



**Agro-pastoralists' Perception on Climate Change in Mvomero District:
A gendered Perspective**

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Abstract

Studies on agro-pastoralists' perception to climate change have reported inconclusive evidences. This paper analysed agro-pastoralists' perception on climate change from the gender perspective in Mvomero district in Tanzania. The study adopted cross sectional research design and involved 135 agro-pastoralists. Quantitative data were collected using semi structured questionnaire. Descriptive and inferential analysis was computed. Pearson's Chi-square, summated index scale and an independent sample T-test were computed to establish relationship between key study variables. The study found higher level of awareness about climate change. Climate change was attributed to frequency of unfavourable climatic events such low rainfall, high temperature and unpredictable on set of rainfall seasons. Gender differences on the level of awareness about climate change was found however the relationship was not statistically significant ($P>0.05$). The perceptions on climate change differed between men and women although the relationship was not statistically significant ($P>0.05$). It is recommended for the government and non-governmental organization espousing for improving the livelihood of agro-pastoralists to improve their knowledge of climate change and how to mitigate its impacts. Gender sensitive approaches should be introduced when training and assisting rural households' decision making towards adopting coping and mitigating strategies to positively impact on gender roles, relations and wellbeing.

Keywords: Climate change, knowledge, perception and vulnerable



1.0 Introduction

Climate change is perhaps the greatest challenge facing our planet today (Adebayo and Oruonye, 2013). The impacts of climate change phenomena are progressively emerging as an unprecedented global challenge to development in general and poverty reduction especially among millions of rural people living in marginal regions with minimal livelihood options (Brown and Crawford, 2008). Scientific evidence show that Africa is one of the most vulnerable regions to the effect of global climate change due to her low human adaptive capacity to anticipated increases in extreme events resulting from widespread poverty, heavy reliance on rain fed agriculture, lack of economic and technological resources, insufficient safety nets and slow educational progress (Bako, 2013, Cooper *et al.*, 2008; and IPCC, 2007). Some of these challenges manifest themselves in the form of drought, flooding and inundation of coastal lands, low agricultural productivity, alteration of surface and ground water and devastation of ecosystems among others (IPCC, 2007). On the whole, the impact of climate change on agricultural production depends on the balance of these impacts (Fischer *et al.*, 2002, McCarthy *et al.*, 2001 and Dinar *et al.*, 2008).

Agro-pastoralism has been a source of livelihood for rural people; however, the agro-pastoral based livelihoods are no longer sustainable due to the impact of climate change, resulting in changes in water flow which cause some socio-economic and ecological impacts in Tanzania (Antezza, 2008). These adverse effect of climate change include decreased biodiversity, lowered agricultural productivity (e.g. irrigation projects), domestic water shortage etc. All these add hardships to already struggling communities (Orinda and Murray, 2005). Currently, rationing of both water and pastures are of repeated occurrence in many places across the country. Further deterioration in water availability will have major effects in Tanzania where already some communities (25% of the Tanzanian) are walking an average of over 30 minutes looking for water (URT, 2003). Traditionally, women and children are responsible for domestic water and fuel-wood collection in Tanzania. As firewood, water and pastures become rare in neighbourhoods, they travel longer distances to collect with negative connotation to their main economic activities.

Bako, (2013) argued that, the awareness of climate change has increased in some places although at an unprecedented pace and it is now accepted as a major threat to human survival and sustainable development. However, men and women have different levels of knowledge and experiences accumulated from years of working in the environment that can be tapped for climate adaptation. Thus, climate change has specific gender characteristics emanating from men's and women's social roles, discrimination and poverty (Brody *et al.*, 2008). This leads to differences in capacities, knowledge, interests as well as needs (UNDP, 2009). Blaikie *et al.* (1997) also contend that, knowledge is not homogeneous within any local population but varies according to respondents, partly due



to gender roles and among others. This difference in knowledge among men and women is more likely to introduce gender based variations in climate change perceptions and mitigation of its effects among men and women agro-pastoralists.

