

Gender Influence on Access to and Control of Resources for Coping to Climate Variability. A Case of Mbita Fisher Community, Homa Bay County, Kenya

Robert David Lubalo Onyango^{1*}, Christopher Oludhe¹ and Dorothy Amwata¹

¹*Institute of Climate Change Adaptation, University of Nairobi, Kenya.*

Authors' contributions

This work was carried out in collaboration among all authors. Author RDLO designed the study, performed the statistical analysis, wrote the protocol. Authors CO and DA supervised the work. All authors read and approved the final manuscript.

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ABSTRACT

Global warming effects have far reaching impacts of livelihoods of many rural communities including fishers. It is in record that fishing accounts for world's 36 million fishers nearly 1.5 billion consumers who rely on fish for their dietary animal protein. Past studies have concentrated on fisher communities and climate variability in marine waters and oceans; mainly investigating the impact of climate variability on fish distribution and production. Limited focus has addressed the interaction between impacts of climate change on the fishing activities on inland and fresh waters such as in Lake Victoria and the fishers coping and adapting with changes and variability of climate. The discussions in this article focused on Lake Victoria shore location of Mbita where the livelihood of local community is largely fishing. The objectives were to: Determine the influence of gender on access and control of fisher resources for climate adaptation in Mbita sub-county; Document the current coping strategies and constraints to Climate variability/change in Mbita sub-county. The study used a constructivist epistemology and the mixed methods research design to help it achieve its findings. Yamane's formula (1964) is used to get the sample size of 388

*Corresponding author: E-mail: ratengtiti@gmail.com;

respondents out of a population of 13191. Primary data was collected through use of questionnaires, interview schedules for KII and FGDs. Secondary data collection was collected through document reviews of relevant past studies reports and working papers on (temperature/rainfall data) of Mbita for the last 30 years data to get the trend of these elements and to determine climate variability and change. The instruments were validated using experts' content validity with the supervisors. Piloting was used to ascertain reliability of the instruments Analysis was accomplished using Statistical Packages for Social Sciences. Presentation was done in descriptive and inferential statistics. The study found that there was gender discrimination in access and control of resources which support adaptive activities that makes women more vulnerable to Climate Variability/Change hazards and disasters. The study further found that adaptation requires access and control of factors of production which were traditionally under the control of male fishers making women more vulnerable and susceptible to surviving through *chamas* and table banking activities. Statistically access to and control was significant to adaptation at p-value of 0.000. Under coping strategies the study found that adaptation required transformation of mind set that called for bigger investment which required the collaboration and consultation of entire Mbita community and county government to address environmental and conservative resource utility. The study concluded that lack of alternative livelihood opportunities/options is the major constraints to adaptation for people living in the Lake Victoria region escalated with limitation of skills outside fishing industry, limitation of other employable professional skills including lack of capital. The study recommends a transdisciplinary concientization of adaptive strategies which can translate into flexible and sustainable climate change adaptation and gender inclusive livelihood activities. Future research should explore participatory action research on environmental influences affecting CCA by comparing findings across other beaches and livelihoods to see if gendered resources have any role in their adaptation.

Keywords: Gender; climate change and livelihood adaptation.

1. INTRODUCTION

Gender refers to masculinity and femininity; staying clear of biological differentiation. Basically gender is socially constructed roles stereotyped on men and women girls and boys. It is a central organizing principle of societies, and often governs the processes of production, reproduction, consumption and distribution. Many communities in Africa use biological gender as a development planning tool for accessing and controlling livelihood resources.

On the other hand fish is the main source of dietary protein for over 1 billion people worldwide. The global fisheries sector supports over 43.5 million people directly and over 200 million in associated fishery industries with the majority of these persons being in developing countries [1].

