Pastoralists in Tanzania: Experience of Hanang District

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Abstract

This study was conducted in Hanang district, Manyara region to examine the awareness of Barbaig pastoral community on the problem of climate variability and change and its effect on accelerating poverty. The study assessed the level of knowledge and experience that pastoralists have and the effects of climate variability and change to the community. The study used interview, Focus Group Discussion (FGD) and observation to collect data from respondents. A total of 100 respondents from two villages (Gisambalang and Dirma) together with 10 key informants were involved in the study.

The results obtained from this study show that the majority of the respondents (76% and 72% from Gisambalang and Dirma respectively) were aware of the presence of changes in rainfall patterns and temperature. They were able to point out the causes, indicators and resulting effects of climate change. The effects associated with changes in climate noticed by pastoralist includes drought, dry of water sources, poor farm harvest and increased level of poverty. From this study it is recommended that, the policy on climate change control should be given due weight in line with special programs to be introduced to empower pastoralist communities to get correct information and modern ways in addressing issues of climate change. The government should motivate pastoralist to engage themselves in modern ways of keeping animals, environmental conservation and land use planning.

Key words: Awareness, Climate Change Policy, Climate Variability and Change, Pastoralists, Poverty, Tanzania

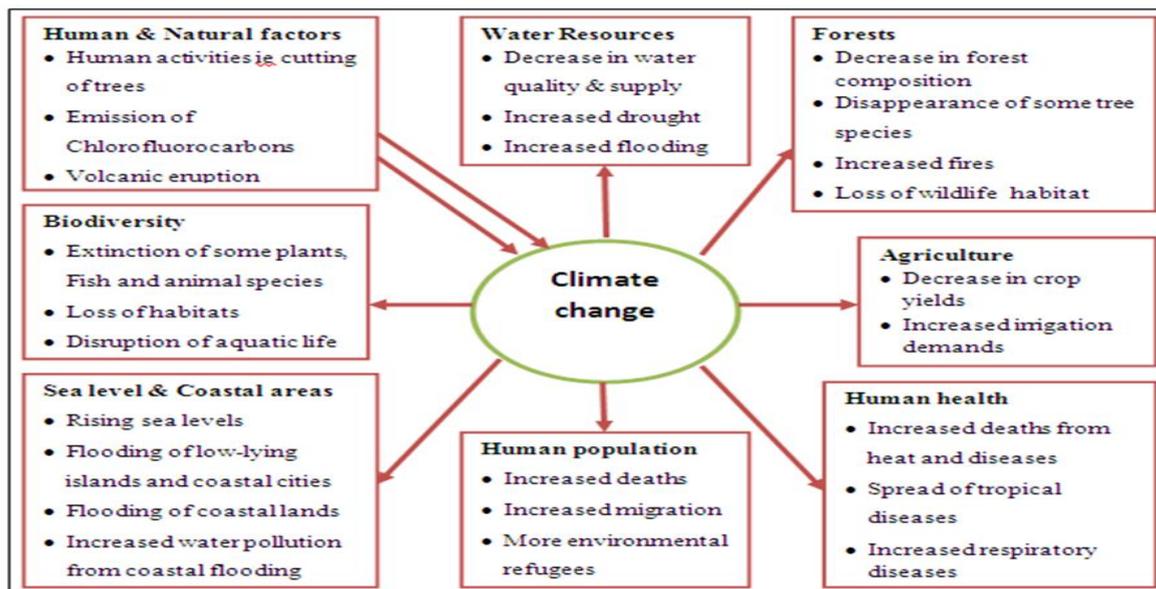
1.0 Introduction

1.1 Background Information

Climate change refers to a shift in the state of weather parameter or its variability persisting for an extended period of time which might be due to natural changes or persistent anthropogenic changes in the composition of the atmosphere or in land use. Climate variability refers to variation in the mean state of climate on a temporal and spatial scale beyond that of individual weather events like extended droughts, floods and hurricanes (Hegerlet *et al.*, 2007).

