

CLIMATE CHANGE PERCEPTIONS AND COPING STRATEGIES AMONG THE MARGINALIZED AND RESOURCE POOR HOUSEHOLDS IN THARAKA SOUTH, KENYA

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ABSTRACT

Global climate change will continue to have significant effects on sectors that support human life systems. The agricultural sector is one of the most vulnerable to the risks, uncertainties and impacts associated with climate change. Adaptation and coping strategies will determine how human being will respond and get affected by climate change. The purpose of the study was to understand the perceptions and coping strategies amongst the small holder farmers in Tharaka South, of Tharaka Nithi County who poor in terms of resources and marginalized. The study relied on primary data which was collected from 100 households using a semi structured questionnaire. Data was supplemented using Focused Group Discussions and Interviews with key informants. Data was analyzed using SPSS. The findings shows that local farmers have an informed understanding on issues related to climate change and local livelihood strategies especially those relating to agricultural sector. Further, the study revealed that local farmers have adopted climate change coping strategies like planting improved seed varieties of drought resistant crops like green grams, sorghum and cowpeas. Other coping strategies include; planting multiple crops and practising irrigation. However, as local farmers struggle and strive to adapt and cope with the changing climatic conditions they are faced with challenges related to lack of availability of planting materials (seeds), high cost of seeds and irrigation technology

Keywords: Climate change, coping strategies, Perceptions

Introduction

Agricultural sector is one of the most affected in relation to the risks, uncertainties and impacts associated to global climate change. In this regard adaptation to climate change has become one of the viable options to minimize the vulnerability of agricultural dependent households. According to Reidsma et.al (2010), IPCC defines adaptation as an adjustment in human or natural systems in respect to actual or expected climate change. Adaptation to climate changes has both short-term and long-term strategies (Guo et.al, 2010).The changes in weather pattern

and climate has forced farmers across the globe to have diverse strategies with regard to making choices in agricultural activities or enterprises to carry out in their farms. Globally farmers have adopted different climate changing coping strategies (Thomas et.al, 2007). For instance, Kurukulasuringa and Mendelson (2007) found that farmers choose heat resistant crops as a strategy to cope with changing climate conditions in Africa. Some Sub-Saharan farmers have responded to climate change by discontinuing the sources of income from climate- dependent to non-farm income generating activities (IfejukaSperanza and Scholz 2013). Other farmers have also responded through selection of cropping patterns and diversification of crop varieties (Thornton et.al, 2006; Deressa et.al 2009; Bryan et. al 2009).

According to Yaro (2013), global communication systems have been effective in disseminating information to farmers on the effects and impact of climate change. There is no doubt that communication has been important in increasing farmers' knowledge on climate change, and their preparedness on how to handle the impacts associated with climate variability. Besides, farmers have developed rich indigenous understanding which has enabled them to respond to changes in climate and weather patterns in managing their agricultural activities. Therefore, it is valuable to understand the farmers' point of view in regard to how they are adapting and coping with climate change. It is important to note that the interconnections between agriculture and climate change vary between arid and semi-arid conditions and those of temperate regions (Slingo et.al, 2005; Vogel et.al 2007). The farmers in Sahel region have developed deep cultural knowledge on climate change matters (Mertz et al. 2009), thus it is worthwhile to explore whether they are applying this knowledge in making agricultural decisions on their farms. This information should be useful to policy makers and development practitioners in making decisions and choices of the best adaptation strategies to support. In addition, understanding of farmers' perceptions on climate change is invaluable, since these have a significant impact on the outcome of adaptation strategies which are adopted by farmers (Yaro, 2013). In Sub-Saharan Africa, farmers have been hit hard by effect of climate change, since it has affected agricultural production hence disrupting livelihood strategies of a large population. Faced with climate uncertainties, adaptation strategies adopted by farmers have been influenced by a mix of factors; climate variability, poor infrastructure, poverty levels and low productivity (Mertz et. al 2009). These conditions vary from one community to the other and more significantly may vary from one farming household to another. Yaro (2013), point out that adaption strategies chosen by farmers are influenced by knowledge base, assets and capabilities. Ellis (2000) further notes that structures and institutions play a role in influencing livelihood outcomes in rural areas. Therefore the impact of climate change on rural livelihood can only be managed or minimized if small scale farmers are able to adopt appropriate adaptation and coping strategies. This study aims at finding out how farmers are responding to climate change with specific focus on the agricultural