Globally fisheries are under intense pressure from habitat destruction, biodiversity loss, overfishing, pollution and ocean acidification and this situation is getting further complicated by the impacts of climate variability. The

Intergovernmental Panel on Climate Change observed that small scale fisher folk in the developing countries will be most vulnerable to climate change and variability due to high reliance on fisheries and poor adaptive capacity [2]. A number of studies have investigated the vulnerability and adaptive capacity of the fisheries dependent community to climate change and variability but there has been little emphasis at the local scale on how impacts of climate change and climate variability is affecting the lives and livelihoods of the majority of small-scale fisher folks, who make up more than 90% of the world's fishers and fish trade [3].

World Bank reported that the Lake Victoria Basin supports a population of 40 million providing a variety of economic and development opportunities from fisheries and tourism [4]. This implies that all livelihood opportunities around Lake Victoria are under threat due to a number of environmental problems including pollution of the lake, biodiversity loss, habitat destruction, soil erosion and new impacts of climate change and variability.

1.1 Problem Statement

Equal access to and control over economic and financial resources is critical for the effective adaptation to the impacts of climate variability/change thus the call to enhance women's access to economic and financial resources due to the long standing inequalities in the gender distribution of economic and financial resources especially in the fisheries which are synonymous with men in Lake Victoria area. The unequal access to resources limits women's capacity to ensure productivity, security of livelihoods and food security and is increasingly linked to poverty, migration, urbanization and increased risk of violence.

Adaptability of individuals is controlled by the extent to which they have access and control to natural resources of production. Most local communities culturally stereotype gender roles which result into such differentials which inhibit women and girls access to and control of resources making them more vulnerable to impacts of Climate Change/Variability. Women are the primary resource managers yet they have less access than men to resources such as land, credit, agricultural inputs, training and extension, a state that increases their vulnerability to extreme climatic events [5].

In the Lake Victoria fisheries the men have more access and control of the fish and fishing equipment due to cultural undertones. With very few women particularly those with access to capital may buy fish and fish products from the market, or directly from the landing sites, taking the catch home for processing and/or selling it in other areas. The areas where they will sell their fish will then depend very much on their own mobility and their access to ice and to processing techniques for making the product last longer without perishing [6].

The current study interrogated the influence of gender on access to resources and its control gender on the adaptation to climate variability by the Fisher Community in Mbita, Homa Bay County, Kenya.

1.2 Study Objectives

- i. Determine the influence of gender on access and control of fisher resources for climate adaptation in Mbita Sub-County.
- ii. Highlight the fishers' current coping strategies/ constraints to Climate Variability/Change in Mbita Sub-County.

2. LITERATURE REVIEW

2.1 Gender and Climate Change

Gender as a social construct is defined in terms of roles, responsibilities, and opportunities available to men and women; boys and girls. In development gender is used as a tool for organizing communities in traditional societies, and governing processes of production and reproduction, consumption and distribution of resources [7].

2.2 Gendered Roles in Fisheries

In Sub Saharan Africa, men and women participate in different but complimentary activities in fisheries. The men's activities dominate mainly the extractive processes while the women are often responsible for post-harvest activities, which frequently earn narrower profit margin than that made by fish catchers [8]. The fisheries are governed by a highly gendered labor and power distribution practices that involve restrictions on access to fishing grounds, unequal control over fisheries governance and unequal access to resources needed to engage in fishing [9].

2.3 Fisher Communities' Resources Access and Control

Resource access in fisheries in Africa is gendered and governed by cultural norms. The roles in fish harvesting are founded in deep rooted gender stereotypes of men and women participating in different but complementary activities [10]. A study in Nigeria on gender roles in fishery; his findings were that fishery activities were largely male dominated as the local community reckoned that women lacked physical strength required for the work [11]. Fishers' knowledge controls their ability to cope, scale up or diversify into other livelihood activities as the fisher groups require capital for the purchase of boats, fishing equipments and payment of labourers and that lack of capital led to alternative improvisation by the fishers resulting into unsustainable resource use and depletion of fish resources.