Across the African continent, it is predicted that there has been an increase in temperature ranging from 0.2°C (0.36°F) up to more than 0.5°C (0.9°F) per decade (Hulme *et al.*, 2001). In Tanzania, climatic change is expected to raise the mean annual temperature by 3-5°C by 2075 (URT, 2009). The climate change already touched every corner of the world and every aspect of people's lives, affecting rich and poor in whatever part of the globe they live; it has a direct impact on livestock production through reduced water and forage (Mwandosya, *et al.*, 1998). Changes in climate cause ozone layer depletion leading to increased heat and temperature water availability problems associated with flood, drought, effects on human health, desertification and change in sea level (Nast, 2001). Figure 1 below indicates some of the causes and effects of Climate change to the people and the environment.

Figure 1: Some of the causes and effects of Climate variability and change



Pastoralism remains the main source of livelihood for HanangBarbaig pastoralist and contributing about 25% of Gross Domestic Product (GDP) in Tanzania (URT, 2009). With likely long-term changes in rainfall patterns and shifting temperature zones, climate change is expected to significantly affect livestock production, which could be detrimental to the region's food security and economic growth, (Admassie, 2008). Adaptation and mitigations to such climatic change is important in reducing its great impact to pastoralist as they depend on the activity for their basic needs as well the economy of the country, therefore people's awareness on climate change is an important determinant of adaptation and mitigation to prevent impact brought by those changes.

Manyara is one of the regions in Tanzania badly affected with climatic variability and change, pastoralists particularly in Hanang district have been suffering from varied problems associated with climate change including drought, high temperature, water shortage which pose production challenges. It is not known yet whether farmers are aware of climate change and its implications for livestock production. Therefore, whether the decisions of pastoralist to abandon livestock production is a deliberate decision or rather is a consequence of climate change and variability and ill-informed on their effects on poverty incidences, is the focus of this study.

2.0 Methodology

This study used cross-sectional design because it involves gathering of data to a representative population sample at a single point in time. Both probability and non-probability sampling procedures were used to select the respondents. Stratified sampling and simple random sampling methods were used to get 100 respondents from Dirma and Gisambalang villages. Purposive sampling was used to select key informants such as village leaders, Agriculture extension officers, Ward Executive Officer and District official staff for their position and been working closely with pastoralists to obtain specific and technical data. The data collected from this study were obtained from both primary and secondary sources. Primary data collection methods included interviews, Focus group discussion(FGD) and observation while secondary data collection methods included a review of diverse source of professional reports/documents in hard copies and electronic forms.

Data were systematically analysed using Statistical Package for Social Science (SPSS). This includes computation of frequency and percentage. Ranking and scoring was used to understand which are the major effects of climate change in pastoralist community and changes were analysed by comparing the livelihood variables between present and past. The results for analyses data were presented by using figures, tables, charts and word text.

3.0 Results and Discussion

3.1 Barbaig pastoral community awareness of climate variability and change

The study results learnt that the majority of the respondents were aware of the changes in climate. During Focus Group Discussion (FGD), respondents were able to mention the effects of changes in climate and the interview evidenced that 76% and 72% of the respondents from Gisambalang and Dirma villages respectively were aware (Figure 2). This is so because climate variability and change is a well-known phenomenon this day, affecting people and animals so long experience (old age) and high level of education assists in creating awareness. Only 24% respondents from Gisambalang and 28% from Dirma claimed not to be aware of the incidence of climate change and variability.

