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Gender dynamics among fish entrepreneurs: A Case of Kipumbwi Ward in Pangani District Council, Tanzania

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Abstract
Dynamics in gender roles vary regionally, economically, and culturally in the entire fisheries value chain. This paper examines gender dynamics among fish entrepreneurs. Specifically, focused on the identification of fishing activities, assessed challenges, and established measures against stipulated challenges. The study was conducted in the Pangani district council. A mixed-methods design based on the principle of triangulation was employed. A structured questionnaire was used to collect quantitative data, while a checklist guiding tool was used to collect qualitative data from the key informants. Quantitative data were analysed through the SPSS programme, while qualitative data were manually analysed through content analysis. The process involved carefully reading the data to gain an in-depth understanding and identifying key issues that emerged. Stratified sampling was used, and 202(100%) respondents were interviewed, out of which 151(75%) were males and 51(25%) were females. Four (4) in-depth interviews were conducted with the key informants, as they were familiar with the experience of the topic under study. Fishing activities carried out by women include carrying fish from the boat by 162(80%), food vendors by 139(69%), seaweed farming by 134(66%), and frying and selling small fish by 143(71%). On the contrary, men were responsible for fishing by 197(98%). Other activities were selling big fish by 173(86%) and removal of fish scale by 156(77%). Challenges include accidents, loans with high interest rates, lack of security boat, unpredictable income, improper market, high taxes, and lack of capital. Study findings reported mitigation measures that include building of modern market, modern ways of fishing, capital assistance, a conducive environment for fishing activities, and the provision of entrepreneurship skills. Policy makers were informed through study recommendations, such as the creation of a conducive environment for fishing activities and recognising fishers, for their sustainability.

Introduction
It is estimated that 180 million people worldwide are working in fisheries and aquaculture, of whom half are women (FAO, 2024). Gender dynamics in fishing activities are a common phenomenon, as gender disparities are present throughout the fisheries value chain, with implications for the livelihoods of those involved in fishing activities (Garcia et al., 2023). Additionally, Torell et al. (2019) noted that women who participate in fishing activities, usually in nearshore areas, are also involved in post-harvest activities such as processing and marketing, which typically provide them with income. Knott and Gustavsson (2022) noted that, despite the long-standing notion that fishing is a

male-dominated domain, both men and women are involved in all stages of the fisheries value chain. Heise et al. (2019) noted in their study that perceptions of gender dynamics in small-scale fisheries and conservation areas in Cambodia revealed that men had more power in accessing and controlling fishing resources than women. While Mkuna and Baiyegunhi (2021) noted that gender dynamics in small-scale fisheries and aquaculture are embedded with culturally constructed roles that prohibit women from accessing markets and resources, these dynamics restrict women from participating in certain fisheries activities.

In Africa, the fish-producing industry has traditionally been gender-segregated, with males and females having predefined roles as entrepreneurs (Abunge & Opiyo, 2021). Women make up half of the overall workforce throughout the fisheries and aquaculture value chains, occupying critical roles. They constitute a disproportionately large percentage of the people engaged in the informal, lowest-paid, least stable, and least skilled segments of the workforce (IFAD report, 2020). The roles women play in the fishing industry are often strongly influenced by the social, cultural, and economic contexts in which they live, and they usually face gender-based constraints that hinder their agency, thereby preventing them from fully benefiting from their roles in the sector. However, the idea is that fisheries are exclusively a male domain in the African context. Considering that fisheries and the fishing sub-sector enhance economic growth and contribute to creating jobs and increasing income among fish entrepreneurs.

Gender dynamics in this study refer to the socio-cultural ideas about gender and the power relationships that define them (Murunga, 2021). It is essential to recognise that these gender dynamics evolve, as women and men assume diverse roles in their lives, including those of spouses, siblings, coworkers, and parents. Depending on their preferences, women and men may work together or separately for each role. It was further noted by Mangubhai et al. (2022) that an understanding of these dynamics could facilitate consideration of how they are likely to lead to greater differential and complex gender relations and power imbalances in fishing communities.

