

Community Practices and Gender Dynamics in Drought and Flood Risk Management in Arid South Eastern Kenya Region

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ABSTRACT

Droughts and floods are recurrent climate hazards in arid and semi-arid lands (ASALs), significantly affecting livelihoods, food security, and water availability, particularly in sub-Saharan Africa. This study examines community practices and gender dynamics in drought and flood risk management in Ikanga-Kyatune ward, Kitui County, Kenya. The study seeks to (i) analyze community-based practices used in drought and flood risk management, (ii) characterize gender roles and power relations in drought and flood risk management and (iii) describe the drought and flood risk support systems available to the community. A cross-sectional research design was employed, using qualitative methods to collect data from 63 households through interviews and participant observation. The findings reveal that droughts are frequent, occurring approximately every two years, while floods are relatively rare. The major impacts of drought include water scarcity and crop failure, whereas floods cause localized damage. Communities have developed various adaptation and coping strategies, with water harvesting and crop diversification identified as the most widely practices. Women, boys, and girls are primarily responsible for implementing coping strategies. In contrast, men dominate decision-making processes, particularly regarding financial resources. Access to drought and risk support systems is limited, with radio serving as the main source of information. The study concludes that water harvesting and crop diversification are the most common community practices adapted to manage droughts while flooding events are not very common. Community groups are at the center in managing droughts and floods. The study recommends integrating indigenous and scientific knowledge in drought and floods prediction, strengthening community training, and promoting gender-inclusive decision-making in disaster risk management.

Keywords: Community practices; adaptation, coping; disaster risk; livelihoods

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1.0 Introduction

Drought is one of the most devastating but least understood weather phenomena, largely because of its slow onset and its accumulating impacts over time (Opiyo *et al.*, 2015). Droughts are successively classified

as either meteorological, hydrological, agricultural, or socioeconomic as they advance in evolution (Wang *et al.*, 2025). Flood is a condition that occurs when water overflows the natural or artificial confines of a stream or other body of water, or accumulated by drainage over low laying areas (Otuya and Ochieng, 2018).

Droughts and floods are common occurrences in arid and semi-arid lands (ASALs) around the world, and more so in the horn of Africa where they have become more frequent lately (Nicholson, 2014). In these areas rainfall is highly variable, unpredictable, and often extreme. In these regions, prolonged dry spells frequently alternate with short periods of intense rainfall, resulting in recurrent water scarcity as well as flash floods that damage infrastructure, crops, and livelihoods. The increasing variability associated with climate change has further intensified the frequency and severity of these hazards, undermining household resilience and deepening vulnerability among already marginalized populations. In countries such as Kenya, particularly in the arid and semi-arid counties of the south eastern region, droughts and floods significantly affect food security, livestock production, water access, and socio-economic stability. These recurring climate extremes not only strain natural resource systems but also expose underlying social inequalities. In Kenya, riverline flooding is the most common even though ASALs are quite vulnerable to flash flooding (Otuya and Ochieng, 2018)

Communities in ASAL areas of Kenya have over time perfected practices to predict, cope and manage droughts and floods through a combination of indigenous knowledge and adaptive livelihood strategies. Elders and local knowledge holders traditionally observe environmental indicators such as animal behavior, wind patterns, flowering of specific tree species, and the position of stars to forecast impending droughts or heavy rains. During drought periods, households diversify livelihoods through livestock mobility, drought-resistant crop varieties, water harvesting, food storage, and reliance on social support networks. In times of floods, communities construct temporary drainage channels, elevate granaries, relocate livestock to higher ground, and engage in collective action to protect shared resources. These practices are often embedded within cultural norms and social institutions, enabling communities to reduce risk and enhance their resilience.

Droughts and floods have a gender dimension as they do not impact men and women equally. In many ASAL communities, socially constructed gender roles determine access to resources, division of labor, and decision-making power, which in turn shape vulnerability and adaptive capacity. Women, who are often responsible for water collection, food preparation, childcare, and small-scale farming, tend to experience increased workloads

during droughts as water sources dry up and food becomes scarce. Floods may further expose women and girls to safety risks, displacement, and disruptions in education and health services. At the same time, men particularly those engaged in livestock herding or wage labor may face economic pressure, migration stress, and loss of productive assets. Unequal access to land ownership, credit facilities, climate information, and leadership structures often limits women's participation in formal risk management processes.

The droughts and floods risks and community responses in ASALs have been complicated by increasing climate change and variability occurrences and changing community norms. Communities must quickly change and adapt to the changing scenarios as they shape how different groups experience risk and respond to them. To obtain a comprehensive understanding of the changing drought and flood risk management in ASAL communities, we conducted a field survey to interact with communities living the experiences. Understanding these community practices and their gendered differences is essential for designing inclusive and effective drought and flood risk management strategies in arid and semi-arid regions. The objective of this paper is to examine how community practices and gender dynamics influence drought and flood risk management in arid South Eastern Kenya. Within this context, the specific aims of this study are; (i) analyze community-based practices used in drought and flood risk management, (ii) characterize gender roles and power relations in drought and flood risk management and (iii) describe the drought and flood risk support systems available to the community.

2.0 Materials and Methods

2.1 The study area

The study area is Ikanga-Kyatune ward located in Kitui county, Kenya about 220 km East of Nairobi, and it straddles the Kitui - Kibwezi highway and covers an area of 491 Sq km. (Figure 1). The altitude is about 850 m above sea level. The average yearly rainfall for Kitui is around 1000 mm with large local differences. The rainfall pattern is bimodal consisting of "long rains" between March and May, while the "short rains" season occurs between October and December. The vegetation of the study area is described as Somalia-Masai Acacia Commiphora deciduous bushland and thicket within the Somalia-Masai ecoregion dominated by *Commiphora spp*, *Acacia spp* and *Adansonia digitata L*.

