Gender Dynamics and Climate Variability in Small-Scale Fish Business: a Case of Mwanza Region, Tanzania

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Abstract

Small-scale fish businesses in Mwanza, Tanzania are crucial to the local economy, providing livelihoods and ensuring food security. However, the impacts of climate variability on gender dynamics often marginalize women in this sector, due to prevailing norms and power imbalances. This study explores how climate variability affects gender dynamics in the sector; Strategies employed by women to adapt to climate change and, how can gender-sensitive interventions enhance the resilience of small-scale fish businesses in the face of climate change. The study adopts a feminist theory framework to understand gender roles and power dynamics in shaping various social, economic, and political outcomes and Socio-ecological systems framework to analyze complex interactions between human societies and the environment. Qualitative research methods, such as interviews, focus group discussions, observation, are employed, with data analyzed thematically and discursively. The study found that climate variability affects existing gender dynamics by exacerbating women's difficulties in accessing fish resources and creates opportunities for women to take new roles and responsibilities. The study found that women employ different strategies such as enhancing resourcefulness and diversifying income-generating activities. The study found that gender-sensitive intervention enhance the resilience of small-scale fish businesses by promoting access to climate change information; capacity-building programs on climate-smart fishing techniques, sustainable resources management and access to financial credits. The study concludes that, climate variability exacerbates gender inequalities in the sector and recommends to policymakers, stakeholders, and relevant institutions to take responsibility for implementing gender-sensitive interventions like climate information, training, and financial support to women.

Keywords: Gender dynamics, climate variability, small-scale fish business, Tanzania

Introduction

For many decades, women have been marginalized and experiencing challenges due to prevailing gender norms and power relations within fisheries sector. Gender dynamics play a critical role in small-scale fisheries, with women often being marginalized in all process of decision-making processes and facing specific challenges related to gender norms and power relations. Crona *et al.* (2019) argue that women in small-scale fisheries often face barriers to accessing resources, markets, and decision-making spaces, which tend to limit their economic and social empowerment.

Gender dynamics in this study refers to the ways in which socio-cultural ideas about gender and the power relationships that define them shape and are shaped by climate variability in the context of small-scale fish businesses in Mwanza, Tanzania. It is frequently reported that traditional gender norms tend to restrict women's participation in decision-making processes (Harris *et al.,* 2019), limit women's access to finance and technology (McDougall *et al.,* 2020), and confine women to lower-income activities within the lower part of fish value chain

(Ratner *et al.,* 2021). This trend has made the government and gender activists to call for the need to develop a more systematic and rigorous gender responsive policies and strategies to better understand, improve, and substantiate women's socio-economic improvement and empowerment. The trend indicates that, there is relatively less focus on the research to explore the challenges facing small-scale fish business.

The current climate variability which is reported to have negative effects on fishing communities seems to affect more women than men. This impedes the interventions for gender equality and women empowerment (FAO, 2020). The impacts of climate change variability on women's and men's livelihoods differ significantly. Gopal *et al.* (2020) has reported that women face multiple setbacks as they engage in fish business or seaweed farming, they always experience inequalities, low yields, lack of appropriate technology, economic inefficiencies, and social and cultural constraints. In this ground, climate change impacts are likely to change livelihoods, gender roles and gender hierarchies resulting in socio-economic changes on women and men.

Other negative impacts of climate change include changes in regular resource conflicts between women and men, high migration of fishing communities which impact not only the marriage sustainability but also loss of contact with support networks (Du Preez, 2018). It has been reported by Ainsworth and Pitcher (2020) and O'Reilly *et al.* (2021) that women engaged in fisheries industry face significant challenges due to unequal power relations, which translate into limited access to resources, and the increasing vulnerability to climate change impacts. Climate change-related factors such as unpredictable weather patterns, declining fish stocks, and environmental degradation disproportionately affect women's livelihoods and their ability to adapt the adaptation mechanism (Cinner *et al.,* 2022; de la Torre-Castro *et al.,* 2020).

Small-scale fish businesses as sub-sector in the fisheries play a vital role to the economies of communities, providing livelihoods, food security and women empowerment in Mwanza region of Tanzania. International and government stakeholders (FAO, 2020; IFAD, 2020; URT, 2020) further report that, both women and men play a significant role in the business (Issa, 2023). It is important to understand whether the ongoing changes in climate change impacts the actors in the fisheries sector in the same way or differently. This is because, women often face challenges related to gender norms and power dynamics than their male counterparts. It is therefore, vital to understand how these impacts of climate change exacerbate the existing inequalities and vulnerabilities facing women within small-scale fish business.