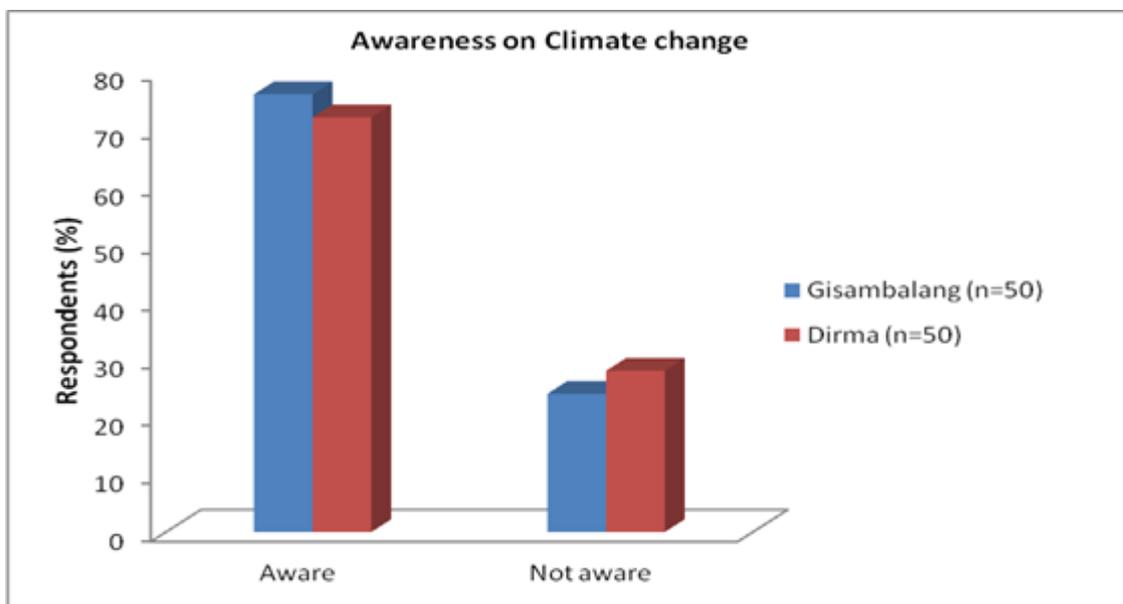


Figure 2: Barbaig pastoralist awareness on Climate Change by Village

Source: Fieldwork Survey, 2012

The result of the study from key informant on the level of awareness of pastoralists revealed the same, that majority of Barbaig pastoralists is aware of climate change and variability. One of the livestock officers said;

“Most of the pastoralists know climate change in their local context and in local different experiences”. He added that “most of them do not consider that human activities like overstocking can lead to climate change”.

3.2 Awareness on Climate Change by characteristics of respondents

Education Level and awareness on Climate Change

Results on the influence of level of education on the awareness of climate change indicate that the levels of awareness, increase with the levels of education (Table 1). The results revealed that for those who attained college education, all of them (100%) were aware of climate change compared to those with lower levels of education while awareness on climate change for those who attained secondary, primary and informal education were 85.7%, 77.5% and 63.4% respectively. This implies that those with formal education have a greater chance of getting more information about climate change.

Table 1: Awareness of climate change by sex, level of education and age

Characteristics	Description	Respondents (%)	
		Aware	Not Aware
Sex	Male	72.5	27.5
	Female	77.4	22.6
Education level	Informal	63.3	36.6
	Primary	77.5	22.5
	Secondary	85.7	14.3
	College	100	0
Age (years)	18 – 25	60	40
	26 – 35	71.8	28.2
	36 – 45	76.5	23.5
	46 – 55	72.7	27.3
	>55	100	0

Source: Fieldwork Survey, 2012

Sex and awareness on Climate Change

The results indicate that females (77.4%) were more informed on climate change than in the case of males (72.5%). This difference can partly be due females being more exposed to activities that are affected by climate change. However, situation that both villages are facing the problems relating to climate variability and change and also in Barbaig society, males and females are both engage in pastoralism.

Age of the respondents and awareness of Climate Change

Results at the age of respondents and awareness of the climate change revealed that, respondents with the age between 18 to 25 years, 26 to 35 years, 36 to 45years and 46 to 55 years are aware of climate change at the proportion of 60%, 71.8%, 76.5% and 72.7% respectively. All respondents (100%) aged above 55 years were aware of the climate change. These results suggest that the awareness of climate changes increase with the age as they gain knowledge through experience and the use of Indigenous knowledge.

3.3 Awareness of causes of climate change

Respondents were able to point out different causes of climate changes when asked. They further mentioned that deforestation; overstocking, farming activities; Barbaig god's factor and bush fire are the driving factors to climate change. The study revealed that deforestation accounts for 90% in climate change (Figure 3). This was explained further that, human requirements such as the need for settlement, farm expansion, charcoal and building materials, cutting down trees can lead to environmental degradation. Through the field visit, it was also noted that, Gisambalang village is more affected by the problem of deforestation compared to Dirma village due to a good number of livestock kept.