A livelihood perspective informed this study. From a livelihood's perspective, gender norms, roles, and expectations are central to the differences that determine how people can access, engage with, and have control over livelihoods, including new opportunities created through initiatives (Barsoum, 2021). Gender differences in livelihoods, as well as the social constructs that underlie them, are dynamic and can vary significantly across space and time (Barsoum, 2021). The perspective begins with how different people in various places live. It encompasses the means of earning a living, a combination of resources utilised, and the activities undertaken to sustain life. It describes a complex web of activities and interactions, with an emphasis on diversity, on how community members can make a living. From a livelihood perspective, the dynamics emphasise adaptation, improvement, diversification, and transformation. This ranges from the individual level to complex livelihood strategies and pathways at the household, village, and district levels (Barsoum, 2021). The livelihood perspective focused on understanding complex, local realities among local people in a respective setting. In this regard, gender dynamics among fish entrepreneurs in Kipumbwi ward were comprehended within the context of a livelihood perspective, in which fishing entrepreneurs were examined by identifying variations in their activities, challenges, and ways to address the difficulties they faced. Fishing, apart from being a trade in Kipumbwi ward, was compounded by numerous challenges to both men and women.

Sambuo et al. (2018) noted in their study that fishing activity in Tanzania is among the rapidly growing industries in small-scale businesses, where the majority of women and men are self-employed. According to the Tanzania Investment Centre (2019), fishing was a significant economic activity for the entire population. (Sibeyo, 2020) added that small-scale fish businesses provide jobs to both men and women as a substantial source of their livelihood, as they require affordable capital and offer

quick income for Coastal and Lake Zone communities. Agbontale et al. (2020) &Thomas et al. (2021) added that almost 100 million people are estimated to be involved in small-scale post-harvest activities, which include fish trading and marketing. Gender dynamics in fishing activities have been reported in various literature. Yet, there was a need to comprehend the underlying dynamics of gender in relation to fishing activities, challenges, and strategies for overcoming these difficulties. This study, therefore, intends to understand the gender dynamics among fish entrepreneurs in Kipumbwi ward. Specifically, the study focused on identifying gender differences in fishing activities, assessing the challenges associated with fishing, and establishing mitigation measures to address the difficulties stipulated.

Methods

Study design

A mixed-method design was used, which allowed triangulation of quantitative and qualitative approaches. A quantitative approach utilised a structured questionnaire to collect data, while a checklist served as a guiding tool for collecting qualitative data. The quantitative approach enabled the researcher to comprehend the variations in fishing activities, assess the challenges faced by fish entrepreneurs, and establish ways to address the difficulties stipulated. On the other hand, qualitative data complemented the collected data, enabling the researcher to gain an in-depth understanding of the topic under study by comprehending the feelings, opinions, views, and meanings associated with variations in fishing activities, challenges, and potential ways forward. A total of 202 respondents were interviewed, of whom 151(75%) were male respondents, while 51(25%) were female respondents. Additionally, four (4) in-depth interviews were conducted with the key informants, to complement the collected information, these include the village executive officer, the village chairperson, the ward executive officer and the ward fisheries officer.

Study area

This study was conducted in the Pangani District Council, located in the Tanga region, specifically in the Kipumbwi ward. The ward has two (2) villages, namely Kipumbwi and Kwa Kibuyu (Pangani district profile, 2022). Kipumbwi village was purposefully selected for the following reasons: first, it was located along the Indian Ocean's shore, and the primary economic activity was fishing. Secondly, the area has unique features in relation to fishing activities, where women comprise a significant proportion of the workforce. Third, the area was characterised by distinctive features of the fishing community, including a shared culture, belief system, and limited involvement in other economic activities, such as farming.

Study population

The study population was both men and women aged 15 years and above. These respondents were obtained from the fishing community, where fishing activities were carried out, in Kipumbwi village. They were purposefully selected because they were located near the fishing community, along the shores of the Indian Ocean. Among them were fishers, petty traders, fish carriers and fish traders in Kipumbwi village.