The population of the area is 37, 540 people spread over an area of 473.6 square kilometers, yielding a density of 79 persons per square kilometer. Settlement patterns are predominantly dispersed and rural, favoring foothills for deeper soils suitable for farming. Poverty levels stands at 70% making the area among the poorest in Kenya.

2.2 Research design and data collection

In order to meet the data requirements of the objectives, a cross-sectional survey was done where qualitative data was collected. Interview schedules were used to collect data from households. The study targeted the household heads and in case they are unavailable the next available adult member of the household was interviewed. The respondents were systematically sampled after every 200 meters starting from the main road and moving in a straight line to the East and west across the breadth of the ward. In total 63 households were sampled. The interviews centered on experiences, community practices, gender roles and access to information and support in drought and floods risk management. Interview data was supplemented by participant observation.

2.3 Data analysis

The questionnaire data was analyzed using descriptive statistics. Percentages and proportions were presented using pie charts and bar graphs.

3.0 Results and Discussion

3.1 General results

(a) Population sampled

A total of 63 household was sampled in Ikanga-Kyatune ward. The gender representation of the respondents was equal as out of these 32 were female and 31 were males. Figure 1 below shows the composition of the respondents.

When grouped by age most of the respondents were above 35 years old indicating their long stay and experience with droughts and floods in the area. Figure 2 show the age distribution of respondents.

At least half of the respondents (49%) are literate as they have attained secondary and post-secondary level of

education. Figure 3 shows the level of education of the respondents.

Most of the respondents (40%) depend on agropastoralism as a source of livelihood closely followed by small businesses while only less than 5% depend on casual labour as shown in figure 4 below.

Nearly all the respondents (95%) have lived for more than 10years in Ikanga Kyatune ward and have experienced frequent droughts. While every respondent has experienced drought, only 11% have experienced floods. Those who experienced droughts described it as frequent (once in every 2 years) while those who experienced floods described them as rare (once in 10 years). Figure 5 below shows the length of time the respondents have lived in the area and their experiences with floods.

(b) Impacts of drought and floods in the study area

The main impacts of drought was identified as water scarcity and crop failure while loss of human life was least mentioned. 2% of the respondents reported loss of human life related to drought which shows the gravity of the mater. Figure 6 below shoe the various effects of droughts identified in the study area.

3.2 Community based practices in drought and flood risk management

(a) Drought and floods adaptation and coping strategies

A number of drought adaptation and coping strategies are practiced by the community. Water harvesting and crop diversification are the most widely used adaptation strategies practiced by all the respondents while waiting to receive relief food is the least practiced strategy. Figure 7 below shows the strategies commonly used by the community.

Even though two drought coping strategies were identified in the study, they are not popular as they are practised by a small percentage of respondents. Livestock mobility as a coping strategy is not popular due to a number of reasons. One, when droughts occur they cover an entire area and thus pasture is not available over vast areas, thus moving them may not yield much positive

results. Two, land in the study area is individually owned and three the present community structures are not favourable for such undertakings. This finding agrees with Opiyo *et al.*, (2015)

Engaging in off farm income generation activities such as employment and businesses is a popular adaptation strategy. This is because they are regarded as non-climate sensitive activities and not vulnerable to vagaries of drought.

Floods are not very common in the study area although a few respondents have experience them. Cutting drainage channels is the most popular method of coping while relocation is the least common method. Figure 8 below shows the main flood coping strategies employed in the study area.

(b) Indigenous and traditional methods of drought prediction

Very few of the respondents (14%) are familiar with traditional methods used to predict drought while the majority are not as shown in figure 9 below. The signs that drought are coming includes observing birds' movement and behavior, the position of the moon, trees behavior e.g. high production of Ukwaju (*Tamarindus indica*) and Mabuyu (*Adansonia digitata*) is an indicator of impending droughts. Others use the sound of insects such as millipedes as an indicator of droughts. Other respondents indicated that certain cloud patterns indicate drought. The results from this study show similarities with those from a study carried out by Kipkorir *et al.*, (2011), whose results revealed indicators such as flowering of Sirioch tree species (*Bothriocline fusca*), observation of wind flow direction, migration of birds and shading of leaves by some trees, are used to predict the onset of rains in Nandi and Keiyo counties in Kenya.

The low percentage of respondents who are aware and rely on indigenous methods of drought prediction that either the knowledge is disappearing or not reliable. This finding is in line with Lolemtum *et al.*, (2020) who reported that many of the respondents in a study area in West Pokot relied on the meteorological department for any information concerning the characteristics of droughts and rain. The study also indicated that many of the respondents relied on the conventional sources of

early warning systems as compared to those who understand the use of indigenous knowledge.

c) Effectiveness of drought and flood management strategies

The community flood and drought management strategies are very effective. 89% of the respondents attest that community practices have managed droughts and floods effectively while only believe otherwise as shown in figure 10 below.

Community groups are at the fore-front of drought and flood managements with 70% of the respondents affirming that communities are involved in drought and flood management. The groups involved include the self-help groups, farmer groups and religious groups as shown in figure 11 below.

These groups are involved by trainings farmers on good farm practices, fighting droughts and floods together, supporting one another through merry-go-rounds, loaning money to support households, helping in digging trenches to controls soil erosion, offering moral and psychological support etc.

3.3 Gender roles and power relations in drought and flood risk management

Women, boys and girls play a big role in flood and drought management while men play a minor role. They are in charge of water fetching and rationing (figure 12a), food preparation, storage and rationing during droughts (figure 12b) and for caring for the children, the sick and the aged during droughts and floods as shown as shown in figure 12 © below

During droughts and floods episodes, men (88.6%) make most of the decisions on how income will be spent as compared to only 13.1 of the women. Only 3.3 of the households make have men and women making decisions jointly as shown in figure 13 below

Men and women face different challenges in managing droughts and floods (Figure 14). The greatest challenge to women is heavy household chores while for men its income.