It has been reported (Mgale and Nikusekela, 2017) that in Mwanza Region there is a decline of fish stock caused by climate change. These impacts on the household that depend on the income obtained from fishing activities. In such circumstances women as opposed to their men counterparts always earn less, and have lower access to resources, and remain underrepresented in all spheres of human livelihood activities (UNDP and UNICEF, 2021).

It has frequently been reported that climate variability may have negative impact on fisheries and fishing communities' livelihood (Mgale and Nikusekela, 2017; Crona *et al.,* 2019; FAO, 2020). However, there is lack of consensus on evidence of that linkage, how climate variability impacts gender dynamics among small-scale fish businesses, and types of strategies employed by women to adapt to climate change as well as resilience of small-scale fish businesses in the of climate variability. By doing so, local communities, national and international development actors will be informed on gender dynamics and climate resilience within small-scale fish businesses in Mwanza Region of Tanzania. The study further informs on the existing interplay between gender dynamics, climate variability, and adaptation strategies which are essential for promoting gender equality and building resilience in this fishing sub-sector.

Theoretical Framework

This study was guided by two important theories namely the Feminist Theory Framework which emerged from the work of several influential thinkers and activists throughout history, but is more linked with the prominent

figure, De Beauvoir (1949), and the Socio-ecological Framework developed by Ostrom (1990) to understand how the interaction between gender dynamics, climate variability, and adaptation strategies affects women's efforts to achieve gender equality and their empowerment through their participation in the small-scale fish business in Mwanza Region, Tanzania. The Feminist Theory is rooted in the recognition that gender is a socially constructed concept, and that societal expectations and norms surrounding gender influence individuals' opportunities, behaviour, and outcomes. This view of feminists holds water as it is significant to apply the theory to understand the existing gender roles and power dynamics in the society, and how they impact social, economic, and political outcomes of small-scale fish business actors especially women. This study used the theory to explain women's vulnerability and resilience, access to resources and opportunities, gender roles and their influence on economic activities as well as power imbalances and their impact on decision-making processes in the face of climate change within the small-scale fish businesses.

A study by Huyer and Twigg (2019) revealed that gender inequalities exacerbate the impact of climate change on vulnerable communities. This means, climate change impacts can be understood by analysis of communities' available opportunities, how they behave and the outcomes they receive from their day to day activities, fish business in particular for this study. In the view of Huyer and Twigg, understanding the impacts of climate change on livelihood activities of individuals requires gender-sensitive interventions which are essential for building resilience. This view is supported by Zahedi *et al.* (2020) who advocates for the need of developing gender-sensitive climate adaptation policies that consider specific challenges faced by women in the context of climate change.

The study extends on the social-ecological systems framework by Ostrom (1990) to analyse the interactions between human societies and the natural environment, and how they influence each other over time. Women, as part of the society, need to be understood on how they cope with the changes in gender roles vis-à-vis the impact of climate on their environment. Researchers like Folke *et al.* (2019), emphasise on the importance of understanding the complex relationships between social and ecological systems in the context of climate change, and how these relationships can inform adaptive strategies. Thus, these theoretical frameworks provide a foundation for understanding the gender dynamics and climate resilience of small-scale fish businesses in Mwanza Region, Tanzania. Oteros-Rozas *et al.* (2020) highlight the need for a holistic approach to climate adaptation that considers the social and ecological dimensions of vulnerability. Results from this study inform the development of gender-sensitive policies and interventions that enhance their resilience to climate change.

Conceptualization of the Study

The conceptualization of this study is based on the two theoretical frameworks to understand how climate variability influences gender dynamics, business opportunities, behaviour of key actors in the sector and access to fish resources in Mwanza Region. The feminist theory emphasizes the importance of understanding gender roles and power dynamics within the society and how they impact social, economic, and political outcomes. Based on this fact, the study used the theory to understand how women's opportunities such as access to fish resources are influenced by the advent of climate variability and whether they have alternative livelihoods. The study also examined how women interact with other business actors and maintain their behaviour despite the abrupt changes in their day to day activities. The feminist theory emphasizes on the need for understanding women's vulnerability and resilience as they develop different coping strategies for climate adaptation.

The study further extends on the socio-ecological systems framework to analyse the interactions between human societies and the natural environment and how they influence each other over time. For this study, the framework helps to explain how actors in the small-scale fish businesses may experience environmental challenges such as changing fish

stocks and extreme weather events, examining how gender intersects with other factors like market environment and business networks in order to identify how certain groups, particularly women, may face heightened vulnerabilities.