Sample and sample size

Stratified sampling was used in this study—the technique where the population is divided into strata, involving three main procedures. Strata or subgroups are chosen because evidence is available that they are related to the outcome. The selection of strata was based on the area and local conditions. After stratification, sampling was conducted separately in each stratum (Kothari,2004). Therefore, in this study, community members who were involved in fishing activities were divided into groups based on their age, occupational experience, and gender. Kipumbwi ward was chosen deliberately, as it comprises two villages: Kipumbwi and Kwakibuyu (Pangani District Profile, 2022). Secondly, among the two (2) villages, Kipumbwi was selected as it was located along the shores of the Indian

Ocean and many of the community members engaged themselves in fishing activities. After selecting the study ward, the next step was to identify the specific population to be surveyed. It was reported that a total of 1,815 people were engaged in fishing activities (Kipumbwi Ward Office, 2025). The statistical power analysis was conducted to determine the minimum required sample size, adopted from (Cohen,1988), to calculate the sample size as follows:

$$S = \frac{X2}{NP(1-P) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{Equation 1}}$$
$$d2(N-1) + X2P(1-P)$$

Where X= Z – score (1.96 for confidence level)
P = population portion (50% for maximum sample)
d = degree of accuracy (0.05 for 95% confidence level)
N = population size (1815)

$$n = \frac{(1.96)2 \times 0.5(1 - 0.5)}{\frac{0.052}{1 + \frac{(1.96)2 \times 0.5(1-0.5)}{(0.52)\ (1815)}}}$$

$$\frac{3.8416 \times 0.25}{\frac{0.0025}{1 + \frac{3.816 \times 0.25}{1815}}}$$

$$\frac{0.9604}{\frac{0.0025}{1 + 0.954}}$$

$$\frac{384.16}{1.954}$$

n= 196

However, the researcher managed to interview (202) respondents in Kipumbwi village because the bigger the sample, the more representative it is (Kothari,2004).

Data collection

Quantitative data were collected through structured questionnaires, whereby 202 respondents were interviewed. Among them 151(75%) were males while 51(25%) were females. On the other hand, qualitative data were collected using a checklist-guided tool, which comprised four in-depth interviews with key informants. The key informants interviewed included the ward executive officer, the village executive officer, the village chairperson and the ward fisheries officer. The key informants were familiar with the study area and well knowledgeable about fishing activities. In-depth interviews with key informants enabled the researcher to obtain detailed information on the topic under study. Moreover, the researcher conducted a thorough literature review.

Data analysis

This study collected both qualitative and quantitative data. In that, quantitative data were analysed through the SPSS computer programme. Thereafter, data were first fed into the computer, coded, and various frequency tables and histograms were computed. Inferential statistical analysis, such as Fisher's test, was employed to determine the relationship between variables. A significance level of 5% was used. A p-value less than 0.05 indicates a significant association between the two variables. A p-value lying outside the limits of confidence suggests no statistically significant difference between the two variables. While qualitative data employed several steps, the data were manually analysed using a content analysis approach. The process involved carefully reading the data to gain an in-depth understanding and identifying key concepts and emerging themes (Hammerley and Atkinson, 2019).

Data were further compared and contrasted to explore similarities and differences in the gender dynamics among fish entrepreneurs.

Ethical consideration

The study has considered all ethical procedures, which involve several steps, including registration of the research project with the Department of Research, Consultancy, and Postgraduate Studies at the Mwalimu Nyerere Memorial Academy, Karume campus, Zanzibar. This was followed by the provision of a permission letter from the Deputy Campus Director of Academic, Research, and Consultancy, which was sent to the Pangani District Council. The following procedure was used to obtain the research permit, which was obtained through a letter from the Pangani District Council office with reference number HWP/F.20/2/VOL/IV.107. The granted letter directed the Kipumbwi ward executive officer to permit the researcher to proceed with data collection among the fishing community in the respective ward. In-depth interviews were conducted with four (4) key informants in the respective ward offices. Throughout the data collection process, confidentiality was maintained, and rapport was established with the respondent before data collection.