Several studies on perception to climate change have been conducted in Sub-Saharan Africa (SSA) including Tanzania. These studies have been changing focus and covered different aspects such as livestock (Galvin *et al.*, 2001), agriculture (Deressa *et al.* (2008), Ishaya and Abaje (2008), Lema and Majule (2009), Mengistu, (2011), Swai *et al.* (2012), Oruonye, (2011), Hague *et al.* (2012), and Bako (2013); while others have focused on both livestock and agriculture (Meena *et al.*, 2008; Mbilinyi, *et al.*, 2013). In most of such studies, findings are not disaggregated by gender to underscore specific gender based variations on climate change perceptions among men and women agro-pastoralists in developing countries like Tanzania. Hence, caveat in knowledge of the gendered impact of climate change is still exist. Despite the widespread scientific debate concerning people's perception to climate change and variability, many agro-pastoral systems are still facing several hardships like access to water and availability of grazing land. There is a need to collect as many empirical evidence from different socioeconomic locations as possible on agro-pastoralists communities' perceptions on climate change and its impacts on changing gender roles and relations. To that end, this paper contributes empirical evidence on agro-pastoralist communities' perceptions on climate change impacts on their gender roles with a special focus on grass root communities.

2.0 Methodology

The study was conducted in Mvomero District. The area was selected due to adverse impact of extreme events associated with climate change such as droughts and floods which are affecting the area. Furthermore the place is also selected due to the presence of agro-pastoralists community. The study adopted a cross-sectional research design, whereby data were collected only once. Three villages Mkindo, Hembeti, and Msufini were selected purposively from Hembeti ward as they have the majority of its inhabitants who are agro-pastoralists; a total of 135 respondents were selected using a simple random selection technique. The sampling unit involved those who practices both livestock keeping and crop cultivation. Quantitative data were collected by using questionnaires to get information on how agro-pastoralists community perceives climate change impacts and gender roles in the study area. A checklist was used to collect data from key informants and Focus Group Discussion (FGD) which were used to solicit qualitative data. Key informants interviewee included: village leaders, wards officers, well-known agro-pastoralists' leaders, crops and livestock extension workers and members of village government committees.



To capture respondents' perception on climate change and gender roles, Likert scale was used to collect and analyze information on the perceptions of agro-pastoralists on climate change and gender roles. During the analysis, the five levels on the Likert scale were computed and merged into three levels: agree disagree and uncertain. Finally the general perception of all respondents was presented after computing the average percentages of these major three groups of responses: agreed, uncertain/neutral and disagree. Summated scale technique was also applied to compare the overall attitude of perception where score on positive statement were compared to score on negative statements. A descriptive statistical analysis and inferential analysis was computed including: frequency distributions cross tabulation with chi-square. Chi-square test was also computed to establish the association between perception and other selected background variables. Independent sample T-test was used to compare the perception of climate change between men and women.

3.0 Results and Discussion

3.1 Awareness on the changing climate

The findings presented in Table 1 revealed that, relatively more men were aware of climate change than their female counterparts. However, Chi-square statistics revealed that there was no significant relationship in awareness to climate change between men and women. Generally, majority of respondent were aware of the changing climate. Low level of awareness towards climate change may impact on adoption of recommended climate change mitigating strategies. Awareness of the people contributes into their willingness to adapt effective climate change mitigations. These results are comparable with the study done by Mary and Majule, (2009) who found that, farmers in Tanzania had high awareness on climate change especially on impact that lead to risk of crop failure and rising of production cost due to re-planting and re-ploughing of crops. Other scholars have also reported similar findings related to farmer's perception to climate change Ishaya and Abaje, (2008), Adebayo and Oruonye, (2011) and (Egbe *et al.*, 2014).