2.4 Fisher Communities Coping and Adaptation Strategies

Studies have illustrated that fishers adapt to the impacts of climate variability and change in various ways. Faced with declining yields,

income and food security, fishers seek alternative livelihoods e.g. in West Africa, when coastal fisheries resources are scarce, fishers adopt alternative livelihood strategies including hunting for bushmeat [12]. On the Lake Malawi area the fishers coped by diversifying into farming and pastoralism while others migrated in response to the decrease in fish catches that followed the drop in lake levels [13].

2.5 Barriers /Constraints to Adaptation

The most commonly reported barriers are linked to the institutional and social dimensions of adaptation and are context specific across space, time and sector. An assessment of the adaptive capacity of fishers to Climate Change/Variability in the Lake Victoria found that the main barrier to adaptation among the fishers was poverty as the impoverished households had no choice but to alleviate immediate pressures by relying solely on fishing [14].

3. CONCEPTUAL FRAMEWORK

The operationalization of the conceptual framework brings a holistic approach to comprehending the influence of gender on climate adaptation by the fishers in Mbita. The framework identifies that climatic and non-climatic elements with the interaction with the dynamics of gender which used here as a differential planning tool that is strictly observed by the local cultural norms and values within the fisher community to allocate control and access of resources. These norms mediated with gender

interface interact differently with perception and knowledge; livelihood activities and resource access and control accounting for the different levels of vulnerability.

3.1 Area of Study

The study focuses on Mbita in Home Bay County, a small, rural town located along the shores of Lake Victoria, near the southwestern border of Kenya, located on a peninsula, with water on three (3) sides and surrounded by picturesque islands between latitudes 0° 21' and 0° 32' south and longitudes 34° 04' and 34° 24' east [15].

3.2 Study Design

The study used mixed methods research design as it enabled the researcher to complement qualitative approaches with quantitative ones in order to allow for more complete interrogation of the study variables

3.3 Target Population

The study targeted 13191 who are scattered across the Rusinga and Mbita [17].

3.4 Sample Size and Sampling Procedure

The sample size was calculated using Yamane's formula which states, for a 95% confidence level and $p = 0.05$, size of the sample should be $n = \frac{N}{1 + N(e)^2}$ [18].

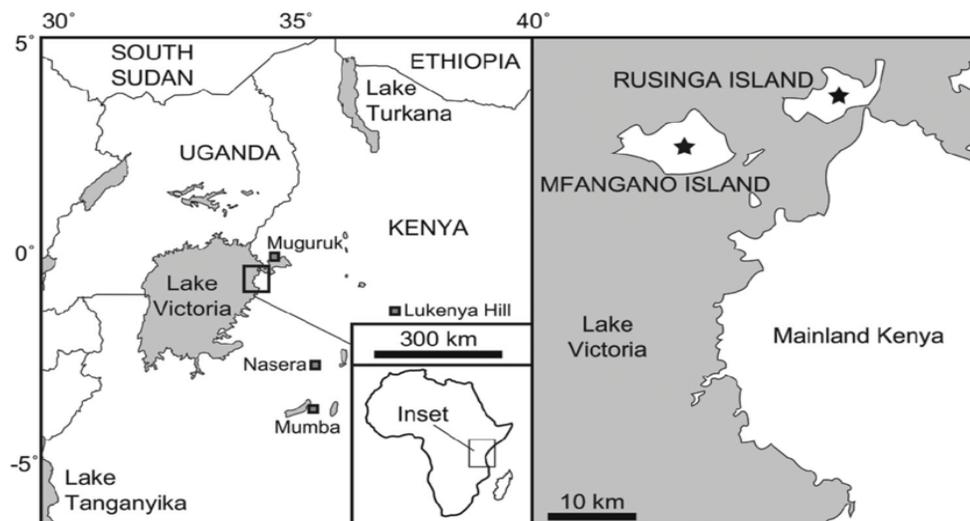


Fig. 1. Map of study area [16]