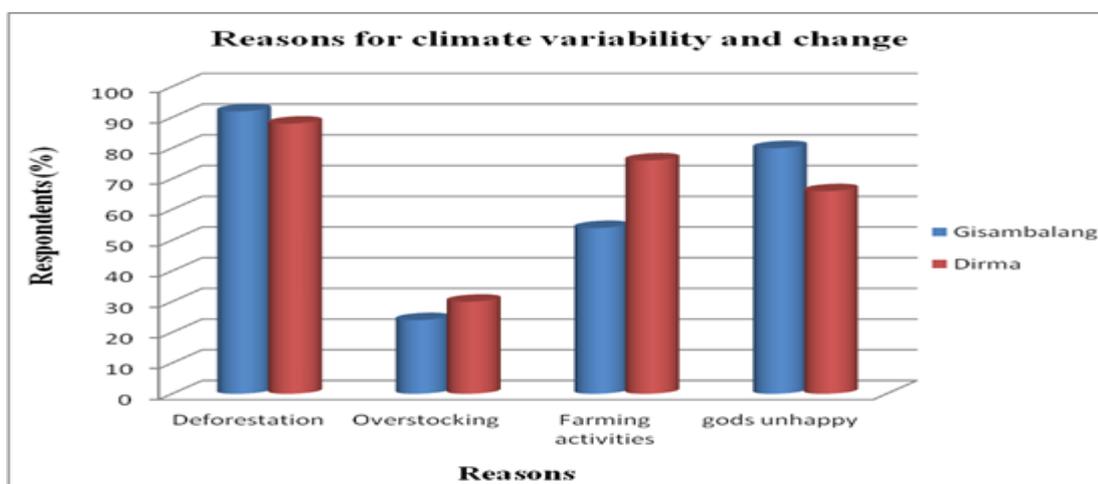


Figure 3:Bargaig perception of the reasons for changes on Climate

Source: Fieldwork Survey, 2012

The next important reason provided by 80-66% of Gisambalang and Dirma pastoralists was that Barbaig gods being angry with them. They believe the gods are angry because pastoralists are no longer worshipping them well, not providing sacrifices as required and others are cultivating the land instead of keeping animals. This indicates that most of the barbaig still believe in traditional ways of life. More than a half (54-76% from Gisambalang and Dirma respectively) of respondents mentioned farming activities as one of the contributing factors for changing in temperature, wind, onset of rains, variations of rainy seasons and rainfall amount. These imply that pastoralists are blaming that the farmers are the source of changes in climate.

Overstocking accounts only for 24-28% of responses from Gisambalang and Dirma respectively. This does not reflect the true picture as the Barbaig pastoralists possess large number of livestock it can be because many pastoralists are against the idea that having many livestock contribute to the destruction of the environment as in the past they had many animals compared to what they have now.

3.4 Pastoralist awareness on the indicators of Climatic Change

Pastoralists are aware of climate change as they managed to mention indicators supporting changes in climate. Some of the indicators revealed were; changes in precipitation increase in temperature, drying of water sources, drying of pasture and increase of families under food insecurity as a result of persistent drought.

Table 2: Indicators of climate change known by pastoralists

Variable	Description	Respondents (%)		Total (N=100)
		Gisambalang (n = 50)	Dirma (n = 50)	
Indicator	Changes in precipitation	94	88	91
	Temperature increase	94	96	95
	Dry of water sources	80	92	86
	Drying of animal pasture	58	40	72
	Increase of diseases	76	68	46
	Food insecurity	42	50	46

Source: Fieldwork Survey, 2012

Temperature increase

Increase in temperature was one of the main indicators mentioned by respondents from both villages (95%). This finding shows that all pastoralists are aware of changing temperature; this is because temperature is easily detected. This was supported by Levira (2009), the temperature has been dramatically increasing, and this is responsible for increased evapo-transpiration in the soil. Data obtained from Hanang Weather station also show a trend increase in Temperature, this is a result of changing world climate which have caused different threats on Earth (Fig 4).