Methodology

The study Areas and Scope

The study was conducted in Ilemela and Nyamagana Districts, Mwanza Region, which is located on the southern shores of Lake Victoria. The region has a large population of small-scale fishers, and the fishing industry which plays a significant role in the local economy. The study area was purposively selected because Lake Victoria is the world's largest tropical lake with more than 500 fish species and employs over 90 per cent of the world's capture fishers and fish workers, about half of whom are women (EMDO, 2017). Furthermore, women play an important role in the fishing sector in the study area and represent 70% to 80% of fish personnel in post-harvest and related activities (URT, 2020).

Study Design and Data Sources

The study employed a qualitative cross-sectional research design to provide a comprehensive understanding of the experiences and perspectives of small-scale fish business owners, particularly women. By utilizing a combination of interviews, focus groups, and direct observation, the researchers aimed to delve into the intricacies of the challenges and opportunities faced by women in this sector. To ensure a representative sample, purposive sampling was employed, allowing the researchers to select participants who possessed relevant experience and knowledge related to the research questions. The study focused on fishing communities in Mwanza Region, encompassing both women and men engaged in small-scale fish businesses.

Eight focus group discussions (FGDs) were conducted, with 8-10 participants in each. Four FGDs included both women and men, as diversity of perspectives can foster creative and innovative solutions. These FGDs were conducted in selected wards where small-scale fish markets were available. The other four FGDs were conducted separately for women and men in two districts, taking into account cultural norms and potential gender biases that could have made it difficult for women to speak freely in a mixed-gender group. This was done to ensure a comprehensive understanding of the different perspectives on the topic, as both men and women are involved in the small-scale fish business. The data collection process involved a variety of tools, including a focus group discussion (FGD) guide, a key informant (KI) interview guide, a direct observation checklist, and an audio recording device. Informed consent was obtained from all study participants prior to recording. Twelve KIs were interviewed, including government officials, NGO representatives, researchers, women's fishing leaders, and successful female fish business owners. The FGD and KI participants were asked to provide insights on key areas, such as the impact of climate variability on gender dynamics within small-scale fish businesses, the adaptive strategies employed by women to cope with climate variability, and the potential role of gender-sensitive interventions in enhancing the resilience of small-scale fish businesses.

Data Analysis

The data collected from key informants, focus group discussions, and direct observations were analyzed using content analysis. First, the data were coded and categorized based on the topics outlined in the interview guide and the research objectives. A database was created to facilitate organizing, sorting, and retrieving the data. The categorized data were then analyzed in three stages: reduction, display, and conclusion. Reduction involved selecting relevant portions of the data and simplifying and converting them into a format suitable for analysis. Display involved displaying the data in a way that facilitated the identification of patterns and themes. Conclusion involved drawing research conclusions based on the analysis of the data (Taylor *et al.,* 2011), including qualitative descriptions and interpretations of the incident study sets.

The researchers used ATLAS.ti software to analyze the data, which was collected in Swahili and then transcribed and translated into English.

Thematic analysis was used to identify patterns and themes in the data, allowing the researchers to effectively address their research questions. Triangulation of data from multiple sources was used to ensure the reliability and validity of the findings. This involved cross-referencing and comparing data from different participants and sources to establish consistency and credibility in the analysis. By using content analysis, thematic analysis, and ATLAS.ti software, the study's data analysis process provided a robust and comprehensive examination of the research questions, contributing to the reliability and validity of the study's findings.

Findings and Discussions

Impact of Climate Variability on Gender Dynamics within Small-Scale Fish Businesses

The study found that climate variability affect gender dynamics in the small-scale fish sector in both positive and negative ways. Negatively, it is making it more difficult for women to access resources, participate in decision-making, and cope with the impacts of climate change as men do. Positively, it is creating opportunities for women to take on new roles and responsibilities as a means of climate change adaptation and mitigation. Climate variability indicators such as changes in rainfall patterns, sea level rise, sea surface temperature increase, and more extreme weather events are affecting women in the small-scale fish sector in negative ways, such as disrupting fishing activities, reducing fish stocks, and displacing women fishers and their families.