Results and Discussion

Demographic characteristics of respondents

A total of 202 respondents were interviewed, among whom 151 (75%) were males and 51 (25%) were females. In terms of age group, it was revealed that 37(25%) males and 27(53%) females' respondents were in the age group of 15 – 25 years, while 49(32%) males and 12(24%) females' respondents were in the age group of 26 -36 years. Other respondents were in other reported age groups. Education was another aspect; it was revealed that 89 (59%) males and 35 (68%) females' respondents had primary-level education, while 40 (26%) males and 10 (20%) females' respondents had a secondary school level of education. It was further revealed that 15 (10%) males and 2 (12%) females' respondents did not attend school. Additionally, other respondents reported having other levels of education. Study findings reported that fishing was the activity carried out mainly by male respondents, by 99 (66%). Petty trading was further reported by 47 (31%) males and 33 (65%) female respondents. Other respondents belong to occupations not reported. Marital status was another aspect where by 94(62.5%) males and 22(43%) females' respondents were married while 46(30.5% males and 11(22%) females' respondents were single. Other respondents were reported in various marriage statuses prevalent in their respective settings. Religion was another aspect; it was reported that 149(99%) males and 42(82%) females' respondents were Muslim while 2(1%) males and 9(18%) respondents were Christians. Study findings further reported that Zigua was the main tribe among 46 (30%) males and 17 (33.3%) female respondents. Respondents reported that other tribes prevailed in the area. There was a statistically significant difference in education level, occupation, marital status, religion and tribe aspects of this study, reported p-value (.000). Table 1 provides a detailed description of the demographic characteristics of respondents.

Table 1: Demographic characteristics of respondents

Sn	Demographic characteristics of respondents	Gender		Chi-square
		Male (n)	Females(n)	P-value
1.	Age of respondents			
	15 – 25	37(25%)	27(53%)	
	26 – 36	49(32%)	12(24%)	
	37 – 47	33(22%)	7(14%)	.637
	48 years and above	32(21%)	5(9%)	
		151(100%)	51(100%)	
2.	Education level			
	Primary-level	89(59%)	35(68%)	
	Secondary level	40(26%)	10(20%)	
	University level	4(3%)	0(0%)	
	Did not attend school	15(10%)	6(12%)	.000
	Other level	3(2%)	0(0%)	
		151(100%)	51(100%)	
3.	Occupation			
	Fishing	99(66%)	0(0%)	
	Petty trading	47(31%)	33(65%)	
	Carrying fish	0(0%)	12(24%)	.000
	Boiling fish	5(3%)	6(11%)	
		151(100%)	51(100%)	
4.	Marital status			
	Married	94(62.5%)	22(43%)	
	Single	46(30.5%)	11(22%)	
	Cohabited	2(1%)	0(0%)	.000
	Separated	9(6%)	12(23.5%)	
	Widow	0(0%)	6(11.5 %%)	
		151(100%	51(100%)	
5.	Religion			
	Muslim	149(99%)	42(82%)	
	Christian	2(1%)	9(18%)	.000
		151(100%)	51(100%)	
6.	Tribe			
	Zigua	46(30%)	17(33.3%)	
	Digo	27(18%)	15(29.4%)	.000
	Tumbatu	22(15%)	3(6%)	
	Other tribes	56(37%)	16(31.3%)	
		151(100%)	51(100%)	

Source: Field data, April 2025

Variations of fishing activities

Study findings revealed several variations in fishing activities in the study area. These activities were carried out by women who carried fish from the boat, as reported by 162 (80%) respondents, while 139 (69%) of the respondents reported that women were food vendors. Findings further revealed that women were involved in farming seaweed by 134 (66%). It was further reported that women were also frying and selling small fish by 143(71%) respondents. On the other hand, it was reported that men participated in deep-sea fishing by 197(98%) respondents. Men were also selling big and small fish by 173(86%) respondents, and men were responsible for the removal of fish scales by 156(77%). Tables 2 and 3 provide a detailed description of Fisher's test between men and women and the reported fishing activities, while Tables 4 to 8 provide other descriptions on Fisher's test (see Appendix 1 - 5). On the other hand, Sambuo et al. (2018) held the view that the role of women in fishing activities is often regarded as supportive due to their limited access to resources, credit, and

training. Women were mainly engaged in offshore fishing and harvesting. They are responsible for fish drying, salting, and selling in local markets, and they also play significant roles in aquaculture, contributing to feeding, cleaning, and maintaining fish farms. Pike et al. (2024) found that livelihood initiatives are common within marine protected areas, aiming to alleviate poverty and provide higher income opportunities. It was further noted by Pike et al. (2024) that among the livelihood initiatives are seaweed farming and coastal tourism, which did not provide significantly higher monetary returns compared to long-standing livelihoods, such as fisheries. Mkuna and Baiyegunhi (2021) further noted that women are not a homogeneous group; the different roles of women throughout the fishing and aquaculture sector vary widely, ranging from harvesting shellfish and seaweed, small-scale fishing and net mending, to processing and marketing of fisheries and aquaculture products.