Photo.1 The location of the study area

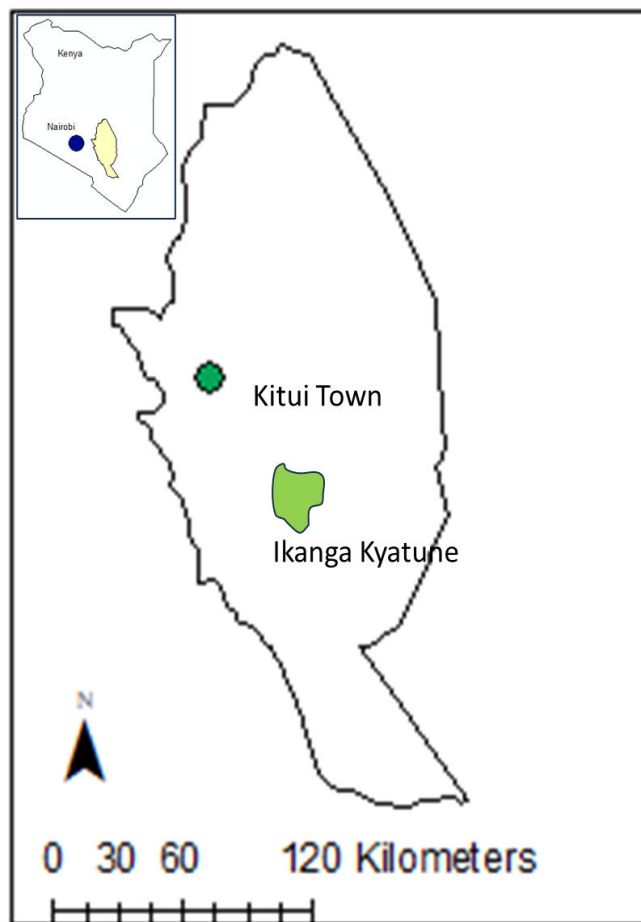


Figure.1 Gender of the respondents in Ikanga-Kyatune ward

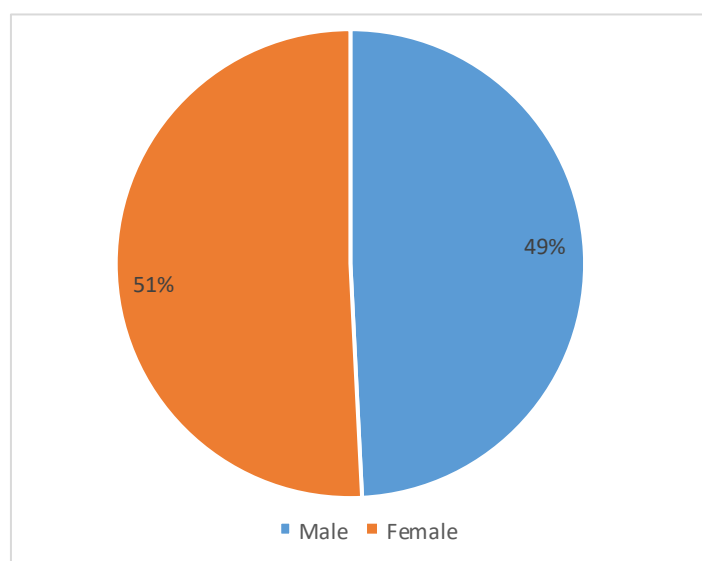


Figure.2 Age groups of the respondents

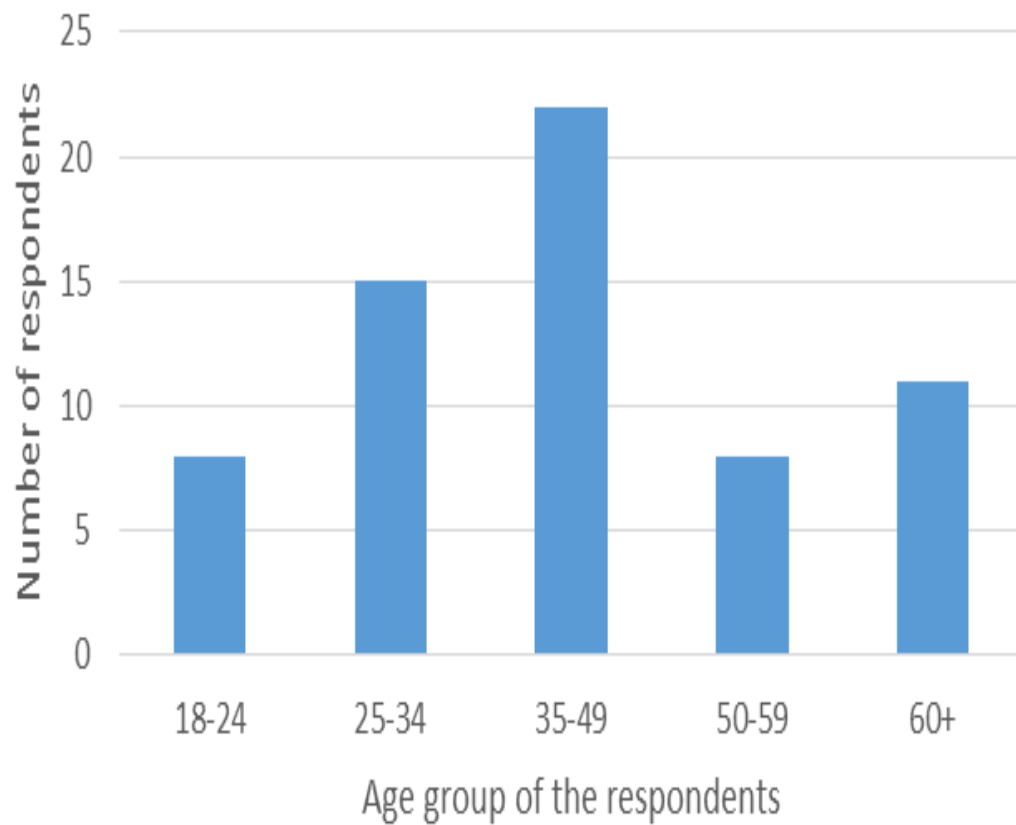