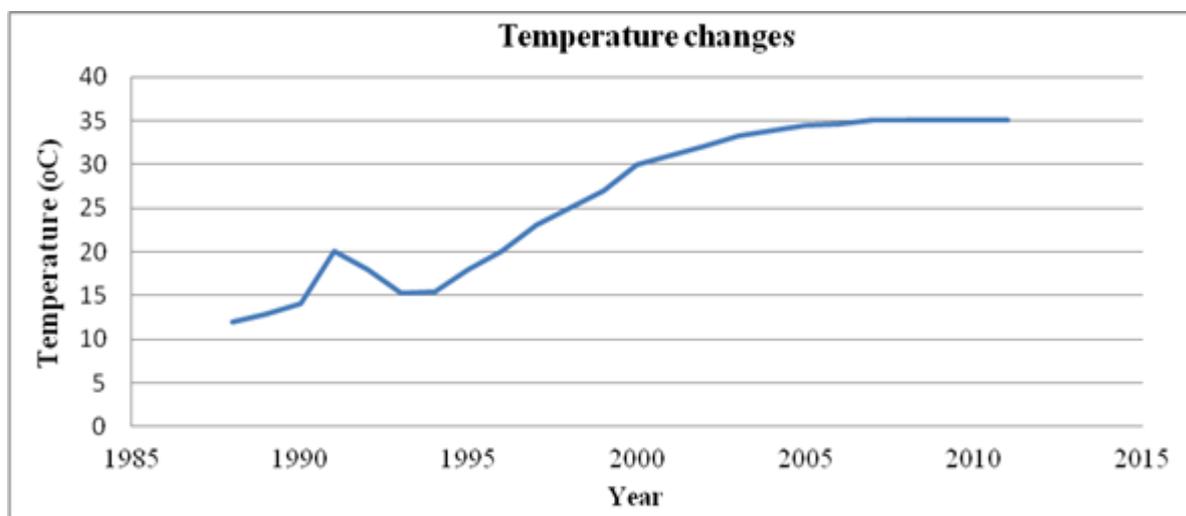


Figure 4: Temperature changes recorded at Hanang Weather Station

Source:Hanang Weather Station, 2012

Precipitation changes

In total, 91% of the respondents observed changes in rainfall patterns. According to what pastoralist observed, there have been a remarkable decrease in the amount of rainfall, rainfall coming late and short period. On the other hand, the key informants noticed changes not only on the total amount of rainfall, but also in the timing of the rains, with rains coming either earlier or later than expected(Figure 5).Also the study done by Lavira (2009), confirms that rainfall pattern has been decreasing at different places in Tanzania hence affect farming and animal keeping activities.