Table 2: Awareness of the changing climate

Variable	Categories	Aware	Unaware	χ^2	p-value
		%	%		
Sex	Male	61.9	58.8	0.126	0.430
	Female	38.1	41.2		



3.2 Perceived climate change: rainfall and temperatures

Change in rainfall pattern and trend as well as temperature are important indicators of the changing climate. In this study it was revealed that the perception for change in rainfall and temperature differ between the sex. Men were more likely to perceive that the temperature was increasing while relatively fewer women perceived increases in temperature. Similar trend between men and women were observed with regard to change in rainfall (Table 2). The findings compare with Bryan *et al.* (2011) who also found that in arid and semi-arid divisions in Kenya, majority of farmers perceived an increase in average temperature and rainfall variability respectively (Bryan *et al.* 2011).

Table 2: Awareness of the climate change: rainfall and temperature

Variables	Levels	Increasing	Decreasing	Stayed the same	Do not know	χ^2	P-value
Awareness on the trend of rainfall for the last 5yrs	Men	6.1	63.4	3.6	25.6	5.536	0.354
	Women	3.8	49.1	9.5	37.7		
Awareness on the changes of temperature for the last 5yrs	Men	67.1	2.4	1.2	29.3	2.284	0.516
	Women	57.7	1.9	0.0	40.4		

3.3 Perception of climate change on gender roles

It is argued that agro-pastoralist's perception on climate change and its impact on gender roles influence the probability of adopting mitigation and coping measures (IFPRI, 2007). This study found that, generally there was a relatively higher score on negative statements than positive ones, implying negative perception. For example, respondents disagreed with the statement that climate change stabilized gender roles in the study area and that climate change forces women and men to spend short time for labour in agricultural Production. A vast majority of respondents (99.3%) also disagree with the contention that as a result of drought women spend short hours searching for pastures and water. Similar trend has also been reported in literature. For example, in Vietnam by Shaw (2008) found that, women collect water from water sources that are far farther away as each drought seasons take its toll of the natural vegetation's. Furthermore, Asheber (2010) found similar result in Ethiopia and Dankelman *et al.* (2008) in Senegal, where women had to travel long distances in search for water. Cultural traditions make women responsible for collecting water, even when this involves long hours performing heavy physical labor or travelling long distances.



Of the five statements with positive connotations, the greatest propositions of the respondents (97.8%) agreed with the statement that climate change forced men to collect firewood and pastures and 63% of the respondents agreed that climate change has influenced women to engage in petty business as they are core bread winner. This implies the perceived change in gender roles as a result of changing climate. These results compare with the study done by Angula (2010) who found that, the impact of climate change influenced majority of women to involve in pet trade to supplement family income. The overall perception mean score for all statements was 32.2 out of 96 which show that majority of the respondents involved in the study had a negative perception on climate change. These findings also compare with other scholars in the field, GlobeScan, (2006) and Pew Research, (2006) both of which found that climate change is more likely to be perceived as a threat in developing countries

Table 3: Climate change and gender roles Percent (n=135)

Statement	Agree	Disagree	Uncertain
Climate change brought about shared activities.	86.7	5.2	8.1
Climate change has influence women in business	63	28.9	8.1
Climate change necessitates men to participate domestic activities.	87.4	11.1	1.5
Climate change forced men to collect firewood and pastures.	97.8	2.2	0
Climate change forced men to milk and selling milk.	77.8	9.6	12.6
Crop varieties lead fewer responsibilities to women.	3	97	0
Drought made women to spend short hours in pastures and water collection.	0	99.3	0.7
Climate change made women to be lazy on tedious work.	3	90.4	6.7
Climate change forced men and women to spend short time in agriculture production.	0.7	99.3	0
Climate change stabilized gender roles in agro-pastoral sties.	0	100	0
Total	42	54	4



4.0 Conclusion and Recommendations

In view of the empirical evidences as presented in this paper it is concluded that the level of awareness about the climate change was relatively higher. There are gender differences on perceived climate change among men and women. These gender differentials on perception of climate change may affect the adoption of recommended practices to mitigate the impact of climate change. Therefore it is recommended for the government and non-governmental organization to increase the knowledge on climate change and on how to mitigate its impacts. Gender sensitive approaches should be introduced when training and assisting rural households' decision to adopt coping and mitigating strategies that may positively impact on gender roles.



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