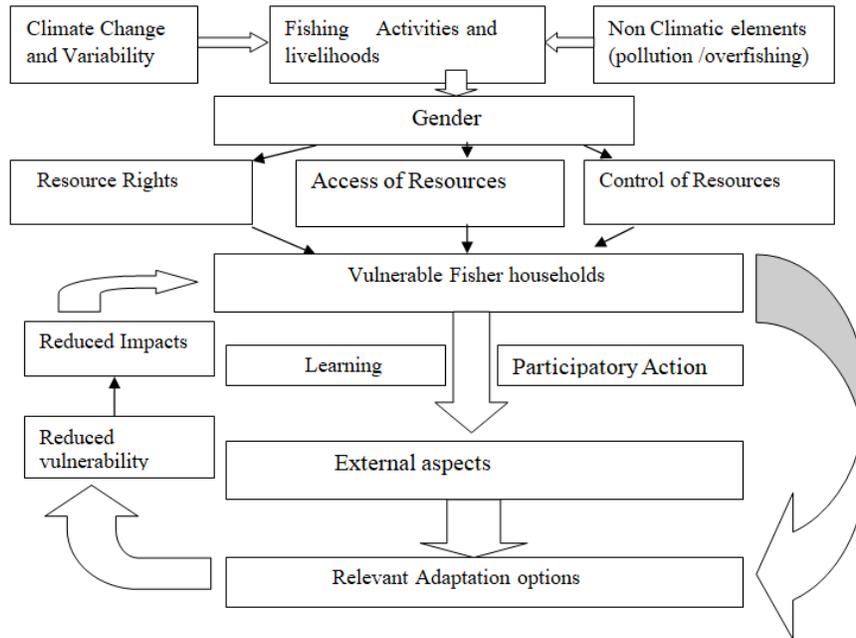


Fig. 2. Conceptual framework by researcher 2019

Where, N is the population size and e is the level of precision. In using this formula to get a sample number from our population, in which N =13,191 with $\pm 5\%$ precision. Assuming 95% confidence level and $p =0.05$, we get the sample size of 388.

3.5 Data Collection Procedures

The researcher obtained all required permits from University of Nairobi. Quantitative data was collected using semi structured questionnaires while qualitative data was collected using focus group discussions and key informant interviews. Secondary data consisting of published peer reviewed scientific articles.

3.6 Data Analysis and Presentation

Data was analyzed using Statistical Packages for Social Sciences and presented in descriptive statistics while qualitative data was analyzed thematically and presented in prose.

4 FINDINGS AND DISCUSSION

4.1 Socio-demographic Characteristics of the Respondents

The study found that 65% of the respondents were male while 35% were female. On age

distribution, 3% were <19years of age ; 32% were between 19-28 years of age ; 40% were between 29-38years of age; 16% were 39-48 of age; 5% were 49-58 and 1.9% of them 59+years.

On marital status, it was found that 25% were single; 55 of whom were males and 22 females; 39% of the married 80 males and 37 females; 9% of the sample were divorced 11 females and 4 males; 19% of the sample were separated 23 were females and 11 males and 9% of the sample were widowed/widowers 15 were males and 13 females.

On education level of the sampled fishers the study found that 4% had no education at all: of these 7 were male and 4 females; 51% had primary education 93 males and 62 were females; 39% attained secondary education 84 were males and 36 females; and 7% had acquired some tertiary education of whom 17 males and 3 females.

4.1.1 Livelihoods and livelihood activities

The study found that 67% of the sampled fishers solely depended on fishing as their main source of livelihood 134 male and 70 female. The study established that next dominant source of income was mixed cropping and fishing accounting for 23% of the respondents made of 48 males and

23 females; 6% of the respondents engaged in livestock rearing distributed in 13 males and 4 females and 4.5% of the sampled fishers engaged in other activities of whom 6 were males and 8 females.

On roles taken in the fishing activities 9% the respondents owned or made boats disaggregated into 19 males and 8 females; 45% of the respondents were either fishermen/boat crews and were all males, while 34% composed of 79 females and 26 males engaged in fish marketing.

