

Climate Change Adaptation and Community Health Assessment in Suba Sub County, Kenya

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Abstract— *The diversity of community responses to climate change mediated extreme weather events reflects the varied geographical, cultural, and socio-economic contexts. Understanding intrinsic and extrinsic community health factors can help structure programs for improving climate change adaptation programmes. Suba Sub County has been hit repeatedly by a number of climate change mediated extreme weather events in recent years. This study was undertaken to investigate climate change adaptation strategies in the Sub County. A cross sectional study design was used and both qualitative and quantitative approaches were used in data collection. A critical analysis of the gender differentiated responsibilities in the Sub County showed that climate change may impact men's agricultural and livestock activities and women's ability to get firewood and safe domestic water. Community perception of climate change mediated extreme weather events showed that; (i) grain prices increase during drought (ii) clean domestic water become scarce (iii) small businesses are affected (iv) livestock health deteriorate (v) grazing fields get flooded or become dry (vi) there is decrease in farm produce. Additionally, participatory problem analysis of climate change mediated extreme weather events showed logical linkages of climate change adaptation to community health and livelihood status. The logical linkages explain how the series of events lead to the cry by the community that "life in Suba is difficult". A critical assessment of climate change adaptation status can ensure that gender issues are addressed and women are able to voice their needs and designing adaptation projects to acknowledge and work within the prevailing dynamics.*

Keywords— *Climate change adaptation, Community health, Participatory problem analysis.*

I. INTRODUCTION

Communities, being at the frontline of climate impacts, possess unique insights and experiences that are critical in developing resilient and sustainable adaptation practices [1]. The diversity of these community responses reflects the varied geographical, cultural, and socio-economic contexts, highlighting the need for tailored approaches in climate change adaptation programmes. Despite climate change being increasingly recognized as a global crisis, there remains a large gap in understanding the specific adaptation strategies that communities use and their effectiveness. This gap is particularly evident in the limited empirical research focusing on the intersection of community-led adaptation initiatives and sustainable social development [1]. Assessment of community health status usually incorporate community perception of the prevailing health challenges [2]. Perception of poor quality of life occurs where there is a feeling by the community members that there is too much of an adverse health condition [3]. Understanding intrinsic and extrinsic factors in the

community can help structure programs for improving community health and climate change adaptation programmes [4]. Community perceptions are beliefs that the residents have about their quality of life. These perceptions have been found to be important determinants of behaviour and have been associated uptake of climate change adaptation and community health programmes [5]. The first step in preparing to develop a community health program is identification of community needs and priorities [6]. The capacity of local communities to minimize adverse health effects through adaptation is partly a function of social capital. Climate change adaptation should take place at the individual, family, community, and government levels. Factors that influence community climate change adaptation efforts include government or non-governmental organisations support, and community behaviour [7].

Climate change adaptation and community assessment can help determine where and how to use limited resources to in the community projects [8]. Rural communities may have limited resources to address many prevailing and competing challenges in the community. Research and needs assessments therefore helps to determine where and how resources may best be focused.

Suba Sub County has been repeatedly hit by a number of climate change mediated extreme weather events in recent years leading to loss of livelihood and increasing disease morbidity in the area. The objective of this study therefore was to understand climate change adaptation and community health challenges in Suba Sub County, Kenya. Specifically, the intention was to understand the climate change adaptation practices by the residents to inform future interventions.

II. MATERIALS AND METHODS

Location and population of Suba Sub-County

The geographical coverage for Suba Sub County is 80 km². The area lies between 34°06"E (Longitude) and 35°11"E, and latitudes 0°07"N and 0°20"S. The Sub County borders Lake Victoria to the North-West, Migori County to the South and Ruma National Park to the West. It does not have any permanent river flowing through it. Consequently, the main sources of water are boreholes and the Lake Victoria. The area experiences frequent windstorms. According to 2019 Kenya population and housing census report the population of Suba Sub county was 155,666 of which male are 75,167 and female were 80,499 (9). Approximately 70% of the residents of Suba Sub County do not have safe drinking water. Cases of

waterborne diseases are therefore common with enteric disease prevalence of around

Study design

A cross sectional study design was used. There was a combination of qualitative and quantitative methods.