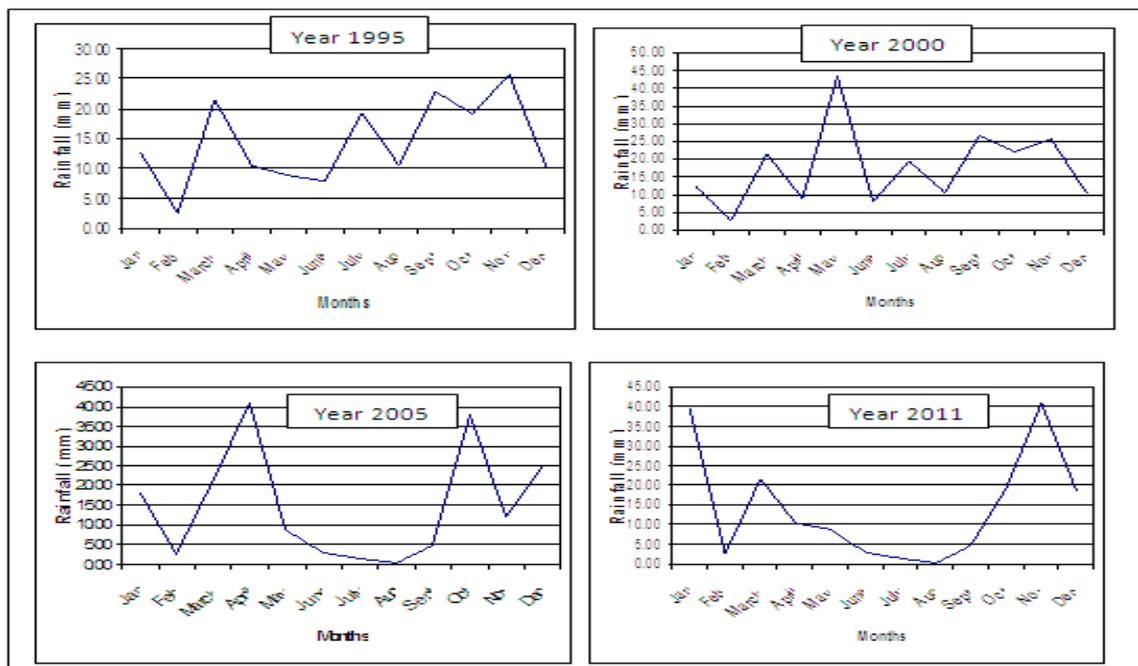


Figure 5: Monthly Rainfall Distribution Variations for Selected four years

Source:Hanang weather Station, 2012

3.5 Effects of Climate variability and change to Bargaig Pastoralists Drought

This study has found that drought is highly experienced in Hanang district; it affects vegetation, cause shortages and loss of quality pasture and water leading to poor health and death of livestock, accounts for 91% of all the respondents(Table 3). The situation is worse in pastoral systems as drought tends to occur every 3-7 years, due to changes in climate (Lane, 2008)

Table 3: Effects of Climate variability and change to Barbaig community

Variable	Description	Respondents (%)		Total (N=100)
		Gisambalan g (n = 50)	Dirma (n = 50)	
Effects	Drought	94	88	91
	Dry of water sources	80	92	86
	Poor farm harvests	58	40	46
	Poverty acceleration	76	68	72

Source: Fieldwork Survey, 2012

Poor crop yields

The study revealed poor farm harvest by 46% from both villages. This is the indication that the majority of the Barbaig pastoralists has shifted to farm cultivation practice as their substitute to livestock. Unfortunately, even with farm cultivation, the crop yields were said to be declining due to shift in a rain pattern, shortage of rainfall and other incidences of climate change and variability.

Poverty acceleration

Poverty acceleration was one of the results of climate change which hits badly the Barbaig community supported by 72% of total respondents. Due to prolonged drought incidences, drying of water sources and poor crop harvest causes difficulties in living situation and paves a way for poverty acceleration. This was also observed by Mwandosya *et al.* (1998) who mentioned the El Niño event, as an example which led to flooding, severe food shortages, 'skyrocketing' food prices, increased in power rationing, and extensive food, cattle and cash crop losses.

Drying of water sources

Another effect of climate change revealed by the study was drying of water sources (82-92% from Gisambalang and Dirma respectively). As far as prolonged drought affects vegetation, the condition leads to dry of water sources which are very important to human being, animals and plants. It was found out that, shortage of water force Barbaig pastoralists moves to different places to search for water for their cattle. Respondents mentioned a number of water sources that have dried due to what they believe as changes in climate.

4.0 Conclusion and Recommendations

4.1 Conclusion

This study was centered on understanding pastoralist's awareness of changing climate and its effects on poverty incidences. It is concluded that pastoralist are aware of changing temperature and rainfall patterns. Pastoralists are able to identify indicators and reasons for climate variability and change. The study concludes that, pastoralist communities experience prolonged drought, high temperature, poor farm yields, dry up of water streams and pasture lands. This situation forces Barbaig community members to shift from one place to other seeking for pasture and water for their animals.

4.2 Recommendations

There is a need for dissemination of climate information to pastoralists and for a range of stakeholders involved in policy-making, governance and service provision, to help people understand and respond to climate change challenges faced in different regions and districts. Livestock keepers should be encouraged and educated on the importance of reducing the number of their livestock to avoid over-stocking, environment conservation and adaptation of modern ways of keeping animals. Land should be planned and divided according to uses; to have specific areas for grazing, cultivation, watering points and to have reserve lands, this could help to keep the ecological system in normal situation.

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