On estimates of monthly incomes; 53% of the respondents comprising of 99 males and 62 females made (0- 4999) Ksh a month; 26% of the respondents comprising of 56 males and 24 females made (5,000 – 9 ,999) Ksh a month; 11% of the sampled fishers made 10, 000 - 14999 Ksh a month in the distribution of; 5% comprising of 24 males and 9 females made (15,000 to 19,999) and 5% of the respondents made of 9 males and 7 females made Ksh20, 000/- plus in month.

4.2 Findings of Objective 1

Determination of the influence of gender on access and control of fisher resources for climate adaptation in Mbita.

4.2.1 Access to fishing equip /storage and processing equipment

The study found that 44% of the respondents comprising of 84 males and 51 females had access to fishing equip/storage and processing equipment. The men owned boats, engines, nets and coolers while the women mainly owned drying nets and frying equipment. On the other hand 56% of the respondents comprising of 117 males and 54 females had no access to fishing / processing/ storage equipment as they were mainly employees (*jotich/jalwedo*) and the boat owners captain had to ensure equipment needed for the operations were both available and well maintained. The study established that legal fishing involved high cost equipment /gear which intermittently spiked off their theft and catalyzed use of illegal low quality gears and techniques.

4.2.2 Access to land/house

The study found that 51% of the respondents comprising of 114 males and 41 females had access to land/house while 49% comprising of

87 males and 64 females did not have access. The men who owned land, majority had pieces of 1-3 acres, with very few owned pieces ranging 5-10 acres. The group discussions established that most of the fishers had rented houses in and around the landing beaches as they were not from the area but only came to earn a living from fishing activities. Most of the rented houses were semi-permanent with either mud/clay walls but with iron sheet roofing or purely built from iron sheet and termed as *Kaunda suit*.

4.2.3 Access to clean drinking water and proper sanitation

The study established that 29% of the respondents had access to clean drinking water in proportion of 58 male and 30 females; 71% of the respondents made up of 143 males and 75 females did not have access. This is a trend that is likely to expose the fishers to the danger of waterborne diseases. On access to proper sanitation it was found that 62% of the respondents comprising 128 males and 62 female had proper sanitation facilities in the form of toilets while 38% of the respondents comprising of 73 males and 43 females did not having any access.

4.2.4 Access to solar power/electricity

The study found that 79% of the respondents comprising of 166 male and 75 females had access to power/solar/electricity while 22% made of 35 male and 30 females did not have access. Access to electricity is limited; majority of the respondents relied on solar power using solar lanterns which are cheaper and cleaner but also depended on having sunshine to charge/power them.

4.2.5 Access to fish and /or fish products

The study found that 24% of the respondents composed of 48 male and 26 female fishers had access to fish/fish products when they needed it while 76% of the comprising of 152 males and 89 females did not have access. Those men who had access to the fish/fish products whenever needed were mainly the boat owners /captains because of their proximity to the means of production and extract of fish from the water. The women access was mediated by the male fishers and therefore restricted leading to "*jaboyaism*" among other strategies to guarantee them access to the fish.

4.2.6 Access to steady market

The study established that 24% of the respondents made up of 44 males and 29 females had access to a steady market. This was explained that men serve different markets mainly of Nile Perch which is either sold to companies for filleting and processing for overseas markets or are gutted and “*mondo*” removed before being sent to markets in Kisumu and Nairobi as market niches but women smoke and deep fry juvenile Nile Perch. The study findings indicated that cultural beliefs were used to limit women to the post-harvest activities that included fish handling, processing and gleaning within the value chain.

4.2.7 Access to savings/investment

The study found that 50% of respondents comprising of 64 males and 89 females had access to savings or investments while 50% comprising of 137 males and 26 females did not have access any savings/investment. Those with access vested more on savings and not investment on livestock, households, fishing equipment or transport in bicycles/motorcycles and a few in land. The majority of women had savings in cash in their “*chamas*” focused on adaptive and survival strategies for sustenance their households thus keep savings.