III. RESULTS

Economic activities in Awasi by gender

The main activities identified in Suba Sub County were; fishing, livestock husbandry, agriculture, Craftsmanship, business trade micro-businesses and sand harvesting from the lake. A critical analysis of gender-differentiated responsibilities in the county showed that climate change can affect the agricultural and livestock activities of men, while women can feel climate change due to lack of firewood and vegetables. Table 1 shows gender differentiated responsibilities in Suba Sub County, Kenya.

TABLE 1. Distribution of gender differentiated responsibilities economic activities in Suba Sub County by gender

Main Activities	Men	Women
Livestock	• Grazing animals	• Watering and feeding of calves
Agriculture	• Oxen ploughing • weeding • Harvesting maize	• Seeding and weeding • Harvesting sorghum • Vegetable planting
Craftsmanship	• Carpentry and Masonry • Brick making	• Dress making • Making mats
Business trade	• Shop keeping • Livestock traders	• Small businesses (selling fish) • Selling second hand clothes
Exploitation of natural resources	• Charcoal burning	• Collecting firewood
Fishing	• Fishing • Selling fresh fish	• Frying, smoking, and selling fish

Analysis of community perception of the impacts of drought in Suba Sub County

Six issues were identified by the participants, namely; (i) increase in grain prices (ii) lack of clean domestic water (iii) effect on small businesses (iv) impact on livestock health (v) effect on grazing fields (vi) decrease in farm produce.

Drought was said to drive the price of grain in the market, reduce farm produce and affect livestock health. Safe domestic water was said to become scarce during drought. The participants also Livestock pastures disappear and small businesses suffer due to shortage of money by the residents to spend. Figure 1 shows the participants perception of the impacts of drought in Suba Sub County.

Participatory listing and ranking of severe climate related events in Suba Sub County

Listing and ranking of severe climate related events according to the results of FGDs were;

- Drought,
- Livestock diseases,
- Domestic water
- Diarrhoea in children

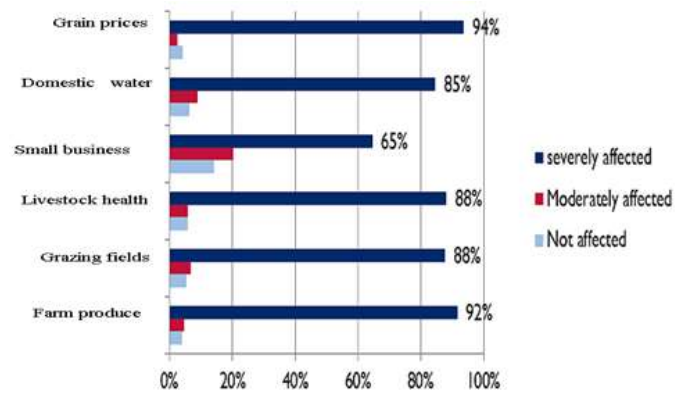


Figure 1. Community perception of the impacts of drought in Suba Sub County

Figure 2 shows the ranking of the participants’ perception of ranking of severe climate related events in Suba Sub County.

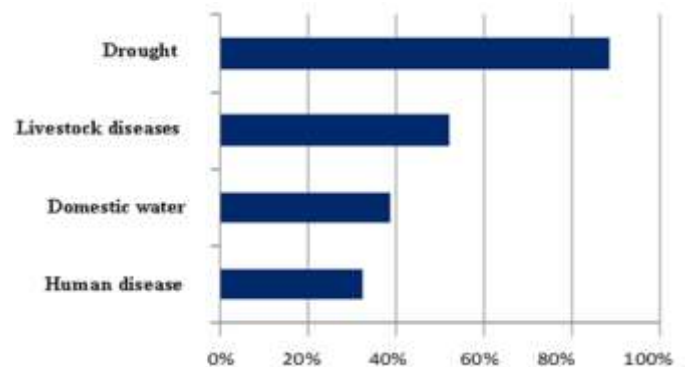


Figure 2. Ranking of the participants’ perception of ranking of severe climate related events in Suba Sub County.