Similarly, during an in-depth interview with the ward executive officer, he explained that:

> *In this area, men are mainly doing fishing activities in the deep sea, while women are doing other activities offshore. The nature and context of fishing activities led women to participate more in offshore activities, such as carrying fish from the boat, frying and selling small fish, acting as food vendors, and engaging in other petty trading. It is the gender roles that differentiate between the men and women, meaning women have more domestic chores at the household level rather than men, hence they have to engage in offshore fishing activities for them to balance the context'* (IDI, Ward executive officer, Kipumbwi ward, April 2025).

It was further added by a fisheries officer from Kipumbwi ward in an in-depth interview that:

> *The roles played in terms of gender influence men to participate in deep-sea fishing activities, while women are more likely to engage in offshore fishing activities. Fishing in the deep-sea involves courage and muscles as it requires the use of force sometimes. In this regard, it is believed that men are responsible for fishing activities as they sometimes spend a night in the deep-sea looking for the fish, while women, apart from involving themselves in offshore fishing activities, are also responsible for domestic chores at the household level. Therefore, the context of the fishing activities with the societal setting resulted in variations in fishing activities in this area* (IDI, Ward fisheries officer, Kipumbwi ward, April 2025).

Table 2: Chi-square test on the variation between gender and fish carrying

Fish carrying from the boat by women (Commonly called bodaboda)		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	2.896d	1	.089		
	Continuity Correctionc	1.486	1	.223		
	Likelihood Ratio	3.002	1	.083		
	Fisher's Exact Test				.152	.002
	N of Valid Cases	162				
No	Pearson Chi-Square	9.487e	1	.002		
	Continuity Correctionc	8.353	1	.004		
	Likelihood Ratio	9.106	1	.003		
	Fisher's Exact Test				.004	.112
	N of Valid Cases	40				
Total	Pearson Chi-Square	212.488a	4	.000		
	Likelihood Ratio	22.656	4	.000		
	N of Valid Cases	202				

Results in Table 2 indicate that there was a statistically significant difference between gender and fishing carrying activity.

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Table 3: Chi-square test on the variation between gender and fish frying and selling

Chi-Square Tests Frying and selling small fish		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	2.160c	1	.142		
	Continuity Correctiond	1.468	1	.226		
	Likelihood Ratio	2.034	1	.154		
	Fisher's Exact Test				.195	.034
	N of Valid Cases	143				
No	Pearson Chi-Square	4.364e	1	.037		
	Continuity Correctiond	3.333	1	.068		
	Likelihood Ratio	4.418	1	.036		
	Fisher's Exact Test				.064	.115
	N of Valid Cases	59				
Total	Pearson Chi-Square	212.488 a	4	.000		
	Likelihood Ratio	22.656	4	.000		
	N of Valid Cases	202				

Results in Table 3 indicate that there was a statistically significant difference between gender and fish selling activity-value (.034).

Challenges associated with fishing activities

Study findings revealed several challenges associated with fishing activities, including accidents, which occurred in 139 (92%) cases among males and 43 (84%) cases among females. This was followed by a loan with a high interest rate by 143 (95%) males and 41 (80%) females' respondents, and a lack of security by 147 (97%) males and 49 (96%) females' respondents. Further findings reported other challenges which include unpredictable income by 124(82%) males and 42(82%) females' respondents, improper market by 147(97%) males and 25(49%) females' respondents, high taxes by 150(99%) males and 45(88%) females' respondents, lack of toilet by 150(99%) males and 49(96%) females' respondents and lack of capital by 127(84%) and 24(16%) females' respondents. Similarly, Mangubhai et al. (2022) identified the following challenges faced by the fishing community in their study: limited access to finance and resources, social and cultural barriers, and economic disparities. At the same time, Quaidoo (2018) observed that women's contributions in small-scale fisheries were often overlooked due to socio-cultural expectations of roles and responsibilities. In view of that, women faced multiple cultural, economic and political limitations while running their small-scale businesses. Such gender dynamics limit women's involvement, contribution, and active participation in fisheries, as they receive little attention when compared to highly valued activities dominated by men. Sambuo et al. (2018) further argued that women faced several obstacles emanating from patriarchal, patrilineal, and patrilocal socio-cultural constructs, as well as religious traditions, and limited control over economic resources and decision-making processes. These socio-cultural factors have deep roots and shape power relations, influencing the ways individuals perform their responsibilities according to gender norms and expectations within their communities. While Knott & Gustavsson (2022) noted that women have limited access to information, extension, and financial services, receive fewer benefits from their activities, and have limited control over markets. On the other hand, both men and women have limited access to physical and capital resources, as well as social protection, in the fishing community, as they are often at risk during their day-to-day activities. Figure 1 provides a detailed description of the challenges among fish entrepreneurs.