4.2.8 Access to credit/loans from banks or electronic money

The study found that 74% of the respondents, 151 males and 73 females had access; 26% of the respondents made of 49 males and 32 females did not have access. This inaccessibility to loans/financial resources was found to be their economic stressor that limited their ability to purchasing new boats, motorize their boats, and thus limited their livelihood adaptive diversify.

4.2.9 Access to 3 balanced meals a day

The study established that 24% mainly boats and gears owners comprising of 38 males and 34 females had access to 3 meals a day although not all were balanced; 76% of the respondents made up of 163 male and 71 females did not have access. The respondents attributed to inconsistency in meals to hard economic times and the urge to adjust for survival. Respondents expressed that they often missed meals when they failed to catch fish because that was their main livelihood; those who did subsistence

farming said that poor yield from the farms worsened the situation of missing meals.

4.2.10 Access to roads/communication

The study found 86% of the respondents comprising of 176 males and 88 females had access to TV/Radio/cell phone for communication and access to passable roads; 14% of the respondents comprising 25 males and 17 females did not have access to either communication or passable roads. This was understandable because parts of Lake Victoria shoreline are characterized by a poor road network and thus increase postharvest fish losses due to autolysis.

4.2.11 Access to regular weather change information

Only 24% of the respondents made up of 46 male and 26 females had access to regular weather change information among them beach leaders and boat owners, while 76% comprising of 155 male and 79 females only watched the changing climatic trends as mapped on increase or decrease of fish catches. This is a handicap that should be addressed to enhance women's adaptive capacity for information is a source of awareness.

4.2.12 Access to extension/trainings/workshops

Only 16% of the respondents comprising 33 males and 16 females shared that they had access to extension/training and workshops. This implies that their livelihood activities are labour intensive that they hardly had time to look for these. The rest 84% of the respondents comprising of 168 males and 89 females spent bulk of their time in livelihood fishing activities.

With reference to Table 1 it was also found that access and control to land and house was statistically significant with a p-value of 0.004. Access to electricity/power was also statistically significant with a p-value of 0.03 with 82% of the male and 71% of the females reporting access. Access to a balanced diet (3 balanced meals a day) among the fishers was statistically significant with a p-value of 0.004 as only 18.9% of the male fishers compared to 32.6% of their female counterparts had access. Access to trainings/workshops was statistically significant with a p - value of 0.000 as only 16.5% of the male respondents compared to 15.2% of their female counterparts who claimed access.

4.3 Findings on Objective 2

To establish the adaptation strategies of the fisher community in Mbita. The study found completely gendered adaptive activities which were consistent with roles men and women played in fishing as part of their livelihoods.

4.3.1 Shifting fishing time

The majority 56% of the respondents out of whom 168 were males and 4 were females had shifted their fishing times. During the rainy weather they went fishing early in order to reduce risks associated with afternoon storms.

4.3.2 Fishing for longer time periods of time

46% of the respondents comprising of 139 males and 3 females stated that they fished for longer time going into deeper waters during dry seasons compared to earlier times. On using modified fishing nets 40% of the respondents said that they changed fishing nets and boats to catch any size and type of fish; changing of boats was necessitated to cope particularly with strong winds.

4.3.3 Marketing adaptation

The majority 28% of the respondents comprising of 46 males and 40 females reported selling fish to only big buyers in effort to sustain their market while 33% of the respondents composed of 34 males and 67 females processed fish before selling it to small buyers for a higher prices.

4.3.4 On use of savings and selling of assets to sustain their livelihoods

The majority 55% of the respondents reported they used their saving to sustain their household when fish catches dropped. While 34% of the respondents made of 78 males and 26 females resorted to selling their assets to sustain their livelihoods during the times of acute fish shortage.