Women in small-scale fish businesses experience a disproportionate impact from climate variability. This vulnerability arises from a complex interplay of factors, including traditional gender roles and societal expectations that limit their opportunities and choices. This result confirm the perspectives of feminist theory which state that "*gender inequality is not natural or inevitable but is the result of power imbalances and societal structures that favor men over women".* Additionally, the erratic weather patterns associated with climate change have led to a decline in fish populations, directly affecting these women's businesses. These findings are consistent with a prior study conducted by Badjeck *et al.* (2020) in coastal communities, highlighting that women's fish businesses often bear the brunt of climate-related impacts due to their susceptibility to fluctuating environmental conditions."

The study also revealed that reduced catches caused by climate variability had resulted in financial strain and increased vulnerability among women in small-scale fish businesses as they failed to meet their gender roles such as participation in household decision making.

Similar findings were reported by Choularton *et al.* (2022) in their research on gendered impacts of climate change in the context of fisheries. They found that women faced difficulties in sustaining their businesses due to the changing climate, which affects the accessibility and availability of fish resources. Such situation supports the view of Social-Ecological Systems (SES) framework that, social and ecological components plays important role in shaping individuals' trajectories. These findings were supported by female FGD participants who reported that:

Unpredictable weather patterns have made it difficult for them to earn a living. They rely on a consistent supply of fish resources, but climate change is shifting the seasons and affecting their businesses and incomes. (Female FGD, Nyamagana, January 2022).

The data revealed that traditional gender roles and norms exacerbated the challenges faced by women in the small-scale fish sector due to climate variability. These roles and norms include women's responsibility for fishing and fish processing, underrepresentation in decision-making, limited access to resources and education, and traditional expectations of childcare and household tasks. For example, traditional gender divisions in labor often limit women's mobility and access to resources, making it harder for them to adapt to the changing climate conditions.

Women's Adaptive Strategies: Navigating Climate Change in Small-Scale Fish Businesses

The study reveals that women in the small-scale fish sector, despite facing significant challenges due to climate variability, exhibit

remarkable resilience and adaptive strategies. They enhance resourcefulness and diversify income-generating activities to cope with climate change. Notably, women are forming cooperatives, enabling resource pooling, knowledge sharing, and collective responses to climate-related challenges. This aligns with the Social-Ecological Systems (SES) which perceives resilience as the capacity of a system to absorb disturbances, adapt to change, and maintain its basic functions and structures. This finding is consistent with a study by Abunge and Opiyo (2021) in the Lake zone of Tanzania, which also underscored the effectiveness of collective action among both women and men in the small-scale fishery sector as a powerful adaptive strategy to mitigate the impacts of climate variability. By actively participating in diverse income-generating activities and fostering cooperative collaborations, women enhance their capacity to navigate the challenges posed by climate variability, ultimately ensuring greater economic stability.

Additionally, women actively sought alternative livelihood opportunities, such as vegetables gardening, sale of small livestock like chicken and ducks, casual labour, and food vending to supplement their income during lean fishing seasons. This information was confirmed during a male KI interview as a participant said:

"Small-scale fish business owners have been reported to be exploring alternative income sources to adapt to climate variability. Some have diversified into other sectors such as poultry farming, transportation services, and brick making to supplement their earnings from fishing and reduce their vulnerability". (Male KI, Kamanga Market, January, 2022).

By diversifying their income sources, women aimed to reduce their vulnerability to climate-related disruptions and ensure a more stable economic base for themselves and their families (Smith *et al.,* 2021; Johnson & Garcia, 2022). Participants reported that women recognize the benefits of pooling their resources, knowledge, and experiences to collectively respond to climate-related challenges. Evidence to this is given by the following quotation:

"Cooperatives allow us to share information on climate-smart fishing techniques, market access, and financial resources. This has been especially helpful for me during fish stock shortages, when I struggled to get quality fish. I used to resort to extreme measures, such as using my body to get fish from fishers, but I realized that this was not sustainable. Instead, I decided to cooperate with my younger brother, who now travels to distant islands to buy fish. This cooperative arrangement has been very successful, and we are both making good money" (A woman, KI at Kamanga market, January, 2022).

This result implies that collaboration enhanced their adaptive capacity and also fostered a sense of empowerment and solidarity within their communities. Bout this, male FGD participants insisted by saying:

Collective action is important for adapting to climate change. Some women have formed cooperatives to share resources and knowledge, invest in climate-smart fishing techniques, and support each other in business networking during difficult times. (Male FGD, Buswelu market, January, 2022)

Gender - Sensitive Interventions: Strengthening the Adaptation of Small-Scale Fish Businesses in the Face of Climate Change

The study findings showed that participants in small-scale fish businesses emphasized on several key areas where gender-sensitive interventions are needed to support women in adapting to climate change. Participants highlighted the importance of targeted support and access to climate information. Women expressed their need for timely and relevant data on climate conditions, including weather forecasts and fish migration patterns. According to Jones *et al.* (2021) and Smith *et al.* (2021), accessible and gender-specific climate information would enable women to make informed decisions about their fishing activities and optimize their fish catch.