Figure.3 Education levels attained by the respondents

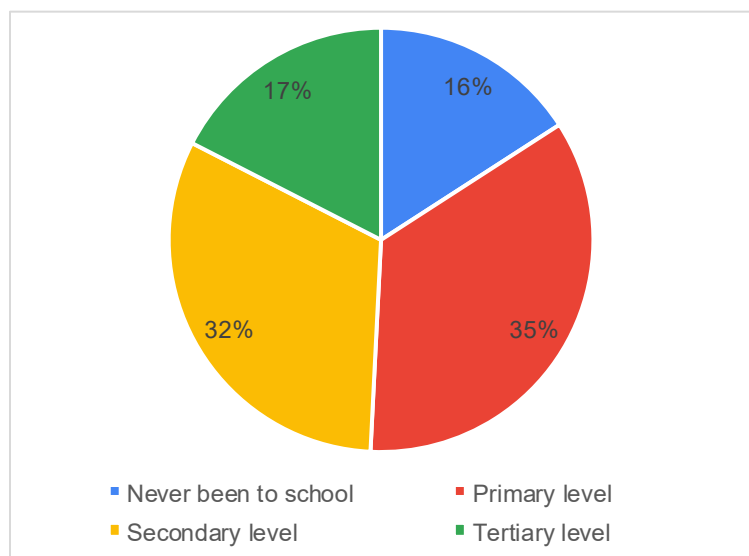


Figure.4 Livelihood options for respondents in Ikanga-Kyatune ward

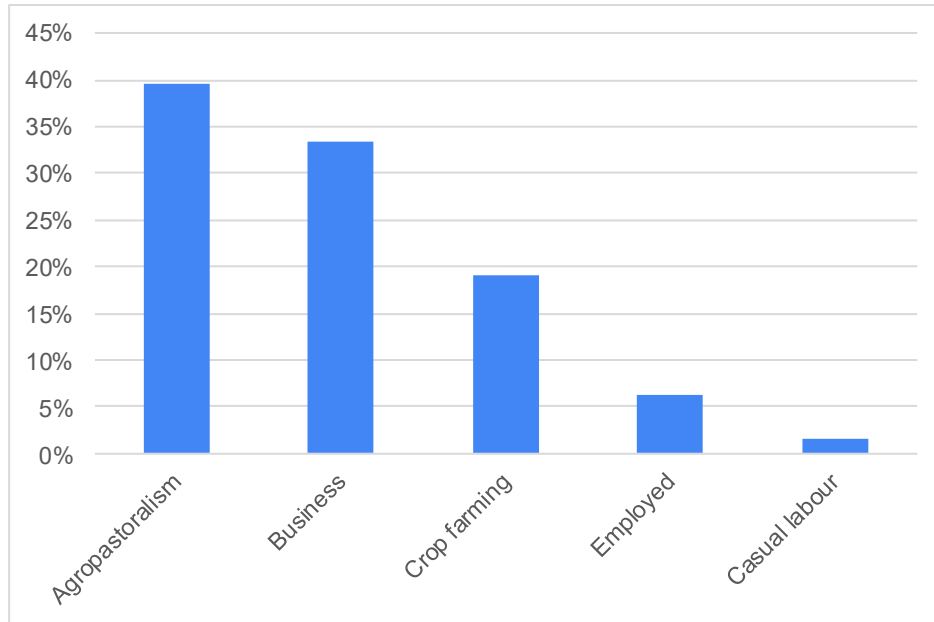


Figure.5 Length of time the respondents have lived in the area (a) and (b) experiences with floods