4.3.5 Migratory fishing

Only 41% of the respondents comprising of 103 males and 21 females said that they had migration to places/beaches with more fish intermittently. From the FGDs across beaches, the study found that males temporarily migrated to other beaches or even to other lakes. The few females who migrate between fishing sites did it to buy fish for resale and particularly when there was not enough fish at the beaches where they were.

As represented in the Table 2 the adaptive and coping strategies used by fishers were gendered and roles stereotyped on cultural approval of the local community. Shifting of fishing time was practiced by 83.5% of male respondents and only 3.8% female respondents with a statistical significance of p-value of 0.000; confirmed that only the males did the actual fishing the 3.8 % females who were in the shifting fishing were boat owners and could influence decision of where to go fishing. Again fishing for a longer time as a coping/adaptation was adapted by 69.2% male respondents while only 2.8% female counterparts were into longer time fishing adaptation with a statistical significance of p-value of 0.000. On fishing further away than

Table 1. Statistical Significance to essential resources by different gender groups

Access and control	Male(Yes%)	Female(Yes%)	p-value
Access to land and house	56.35	39.05	0.004***
Clean drinking water	28.93	28.57	0.947
Proper toilet facility	63.45	59.05	0.453
Power solar electricity	82.23	71.43	0.030***
3 Balanced meals a day	18.9	32.6	0.004***
Fishing processing/storage equipment	41.7	48.6	0.214
Fish/fish products	45.76	49.21	0.988
Steady market for the fish	21.7	27.7	0.219
Savings or investment	31.9	72.3	0.058
Loans from banks	75.1	69.6	0.953
medical attention	21.9	27.2	0.103
Trainings/workshops	16.5	15.2	0.000***

*** Significant at 5% level

before was practiced by 67.7% of the male respondents while only 3.8% of their female counterparts who were boat owners practiced it giving a statistical significance of p-value of 0.000. On changing their fishing nets/boats; 56.7% male respondents practiced with only 7.6% of their female counterparts who hired male fishers had taken this up because most of the fishing equipment is owned by the male fishers with women owning more processing equipment ,this was statistically significant with a p-value of 0.000. When asked if they had resorted into catching any fish species as a coping and adaptation strategy; 45.8% of the male fishers respondents agreed with this while only 2.9% of their female counterparts agreed with this, this was statistically significant with a p-value of 0.000.

Processing and selling to small buyers as a coping and adaptation strategy was practiced by 63.8% of the female respondents while only 17% males practiced this with a statistical significance of p-value of 0.000. Receiving support from family members as a coping/adaptation strategy was reported by 20.12% of the male respondents 48.98% of their female counterparts explained that they survived from family members support with a statistical significance of p-value of 0.000; asset sale as adaptation strategy practiced by 45.3% male respondents while 35.2% of female headed households said in extreme situations they sold assets with a statistical significance of a p-value of 0.000 and migratory fishing was used by 51.2% of the male respondents and 20% female respondents with a statistical significance of p-value of 0.001. Selling of big fish to big buyers and using of savings to sustain households by the fishers as ways of coping and adaptation

strategies were not statistically significant at p-values > 0.05.

4.4 Climate Change Adaptation Constraints

4.4.1 Access to information

82% of the respondents reported that access to information was as a constraint to effective adaptation; however 18% of the respondents did not think limited access to information could reduce their adaptive options.

4.4.2 Access to credit facilities

The majority 81% of the respondents divided into 165 males and 83 females cited access to credit this as a constraint in facilitating adaptation.

4.4.3 Market accessibility

Only 26% of the respondents reported this as a constraint; the remaining 74% did not consider it a constraint because their catch hardly met the threshold for local market. The respondents explained that weak marketing organization among fishermen and small fish traders, placed them in a weak bargaining position with other regional traders; besides fishermen largely operate individually so lack of organized group marketing is the major constraint.