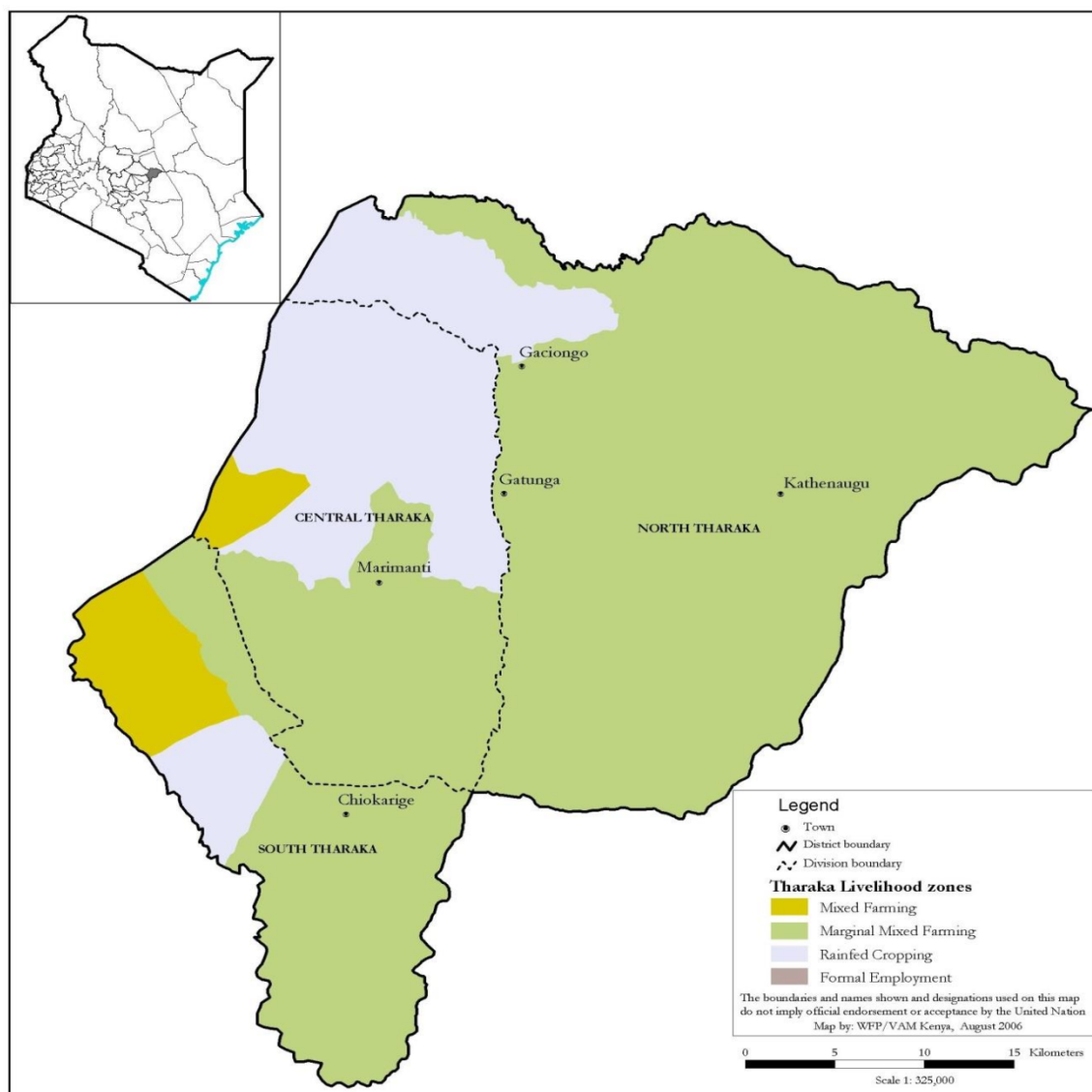
sector. The study will generate useful information on the most appropriate adaptations suitable for the area. This study was carried out in Tharaka South, within Tharaka Nithi County. The purpose of the study was twofold: Understand how local farmers perceive climate change and the effects of climate change and change coping strategies applied by local farmers.