Similarly, the village executive officer during the in-depth interview was of the view that:

> *Accidents are a problem among women, as many of them carry fish from the boat to the selling point. However, the capacity of the carrying bowls has increased, allowing for a large amount of fish to be carried on a single trip with minimal payment. In this regard, women are still holding large bowls, which sometimes causes back injuries due to the heavy weight (*IDI, Village Executive Officer, Kipumbwi Village, June 2025).

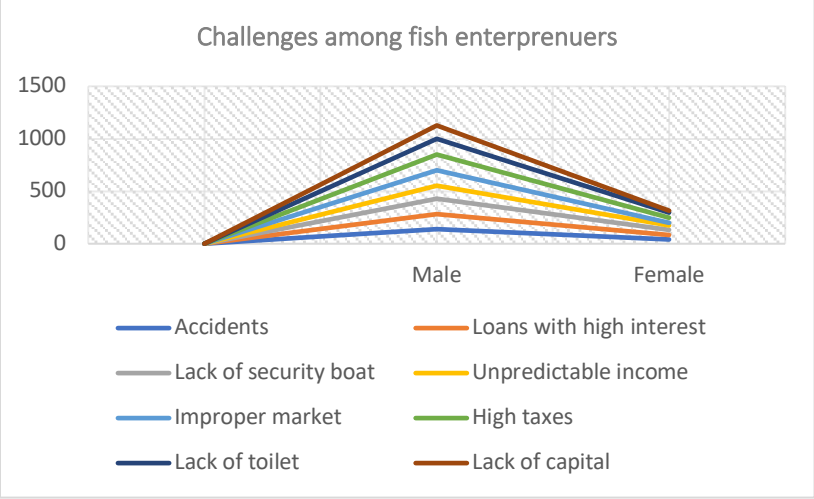
Additionally, the Village chairperson during the in-depth interview added that:

> '*Villagers in Kipumbwi are mainly engaging themselves in fishing activities; however, many of them have little capital with poor fishing vessels. The question of capital affected both men and women entrepreneurs, as they all ended up engaging in loans with high interest rates. Eventually, they circulate into a vicious cycle of poverty. They also face a high tax rate, as they cannot control how prices are set at the fish selling point* (IDI, Village Chairperson, Kipumbwi Village, June 2025).

The ward fishery officer, during the in-depth interview, added that:

> *Fishing activities are usually carried out for twenty (20) days in a month, while the other ten (10) days are used for the repair of the fishing vessel by men, that is the nature of the ocean. During the 10 days, women who are engaging in fishing activities stay home, spending what they have collected. The situation led them to be in a vicious cycle of poverty, of collecting and spending during the 10 days. Women are suffering more because they have little capital with a lot of responsibilities in their households* (IDI, Fisheries officer, Kipumbwi ward, May 2025).

Figure 1: Challenges among fish entrepreneurs



Source: *Field data, April 2025*

Ways of mitigating challenges experienced by fish entrepreneurs

Study findings revealed several ways to reduce the difficulties experienced by fish entrepreneurs. The building of the modern market was reported by 67 (44%) males and 15 (29%) females' respondents. It was further reported that construction of a toilet was undertaken by 149 (99%) males and 50 (98%) females' respondents, and education provision on modern fishing methods was provided to 137 (91%) males and 18 (35%) females' respondents. It was further reported that capital assistance by 130(86%) males and 43(84%) females' respondents, conducive environment for fishing activities by (79(52%) males and 16(31%) female respondents, provision of entrepreneurship skills by 128(85%) males and