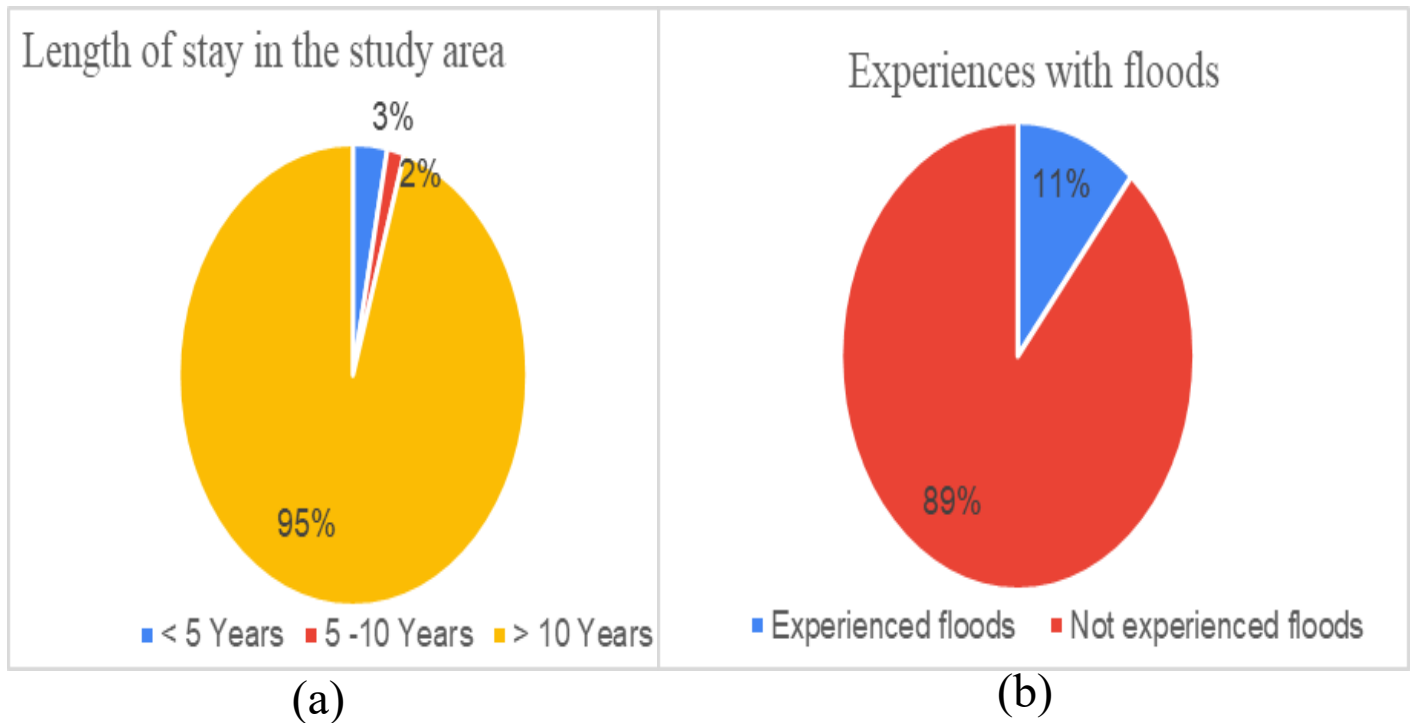


Figure.6 Impacts of drought

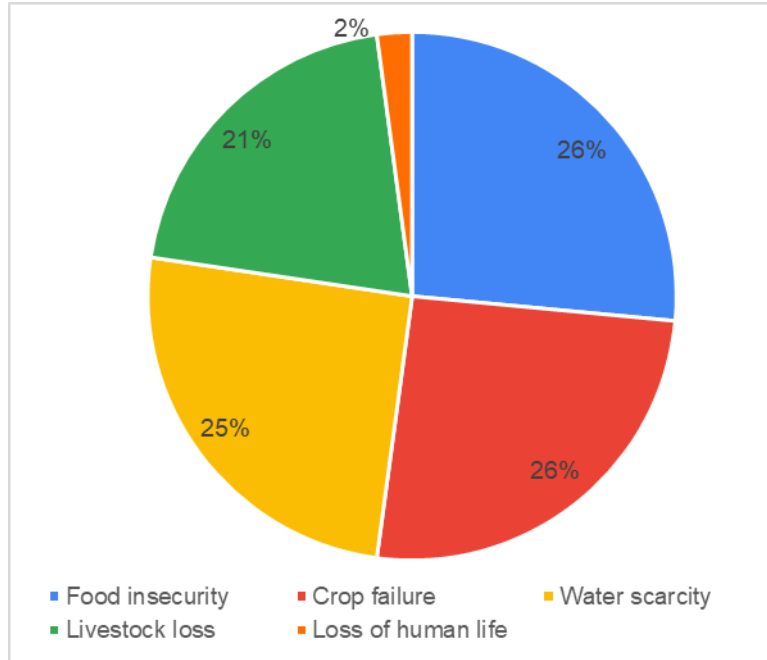


Figure.7 Drought adaptation and coping strategies used by the community in Kitui South