1. Research Methodology

2.1 Study area

Tharaka Nithi County is one of the driest counties in Kenya. The county has two distinct zones which are characterized by different climatic conditions. The upper zone borders Mount Kenya and receives substantial amount of rainfall which is adequate to support agricultural activities. The lower zone is characterized with drier climatic conditions which has unpredictable weather patterns. The study was carried out in Tharaka South District since it is among the most vulnerable area in the county. The area has diverse agro-ecological zones (Smucker and Wisner, 2008). The area is on the Eastern slopes side of Mount Kenya, and the rainfall variability is influenced by a combination of latitude, inter-tropical convergence zone, ENSO and Sea Surface Temperatures (Odingo et al. 2002). The rainfall is bimodal distribution which is unevenly distributed within the seasons and shows significant variability from year to year and season to season (Shisanya 1996). Climate variability has affected agricultural activities within the area and local farmers have adopted varied strategies to cope with climate changes experienced in the area. The study was based on a sampled population of 100 small scale farmers' households which were randomly selected and interviewed (Figure 1).

Figure 1: Showing the location of study area



Adopted from (Odingo et al. 2002)

2.2 Data collection

The study relied on triangulation approach of data collection methods by applying both qualitative and quantitative techniques. Qualitative data was gathered through Focused Group Discussions (FGDs) targeting organized farmers and women groups, and in-depth interviews

targeted the agricultural officers and development organizations working in the area. Quantitative data was collected through administering a semi structured questionnaire targeting 100 smallholder farmers. According to Roncoli (2009), participatory approaches facilitate understanding and uses of uncertain climate information. According to Orlove (2010), use of Focus Group Discussions guarantees high level of farmers' response and thus, this study used multifaceted approach in gathering information to provide latent evidence on climate change matters relating to agricultural adaptation coping strategies. The respondents for administering the questionnaires were randomly selected from the villages while members of the FGDs were recruited from existing farmer organized groups. Primary field data was supplemented with secondary sources. Field data was collected in the month of February and March 2017. The collected data was analyzed using SPSS software version 18. Data was analyzed to give descriptive information about the sampled respondents. Data presentation was done through the use of tables and percentages.

2. Results and discussion

3.1 Socioeconomic characteristics of the households

For this study a total of 100 small scale farm holders were interviewed representing 51% men and 49% women. In regard to age, 47% of the respondents were aged 20-30 years; 41%, 31-40 years and 12%, over 40 years. This shows that most farmers are youthful and in the productive age. From the sampled farmers, 63% had secondary education and above. Thirty three percent (33%) had schooled up to primary level and the rest, 4%, had no formal education. Education play a significant role in decision making process and most probably may have a bearing on the choice of climate change coping strategies amongst the farmers (E. Hisali et al, 2011). The survey results revealed that though most relied on farming 51% (growing of food crops like green grams, maize, beans and cowpeas.) as source of income, households had other sources from livestock keeping 16%, employment 23% and agroforestry 10%. Therefore, farmers have diversified sources of livelihood. From field probing and field observations, the main agroforestry practices included growing of improved varieties of mango trees, oranges, lemons and pawpaws through some form of irrigation. Thus, due to climatic conditions in the area, agriculture is affected by climate changes which are characterized by unpredicted rainfall and drought patterns. Therefore, livelihood diversification and climate coping strategies are important towards the survival of farmers in the region.