38(75%) females' respondents and minimising restrictions to fishers by 127(84%) males and 29(57%) females' respondents. Table 9 provides detailed descriptions of the reported ways toward challenges among fish entrepreneurs (see Appendix 6). Similarly, Ratner et al. (2021) stated that the significance of capacity-building programmes tailored to the specific needs of the fishing sector was crucial to the fishing community. This should involve training opportunities on innovative fishing techniques, sustainable resource management, and alternative income-generating activities among members of the fishing community, as these were identified as essential for enhancing the adaptive capacity of the fishing community. This argument aligns with that of Garcia et al. (2023), who posited that equipping women with the necessary skills and knowledge empowers them to effectively cope with various circumstances, as they are more prone to falling into risks in the fishing arena. Similarly, Ocampo and Binondo (2022) noted in their study that fishing activities are susceptible to external shocks. Additionally, poverty in the fishing community was another factor that contributed to the instability and volatility of the fishing trade. They proposed alternative sources of income for the fishing community to be stable.

Similarly, the ward executive officer in an in-depth interview had a view that:

> *Among the challenges facing the fishing community in Kipumbwi are outdated fishing gear technologies, which hinder the continuation of fishing activities, especially in adverse weather conditions, in addition to the ongoing effects of climate change. Therefore, a holistic approach is required for fishers to pursue their activities properly since it is their primary source of income, shelter and other basic needs. This affects both men and women who are involved in the fishing activities* (IDI, Ward executive officer, Kipumbi ward, April 2025).

Additionally, the ward fisheries officer during the in-depth interview added that:

> *Community members involved in fishing activity in this area do not have enough capital, as they mainly rely on fishing, and there is no diversification among them on how to earn a living. Many of them are poor, as they have little capital, and hence engage in small businesses mainly for subsistence. Therefore, providing financial and technical support would enable them to pursue the fishing activities appropriately and sustain their livelihood* (IDI, Ward fisheries officer, Kipumbwi ward, April 2025).

Conclusion

The study findings shed light on gender dynamics among fish entrepreneurs. Specifically, the study focused on identifying variations in fishing activities between men and women, assessing the challenges associated with these differences, and establishing ways to mitigate them. Study findings revealed that fishing was the primary activity carried out by men, followed by trading in both large and small fish, as well as scale removal. While women mainly support the fishing trade by carrying fish from the boat, frying and selling small fish, and farming seaweed. Several challenges were identified by this study, including a lack of capital, outdated fishing methods, high taxes, accidents, an improper market, and unpredictable income. This study informs policymakers through recommendations, such as providing knowledge and skills on modern fishing methods, offering support through loans, creating a conducive environment for fishing, and minimising restrictions. These recommendations emphasised a holistic approach to minimise the gender dynamics in fishing activities through the respective ministries of agriculture, livestock, and fisheries, as well as the Pangani District Council. This would enable the fishing community to participate appropriately in fishing-related activities. Ultimately, it would foster greater inclusivity in fishing activities, enhance livelihoods, and benefit not only men but also women and the entire fishing community.

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Appendices

Appendix 1: *Chi-square test on the variation between gender and food vendor*

Chi-Square Tests

Women are food vendors		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	1.003c	2	.606		
	Continuity Correctione	.384				
	Likelihood Ratio	1.248	2	.536		
	Fisher's Exact Test					.302
	N of Valid Cases	139				
No	Pearson Chi-Square	.022d	1	.882		
	Continuity Correctione	.000	1	1.000		
	Likelihood Ratio	.022	1	.882		
	Fisher's Exact Test				1.000	.562
	N of Valid Cases	63				
Total	Pearson Chi-Square	100.666a	4	.000		
	Likelihood Ratio	10.413	4	.034		
	N of Valid Cases	202				

Results in Table 4 indicate that there was no statistically significant difference between gender and food vendor activity.

***Appendix 2**: Chi-square test on the variation between gender and seaweed farming*

Chi-Square Tests

Sea weed faming among women		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	.942c	1	.332		
	Continuity Correctionb	.115	1	.734		
	Likelihood Ratio	1.703	1	.192		
	Fisher's Exact Test				1.000	.428
	N of Valid Cases	134				
No	Pearson Chi-Square	.950d	1	.330		
	Continuity Correctionb	.000	1	1.000		
	Likelihood Ratio	1.335	1	.248		
	Fisher's Exact Test				1.000	.517
	N of Valid Cases	68				
Total	Pearson Chi-Square	2.048a	1	.152		
	Likelihood Ratio	3.493	1	.062		
	N of Valid Cases	202				

Results in Table 5 indicate that there was no statistically significant difference between gender and seaweed farming activity, p-value (.428).