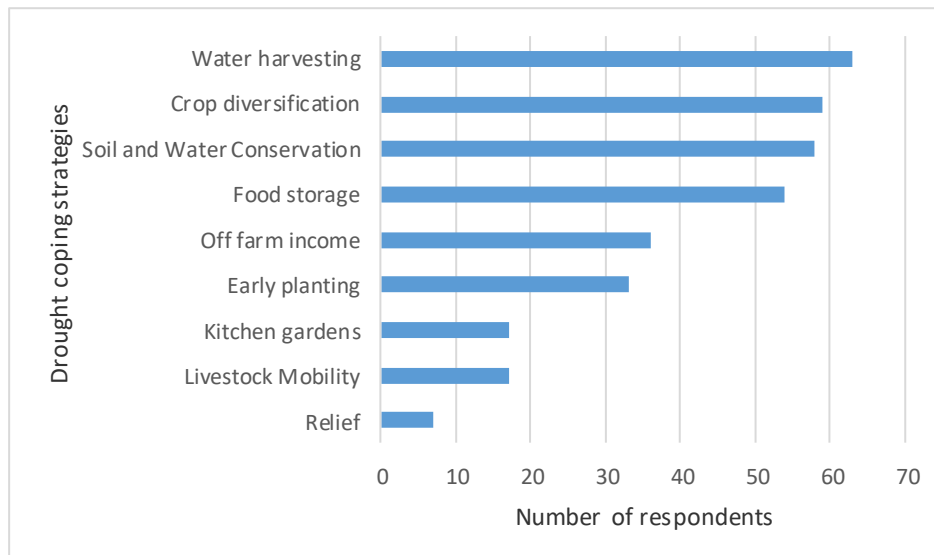


Figure.8 Flood adaptation and coping strategies in Kitui South

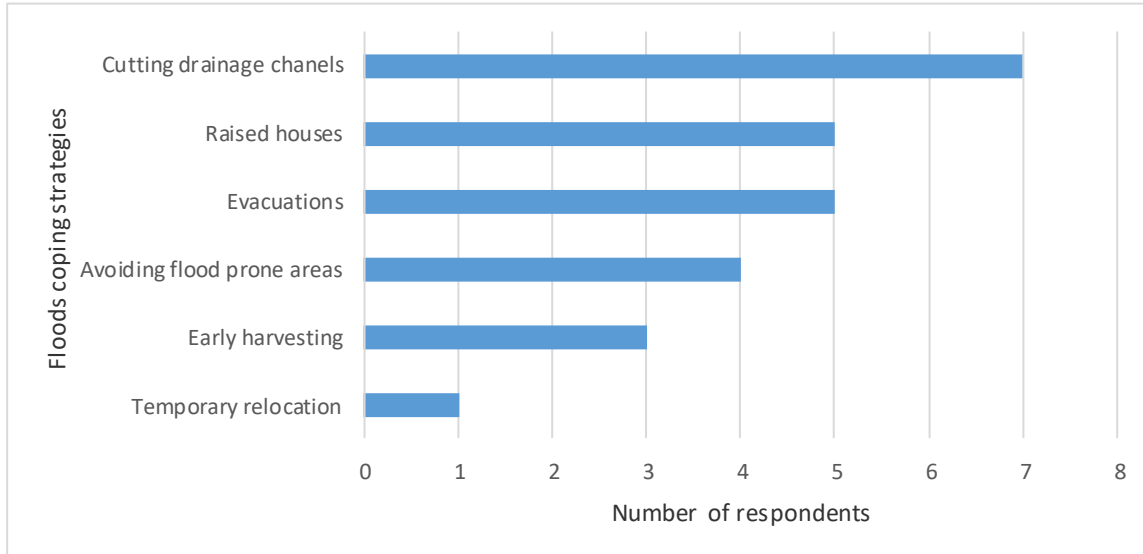


Figure.9 Awareness on indigenous practices used to predict drought

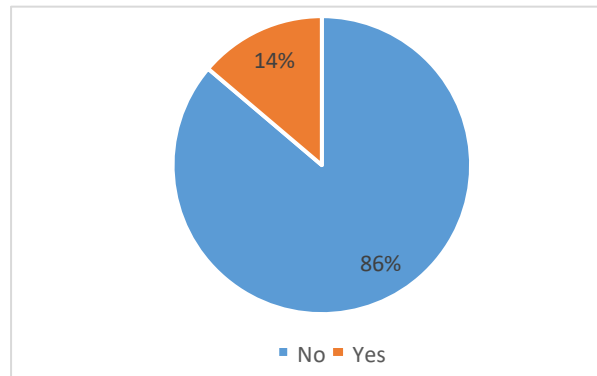


Figure.10 Effectiveness of community practices in drought and floods management

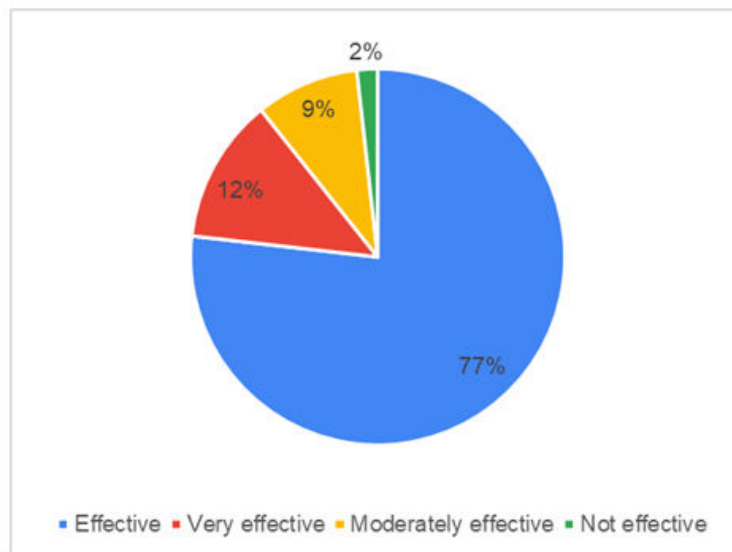


Figure.11 Community groups involved in droughts and floods management

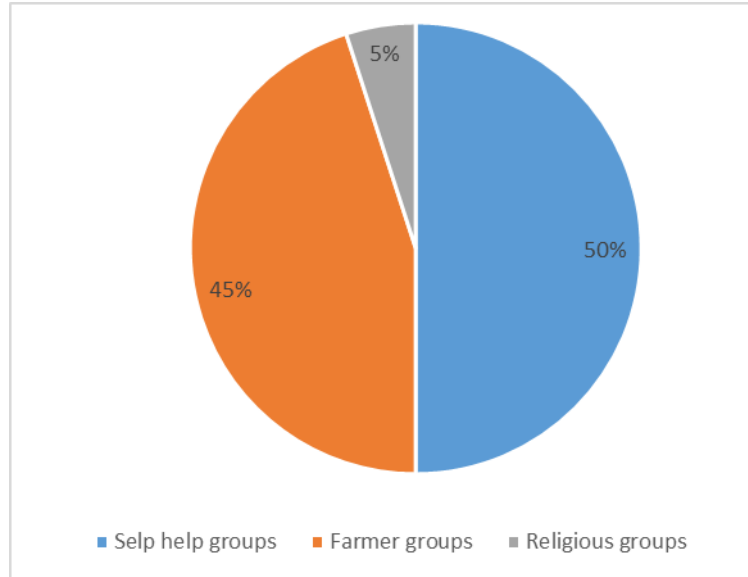


Figure.12 Roles of different gender groups

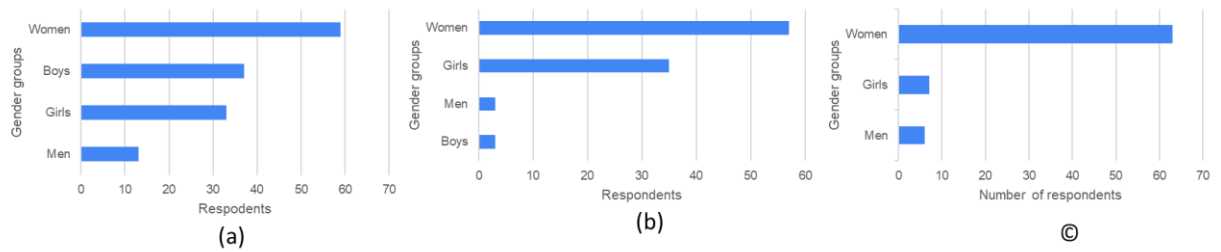


Figure.13 Decision on household incomes during droughts and floods

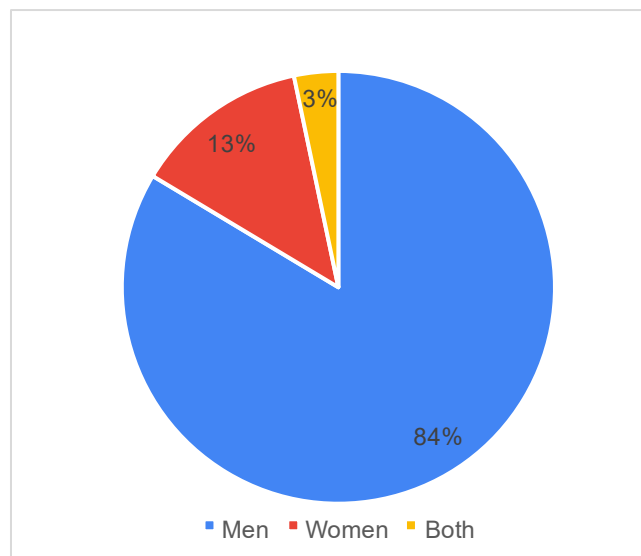


Figure.14 Challenges faced by both men and women in managing droughts and floods

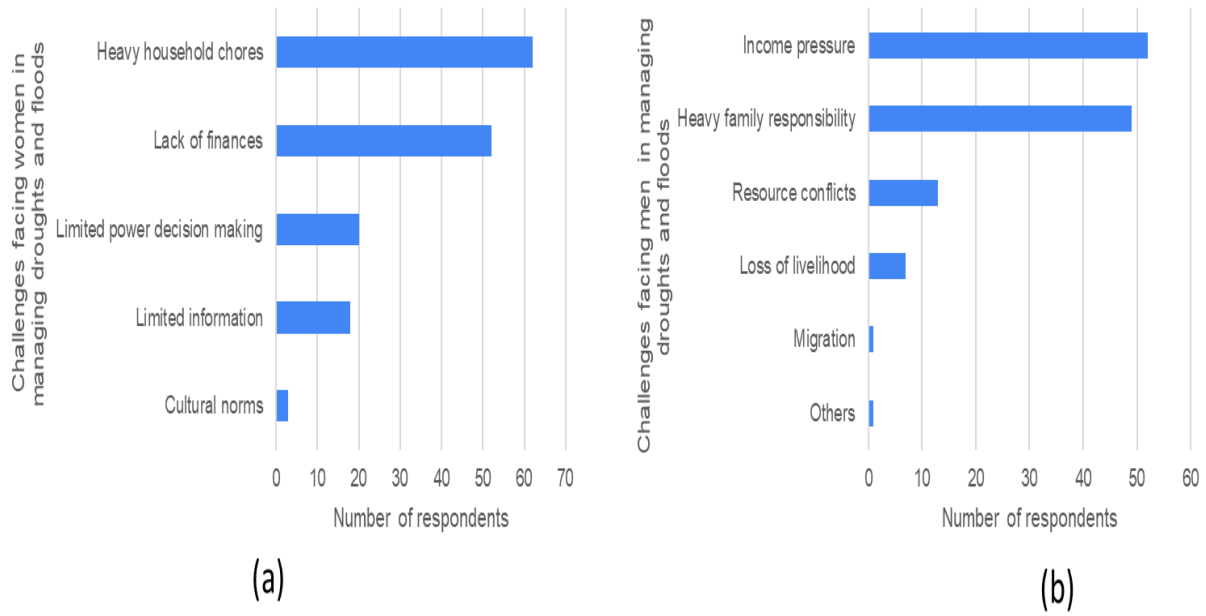


Figure.15 Sources of information on drought and floods

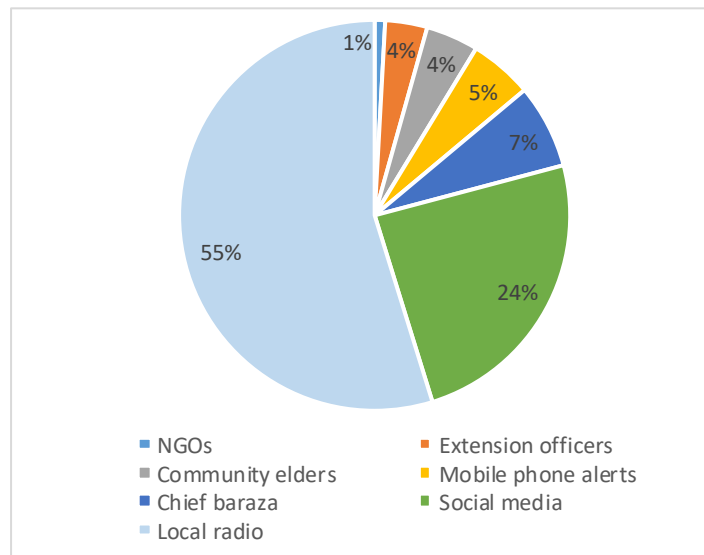


Figure.16 Training on drought and floods

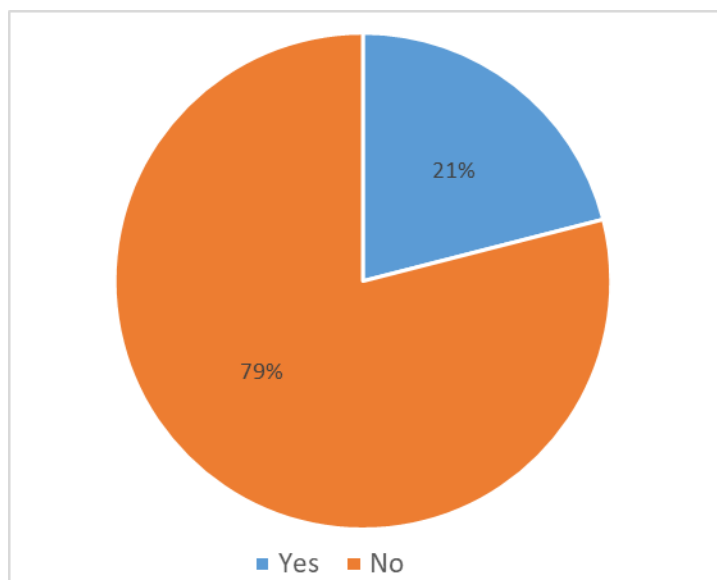


Figure.17 Critical roles during droughts and floods

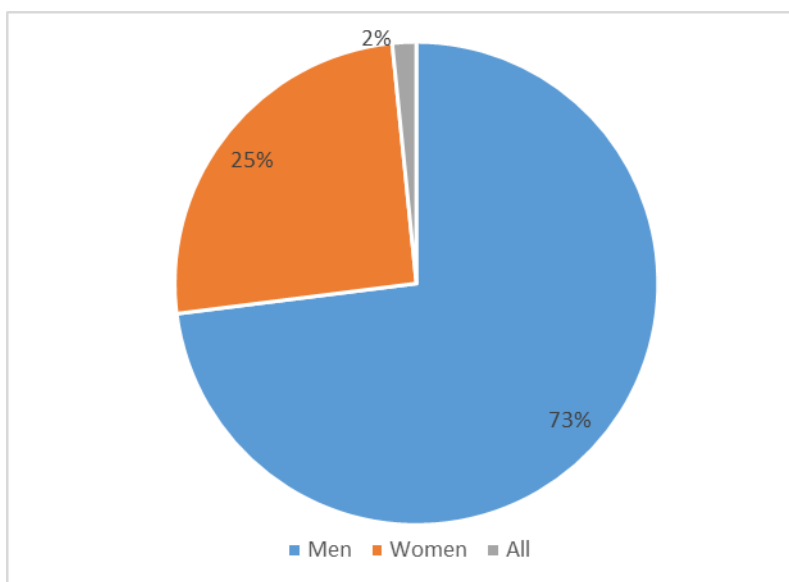
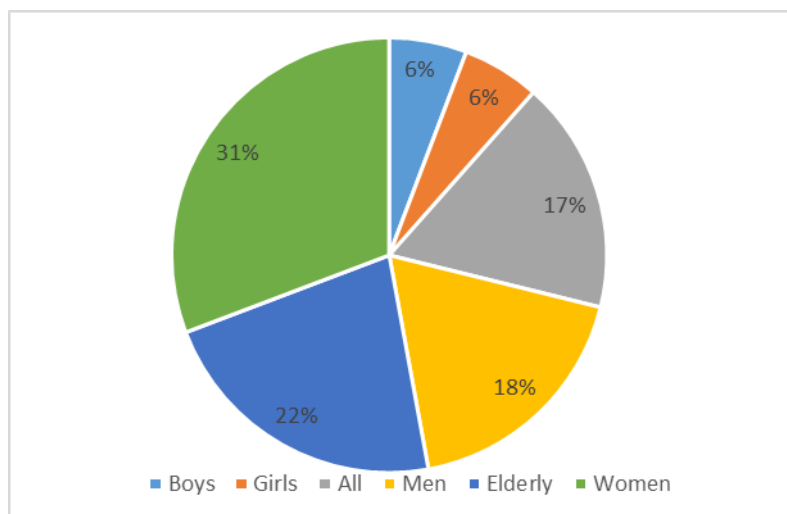


Figure.17 Vulnerable to droughts a flood while boys and girls



Cultural norms are a minor challenge for women as they manage droughts and floods. Migration is also a small challenge to men as they manage droughts. This finding reflects similar findings in literature.

[Nilmi and Thoradeniya \(2018\)](#) found out that women's roles as mothers and housewives limit their opportunities participating in political decision-making representing masculinity features.