Participatory problem analysis of climate change mediated extreme weather events in Suba Sub County

Participatory problem analysis of climate change mediated extreme weather events demonstrated logical linkages of climate change adaptation to community health and livelihood status in Suba Sub County. The logical linkages explain how the series of events lead to the common threads from the themes which make the community perceive life to be difficult.

The logical linkages explain how the series of information gathered from the community members lead to the common threads from the themes and FGD questions. The community identified three major issues major issues driven by a number of factors inked to climate change mediated extreme weather events in Suba Sub County. The issues were; low income, inadequate food supply and Child sicknesses. Other factors contributing to inadequate food included; poor harvest, lack of vegetables, malnutrition, death of livestock and poor access to roads were also mentioned. Figure 3 below shows participatory problem analysis of community health and development in Suba Sub County.

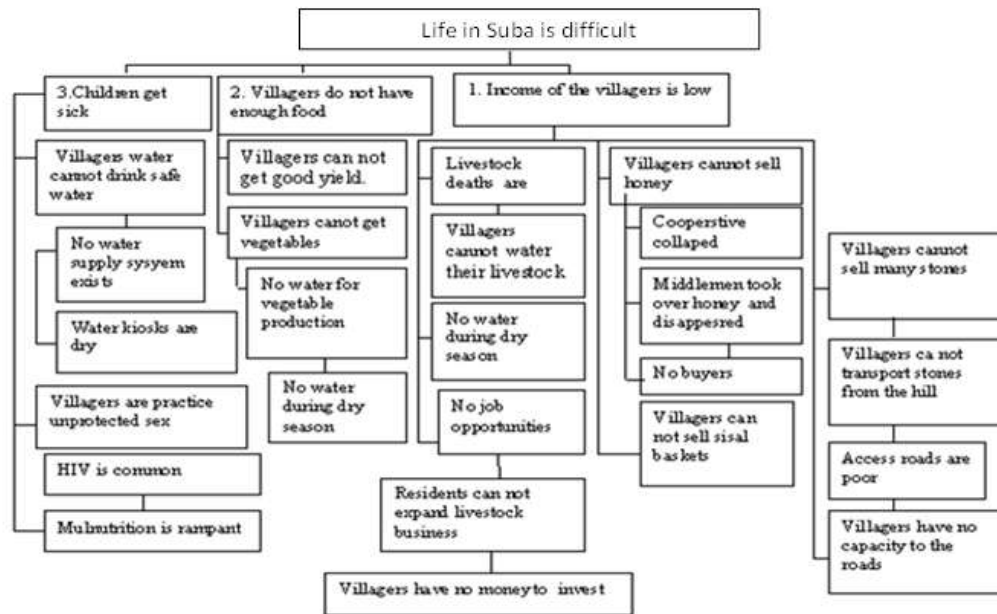


Figure 3: Participatory problem analysis of climate change mediated extreme weather events in Suba Sub County

Knowledge, attitude and practice towards climate change adaptation practices in Suba Sub County

Assessment of knowledge, attitude and practices of the participants revealed that they had very poor knowledge of climate change adaptation practices. They also perceived agribusiness loans as risky to take. The results showed that the residents of Suba Sub County have rigid traditional agricultural practices. Some local cultural practices were found to discourage climate change adaptation e.g women are not allowed to start planting before the village elders. A summary of the participatory KAP analysis of Sub County is shown in table 2 below.