3.2 Farmers' perceptions and understanding of climate change

Farmers' knowledge and attitudes are important in making decision on choice of crops and enterprise to undertake in their farms (E Hisali et al, 2011; Zubair & Garforth, 2006). From this

perspective, the researcher had an interest to find out how the local farmers were knowledgeable on climate change. This was probed with a statement; “**How do you understand the term climate change**”. Survey results revealed that 96% were familiar with the term climate change while 4% did not have an idea. On further probing during Focused Group Discussions, farmers associated climate change with prolonged droughts, drying of rivers, loss of crops and low yields. The findings are important especially during planning and management of impacts or effects on climate change.

3.3 Possible effects of climate change on agriculture

Climate change has had significant effect on agriculture sector in sub-Saharan regions. The decline in agricultural output has led to increased hunger among the developing countries which depend on agriculture for livelihood (Schlenker & Lobell, 2010). The study shows that about 96% of the respondents admitted that climate change was being experienced in the region. The respondents argued that the change is evidenced by increased temperatures, decline in the amount and the distribution of rainfall, low crop yields, prolonged droughts and drying of rivers. The impacts of climate change on agriculture are summarized in (Table 1).

Table 1: Farmers’ perceptions of impacts of climate change on agriculture in Tharaka South

	Agricultural aspects	Percentage (%)
1	Low crop yields	54
2	Decline in milk production	24
3	Livestock death	4
4	Livestock stress	15

From the study 54% of the farmers pointed out that low crop yield was the major impact of climate change on agriculture. Other impacts as pinpointed by respondents included, decline in milk production, livestock death and stress (Wilk et.al 2013). These impacts were made worse due to the fact that the region like other ASALS normally receives low amount of rainfall and experiences prolonged drought.

3.4 Households' climate change coping strategies

Communities have diverse ways or strategies of adapting or coping up with impacts and effects of climate change (Morton 2007). We found that local farmers had a multiplicity of climate coping mechanisms which were adopted within the region to reduce and manage risks associated with climate uncertainties. The most practiced coping strategy was planting of improved varieties of drought resistant crops was thus 39% (Thornton et.al, 2006; Deressa et.al 2009; Bryan et. al 2009). The main crops planted include green grams, cowpeas, peas, millet and maize. The results are summarized in Table 2.

Table 2: Agricultural based climate change coping strategy

	Coping strategy	Percentage (%)
1	Planting drought resistant crops (Improved varieties)	39
2	Intercropping/planting many crops	37
3	Irrigation	30
4	Green houses	4

Also included among the coping mechanisms was planting of different varieties of crops. This explicitly offered an opportunity against total loss during the period of extreme and unpredictable rainfall seasons. Crop diversification has been fronted as one of the surest way of coping with climate change in dry lands (Richards, 1985, Oyekale et.al., 2009; Lin, 2011). However, during the FGDs the farmers revealed getting improved seed varieties was a challenge due to lack of local suppliers and high cost of seeds. Within the study area, drip irrigation was another coping strategy and was made up (30%). The farmers felt that it was cost friendly and saved the amount of water used considering that this is a scarce commodity especially during the dry season. Therefore, in this regard cost and availability of technology is very important during the selection of coping strategies by rural farmers (Deressa et.al 2009).

3. Conclusion

The research was carried out to explore the perceptions and coping strategies towards climate change amongst the smallholder farmers in Tharaka South, Kenya. Findings shows that farmers have an understanding about climate change and it has affected agricultural activities especially contributing to low crop yields, decline in milk production, livestock death and stress. The study

also found out that locals are adopting different climate change coping strategies. It is important to be sensitive to cost when proposing or designing climate change coping strategies since farmers have different economic abilities.

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