Many societies across the world expect women to engage in childbearing, caring, and household work, which limits time for engaging in social activities ([Nilmi and Thoradeniya, 2018](#); [Yadav et al., 2021](#)).

3.4 Drought and flood risk support systems

Various sources of information on drought and flood were identified. Local radio was identified as the biggest source of information while NGOs were least important as source of information as shown in figure 15 below. This is not surprising as according to the Media Council of Kenya-, 74 percent of Kenyans listen to radio ([Agalo, 2023](#)).

Majority of the respondents (79%) did not have had any training on drought and floods management as shown in figure 16 below. The few who received training were trained by CBOs, and research institutions. On the question of whose role is more critical in drought and flood management, 73% of the respondents believe that men's role is very crucial as compared to 2% who

believe the roles of both men and women are critical as shown in figure 17 below.

Women (31%) and the elderly (22%) are the most vulnerable to droughts a flood while boys and girls are the least affected as shown in figure 18 below.

Women are affected more because they are the ones who take care of the kids and the elderly, some maybe nursing and expectant and they are also required to fetch water which is scarce during droughts. The elderly are affected because they may have some age-related disabilities and they don't have the ability to look for food and other survival means.

4.0 Conclusions and Recommendations

Water harvesting and crop diversification are the most common community practices adapted to manage droughts while digging drainage channels and raised housed are the common practices to manage floods. Community groups such as self-groups are at the most active in managing droughts and floods. However indigenous methods of drought and floods predictions are not very popular in the area.

Women, boys and girls play a big role in implementing drought and flood management measures while men make decisions on how money will be spent and allocated during those times. Cultural norms were not a hindrance in participation of women in droughts and floods management in the study area.

On drought and flood risk support, the radio and social media were important sources of information. However, it was found out that very few respondents have been trained on drought and flood management which has been carried out by NGOs.

We recommend that existing indigenous methods of drought and flood predictions should be revitalized and used alongside the modern methods to protect them from disappearing.

More training on drought and flood management should be carried out to the residents of the area as they face these disasters regularly.

Conflict of Interest

The authors declare no competing interests.

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