TABLE 2. Knowledge, attitude and practice towards climate change adaptation practices in Suba Sub County

Knowledge	Attitude	Practice
<ul style="list-style-type: none"> Poor knowledge of adaptation practices Poor knowledge of water conservation Poor knowledge of the role of NGO and CBOs supporting adaptation projects in the area 	<ul style="list-style-type: none"> Community perceive agribusiness loans as risky Believe County Institutions are corrupt and cannot support them Believe resources are given selectively by both NGOs and government Institutions 	<ul style="list-style-type: none"> Rigidity in traditional agricultural practices Social cultural practices which fight adaptation e.g women are not allowed to start planting before the village elders Planting crops thrice a year Dependence on traditional farming methods (manual labour) Practice small scale groundnut, maize and sorghum farming Keep large herds of local cattle

Livelihood and coping practices of the residents of Suba Sub County

The community coping mechanism was assessed by analysing “Before”, “During” and “After” an extreme weather event. The findings showed that the community had various adaptation methods. All the activities during the three phases of disaster are undertaken as normal community practises as shown in table 3 below.

TABLE 3. Households coping mechanism in Suba Sub County

Community-level Coping behaviour	Drought		
	Before	During	After
Action by the community	<ul style="list-style-type: none"> Small business – vegetables, fish trade, Sale of small stock and chicken Exchange of farm produce for other preferred cereals and commodities 	<ul style="list-style-type: none"> Small businesses Charcoal burning and sale of firewood Reduction in the number of meals taken per day. Water vending Manual work 	<ul style="list-style-type: none"> Farm preparation Planting of subsistence’s crops-maize, sorghum Small business – vegetables, fish trade

Agricultural coping practices in Suba Sub County.

The following were listed by the participants’ activities often undertaken as coping mechanisms during extreme weather events, as shown below.

- Introducing drought resistant crops
- Introducing small livestock (sheep and goats)

- Planting fruits trees
- Grazing near lake shore
- Selling livestock
- Planting vegetables near lake shore

- Planting tuber crops

Figure 4 shows a summary of the Agricultural coping practices in Suba Sub County.