4.4.4 Limited knowledge on adaptation

The majority 75% of the respondents cited this as a constraint by because of its complex nature which did not conform to a predictable pattern. Limited/high cost of technology was mentioned as constraint by 85% of respondents.

Table 2. Determination of statistical significance of the fishers communities coping/ adaptation strategies

Climate change adaptation	Male(Yes%)	Female(Yes%)	p-value
Shifted fishing time	83.5	3.8	0.000***
Fish for longer time period	69.2	2.8	0.000***
Fish further away than before	67.7	3.8	0.000***
Changed fishing nets/boats	56.7	7.6	0.000***
Catch any fish species	45.8	2.9	0.000***
Sell to big buyers	22.9	38	0.676
Process and sell to small buyers	17	63.8	0.000***
Received help from family members	20.12	48.98	0.000***
Used savings to sustain household	44.2	74.3	0.074
Sold assets to sustain livelihood	45.3	35.2	0.000***
Migrated places to places	51.2	20	0.001***

*** Significant at 5% level

Table 3. Determination of statistical significance of adaptation constraints

Climate change constraints	Male(Yes	Female(Yes	p-value
Limited access to information on	71.57	100	0
Climate change information is too technical	81.22	82.86	0.725
Limited credit facilities	76.14	89.52	0.005***
Limited market for fish products	19.8	38.1	0.001***
Limited Knowledge on adaptation	78.68	68.57	0.053
Complexity of instituting Adaptation Strategies	17.07	63.81	0.196
Limited/high cost of technology	87.82	82.86	0.235
Poor fishery extension service	64.47	41.9	0.000***
Cultural customs, and beliefs.	30.46	53.33	0.000***
Lack of infrastructure in fishery operations	44.67	41.9	0.645
Inadequate enforcement of policies and laws	70.05	48.57	0.000***

*** Significant at 5% level

4.4.5 Socio-cultural customs

Only 39% of the respondents reported this as a constraint to adaptive activities explaining that it reinforced stereotype gender roles. The focus groups across the beaches expressed that bad weather associated with life hazards from hippos and crocodiles, strong winds, storms, wild water currents, rainfall and cloudy skies interfere with fishing and cause loss of fishing gears. Inability to purchase lifesaving jackets by majority of fishermen was a real constraint to Climate Change Adaptation.

As indicated in the Table 3 all the constraints listed were barriers to adaptation for the Mbita fishers in the study who represented the wider community. Limited credit facilities at P-value of 0.005, limited markets at p-value of 0.001, poor. fisheries extension services at 0.0000, cultural customs at p-value of 0.000 and inadequate reinforcement policies at p-value of 0.000 were the most significantly critical constraints to the fishers.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The patrilineal nature of the Luo tribe who were the majority of respondents always favored men on access of land and education which puts men in better earnings and better investment, while the female fishers who are the homemakers were more vulnerable to extreme weather changes hence Mbita County need to mainstream gender inclusive capacity building for all the fishers including extension services and training which resulted into food insecurity for most of fishers.

The fishers had limited applicable adaptive alternatives due to cost implications the majority

of fishers could not afford the county government must mainstream fisher livelihood as part of sustainable development agenda.

5.2 Recommendations

Mbita fishers community require a well institutionalized gender inclusive, trans-disciplinary multi-sectoral community based livelihood inclusive network to support the fishers and other local livelihoods through workshops and training on adaptive responses which are community owned in collaboration with local research organizations and universities.

Study recommends To fully enhance women’s roles in fishery resource management (e.g. by being owners of boats and gear, by participating in fisheries organizations and by having a more active role in decision-making at all levels), it is necessary to develop the capacity of women in different links of the value chain and to find ways to overcome and challenge institutional and sociocultural barriers.

Promoting access to credit, innovation and technology: Information and communications technology can help increase women’s inclusion in the economy, Greater access to credit, information and technology can also stimulate changes in social norms and attitudes toward women’s roles in society, potentially improving access to education and political involvement.

CONSENT

As per international standard or university standard, respondents’ written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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