***Appendix 3**: Chi -square test on the variation between gender and fishing activity*

Fishing activities carried out by men		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	2.465c	1	.116		
	Continuity Correctiond	1.790	1	.181		
	Likelihood Ratio	2.484	1	.115		
	Fisher's Exact Test				.164	.005
	N of Valid Cases	197				
No	Pearson Chi-Square	2.486e	1	.115		
	Continuity Correctiond	1.726	1	.189		
	Likelihood Ratio	2.504	1	.114		
	Fisher's Exact Test				.189	.094
	N of Valid Cases	5				
Total	Pearson Chi-Square	206.696a	4	.000		
	Likelihood Ratio	17.313	4	.002		
	N of Valid Cases	202				

Results in Table 6 indicate that there was a statistically significant difference between gender and fishing activity, p-value (.005).

Appendix 4: *Chi-square test on the variation between gender and the selling of big fish*

Chi-Square Tests

Selling big and small fish carried by Men		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	5.850c	1	.016		
	Continuity Correctiond	4.063	1	.044		
	Likelihood Ratio	4.623	1	.032		
	Fisher's Exact Test				.030	.030
	N of Valid Cases	173				
No	Pearson Chi-Square	.598e	1	.439		
	Continuity Correctiond	.117	1	.732		
	Likelihood Ratio	.611	1	.435		
	Fisher's Exact Test				.671	.369
	N of Valid Cases	29				
Total	Pearson Chi-Square	203.616a	4	.000		
	Likelihood Ratio	14.100	4	.007		
	N of Valid Cases	202				

Results in Table 7 indicate that there was a statistically significant difference between gender and the selling of big fish, p-value (.030).

Appendix 5: *Chi-square test on the variation between gender and fish removal of fish scale*

Chi-Square Tests

Removal of fish scale carried by Men		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Yes	Pearson Chi-Square	3.984c	1	.046		
	Continuity Correctionb	2.738	1	.098		
	Likelihood Ratio	6.857	1	.009		
	Fisher's Exact Test				.045	.033
	N of Valid Cases	156				
No	Pearson Chi-Square	.646d	1	.421		
	Continuity Correctionb	.239	1	.625		
	Likelihood Ratio	.652	1	.419		
	Fisher's Exact Test				.534	.314
	N of Valid Cases	46				
Total	Pearson Chi-Square	1.743a	1	.187		
	Likelihood Ratio	1.894	1	.169		
	N of Valid Cases	202				

Results in Table 8 indicate that there was a statistically significant difference between gender and the removal of fish scale activity, p-value (.033).

Appendix 6: *Ways of mitigating challenges experienced by fish entrepreneurs*

Sn	Ways toward challenges among fish entrepreneurs	Gender of respondents		Chi-square
1.	Building of modern fish market	Male (n)	Female(n)	P-value
	Yes	67(44%)	15(29%)	
	No	84(56%)	36(71%)	.001
	Total	151(100%)	51(100%)	
2.	Construction of toilet			
	Yes	149(99%)	50(98%)	
	No	2(1%)	1(2%)	.004
	Total	151(100%)	51(100%)	
3.	Education provision on modern ways of fishing			
	Yes	137(91%)	18(35%)	
	No	14(9%)	33(65%)	.189
	Total	151(100%)	51(100%)	
4.	Capital assistance			
	Yes	130(86%)	43(84%)	
	No	21(14%)	8(16%)	.000
	Total	151(100%)	51(100%)	
5.	Conducive environment in fishing activities			
	Yes	79(52%)	16(31%)	
	No	72(48%)	35(69%)	.000
	Total	151(100%)	51(100%)	
6.	Provision of entrepreneurship skills			
	Yes	128(85%)	38(75%)	
	No	23(15%)	13(25%)	.014
	Total	151(100%)	51(100%)	
7.	Minimising restriction fishers by recognising them			
	Yes	127(84%)	29(57%)	.201
	No	24(16%)	22(43%)	
		151(100%)	51(100%)	

Source: Filed data, April 2025