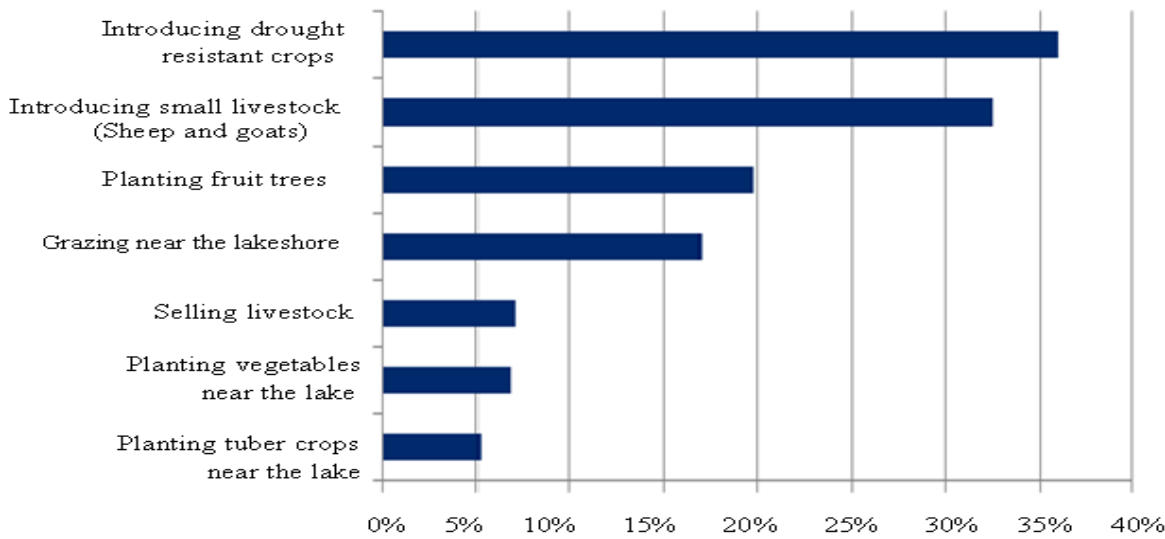


Figure 4: Agricultural coping practices in Suba Sub County

TABLE 1: Climate change adaptation needs of the residents of Suba Sub County

What do you think should be done to improve community health and livelihood and climate change adaptation in Suba Sub County?	Adaptation needs	Respondents
	Provide safe water	13(13.97)
	Provide farm tractors	1 (1.07)
	Create youth employment	2 (2.15)
	Build health centres	10 (10.75)
	Expand rural electrification	1 (1.07)
	Improve irrigation	9 (9.67)
	Create market linkages	9 (9.67)
	Improve road network	1 (1.07)
	Provide livestock drugs	1(1.07)
	Provide livestock drugs	9(9.67)
	Provide safe water	16(17.20)
	Build health centres	7(7.52)
	Build youth training centres	22 (2.15)
	Expand rural electrification	22 (2.15)
	Provide water pans	1(1.07)
	Create youth training / employment	5(5.37)
	Improve road network	3(3.22)
	Create market linkages	1(1.07)
		93

Sources of information on climate change in Suba Sub County

Out of the ninety three (44%) participants said they have heard about climate change from local FM radio stations, 20.4% heard it from newspapers, 31.2% from agricultural extensionists and 4.3% in public forums.

TABLE 5: Sources of information on climate change in Suba Sub County

Source of information on climate change	Respondents	% Score (n =93)
Radio (local FM stations)	41	44
Newspapers	19	20.4
Agricultural extension	29	31.2
Public forums	4	4.3

Weaknesses and challenges of public institutions and NGOs involved in community development in Suba Sub County

For the purposes of this evaluation, institutions were grouped into the following categories.

- (i) Governmental departments
- (ii) Non-governmental organisations (NGOs), community-based Organisations, Faith Based Organisations
- (iii) Research institutions.

The key weaknesses identified in all the institutions are poor accountability and transparency in resource allocation and utilisation of their grants. However, their main challenge is low level funding which does not enable them deliver

services effectively. Table 47 below gives the overall assessment of strengths weaknesses/challenges of the public

institutions and other development agencies working in the study area.

TABLE 6. Weaknesses and challenges of public institutions and NGOs involved in community development in the LVB, Kenya.

Institution/ Organisation	Weaknesses	Challenges
Government departments	<ul style="list-style-type: none"> • Some county government departments have very limited or no staff at the community level • Limited facilities (equipment, vehicles, office space, etc.) • Poor attitude and perceptions of government field staff towards the new devolution system • Poor documentation of community activities • Poor accountability and transparency in resource allocation and utilisation by county government institutions 	<ul style="list-style-type: none"> • low level of funding which does not enable them deliver services effectively
NGOs ,CBOs and Faith Based organizations	<ul style="list-style-type: none"> • Organisations have small areas of coverage in relation to the community needs • CBOs have limited skills and facilities to effectively undertake community projects • Organisations have role conflict in the community (i.e the NGO carrying out the similar activities in the area) • Poor documentation by some CBOs • Limited accountability and transparency in resource allocation and utilization by the local NGOs and CBOs • Weak organisational and management skills in the CBOs • Faith-based organisations serve small areas 	<ul style="list-style-type: none"> • Farmer and other potential beneficiaries’ have no interest in the NGOs adaptation initiatives • Difficulty in attracting big funding • Negative attitude of the community towards NGOs sponsored projects (i.e that they should be freely assisted)
Research institutions	<ul style="list-style-type: none"> • Poor dissemination of agricultural technologies • Poor engagement with farmers and mother beneficiaries 	<ul style="list-style-type: none"> • Difficulty in attracting big grants for climate change adaptation.

IV. DISCUSSION

Community health status and climate change adaptation assessment demonstrated a bottom up approach to planning practices. It proved that the inhabitants understood their priorities. This observation is consistent with that of Haldane et al. [2019]. Participatory problem analysis of community health and development perception in Suba Sub County, Kenya generated logical linkages which explain how the series of events lead to the cry by the community that “life in Suba is difficult”.

V. CONCLUSION

A critical assessment of climate change adaptation at community level will ensure that gender issues are addressed and vulnerable population are able to voice their needs.

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