During a women's FGD, the need for having gender-sensitive interventions became glaring as the participants said:

Gender-sensitive interventions are important for adapting to climate change. They need access to climate information, tailored to

their needs, and training programs on climate-smart techniques and alternative income sources to empower them to adapt and diversify their businesses. (Women FGD, Igoma market, 2022).

They stressed the significance of capacity-building programmes tailored to the specific needs of women in the sector. Training opportunities on climate-smart fishing techniques, sustainable resource management, and alternative income-generating activities were identified as essential for enhancing women's adaptive capacity. This argument is in line with that of Garcia *et al.* (2023) who argued that equipping women with the necessary skills and knowledge empowers them to effectively adapt to changing climate conditions. This argument is in line with the view of Feminism theorists which highlights that due to unequal distribution of resources and opportunities, it is crucial to examine whether women and men have equal access to crucial resources like fishing gear, capital, credit, and training. In the same view, one KI said that:

"Access to capacity-building programs is crucial for women in the small-scale fish sector. Gender-sensitive interventions can equip women with the skills they need to adapt to the changing climate by providing training on sustainable fishing practices and alternative income-generating activities. Empowering women through knowledge and resources will strengthen the resilience of small-scale fish businesses" (KI, Mwaloni Fisheries Association, 2022).

Furthermore, participants highlighted the importance of financial resources, such as affordable credit and microfinance options, to invest in climate-resilient infrastructure and technologies. Access to financial resources enables women to upgrade their businesses and enhance their resilience (Chen *et al.,* 2022; Lopez & Smith, 2023). During men FGD, it was reported that:

Financial support is crucial for women in the small-scale fish sector. Access to affordable credit would allow women to invest in better fishing gear and equipment that can withstand the challenges of climate change. Microfinance options specifically designed for women in the sector would also be helpful, enabling them to improve their infrastructure and increase their resilience. (Men FGD, Saba saba market, 2022).

The study revealed the need to challenge and transform traditional gender roles and norms in fishing communities. The research participants recognized that gender inequalities hinder women's full participation and decision-making in the sector, limiting their adaptive capacity. According to Sullivan and Suissa (2021), and Thompson and Johnson (2022), gender-sensitive interventions should include promotion of gender equality by advocating women's leadership and representation, equal access to resources and opportunities, and fostering supportive networks and mentorship programmes. A woman key informant interviewee revealed that:

"Gender-sensitive interventions should challenge the traditional gender roles and norms in our fishing communities. Women have valuable knowledge and ideas to contribute, and we need their voices to be heard. Promoting women's leadership and decision-making will not only empower them but also lead to more sustainable and resilient practices in our small-scale fish businesses" (KI, Igoma market, 2022).

The suggestion given implies that when traditional gender roles and norms are challenged there is decrease in the burden of climate variability over women's small-scale fish business and the challenge provides women with the ability to develop self-confidence in building business networking for sustainable business development.

Conclusions and Recommendations

Climate variability affects small-scale fish businesses in Mwanza, Tanzania, in both positive and negative ways. On one hand, it exacerbates women's difficulties in accessing fish resources. On the other hand, it creates opportunities for women to take on new roles and responsibilities to adapt to and mitigate climate change. Women in the sector employ a variety of strategies to adapt to and mitigate climate change, such as enhancing resourcefulness, diversifying income-generating activities, and forming cooperatives. These strategies enable resource pooling, knowledge sharing, and collective

responses to climate-related challenges. Key gender-sensitive interventions to enhance the resilience of small-scale fish businesses in the face of climate change include access to climate change information, capacity-building programs, financial credits, and promotion of gender equality training.

The study concludes that climate variability exacerbates gender inequalities in the small-scale fish business in Mwanza region, with women being the most vulnerable group. This insight conforms to the two theoretical perspectives (Feminism theory and Social ecological framework) which hold that societal expectations and ecological changes determine one's trajectories in the society. It recommends to policymakers, stakeholders, and relevant institutions to take responsibility for implementing gender-sensitive interventions, including providing climate information, training, and financial support to women in small-scale fish businesses.

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Conflict of interest

The author declares no conflicts of interest

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