

# BASELINE SURVEY REPORT: GENDER ANALYSIS OF THE FISH & AQUACULTURE SECTOR IN KWALE & KILIFI





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## Abbreviation and Acronyms

<b>BMU</b>	Beach Management Unit
<b>GDP</b>	Gross Domestic Product
<b>IDRC</b>	International Development Research Centre
<b>IMTA</b>	Integrated Multi-Trophic Aquaculture
<b>KII</b>	Key Informant Interview
<b>FGD</b>	Focus Group Discussion

## Executive Summary

The coastal communities in Kilifi and Kwale Counties, Kenya, continue to experience multifaceted impacts occasioned by rapid population growth amidst dwindling of resources as a result of over exploitation, environmental degradation and the COVID-19 pandemic. With a significant decline in fish catches, coastal communities have been affected, particularly the livelihoods of fisherfolks who operate artisanal fishing vessels across the region. The gendered implications of these challenges have led to disparities in income and economic opportunities between men and women. Men primarily engage in fishing activities at sea, while women often find themselves constrained to near onshore and offshore roles such as sea weed farming and fish processing with constrained access to ocean resources. The emergence of the COVID-19 pandemic has exacerbated these gender inequalities, as women fulfill multiple roles as caregivers, nurturers, and unpaid labor providers, intensifying their vulnerability.

It is against this backdrop that IDRC funded Blue Empowerment project undertook a baseline survey. This survey incorporated various data collection methods, including household surveys, focus group discussions, and key informant interviews. A gender analysis was conducted to explore patterns and discrepancies related to gender.

While the survey provides valuable insights into gender dynamics in the context of fishing and aquaculture, it is essential to acknowledge its limitations. The study was region-specific, conducted only in Kilifi and Kwale Counties, and may not be entirely representative of the diversity and variations in other regions. The study also faced challenges with regard to fully exploring the intersectionality of gender, age, and disability. Data translation introduced potential nuances during analysis, and issues such as recall bias and social desirability bias influenced data collection.

The baseline survey findings reveal significant gender disparities in the fishing and seaweed farming sector in Kilifi and Kwale Counties, Kenya, highlighting the urgency of addressing gender inequality to promote sustainable development.



**Livelihoods and Income:** Gender disparities in household asset ownership persist, indicating the need for targeted interventions. The primary sources of income are seaweed farming, fish farming, and business activities, challenging traditional gender norms and emphasizing the changing dynamics in these sectors.



**Utilization of Ocean Resources:** Women's increasing involvement in fishing and men's engagement in tourism-related activities require further investigation to guide interventions promoting equity in the sector. Limited awareness about value addition and disparities in engagement duration and price perception call for gender-sensitive programs.



**Challenges in Seaweed Farming and Aquaculture:** Climate change disproportionately impacts women engaged in fishing and aquaculture, necessitating tailored support mechanisms. Barriers to adaptation and gender-specific obstacles need to be addressed for effective climate resilience.



**Economic Returns:** Seaweed and fish farming has improved living standards and social status, particularly for women. County-specific differences are observed, emphasizing the need for gender-sensitive programming to empower women economically and socially.



**Technology and Innovation:** Gender differences in awareness and adoption of aquaculture and fisheries innovations require strategies to promote equitable access and ownership of equipment.



**Social Support Structures:** Women are more likely to belong to groups or associations, but gender disparities exist in support types and asset ownership. Gender-focused programs should offer credit, technical training, marketing support, and encourage women's leadership within groups.



**Access to Training:** Gender-based disparities in training and skills acquisition highlight the active engagement of women in these sectors. Recognizing these differences is essential for inclusivity and equitable development.



**Governance, Policy, and Institutional Dimensions:** Addressing the gender imbalance in BMU membership, remittance behavior, and government support is crucial to ensure gender equality in the fishing and seaweed farming sectors. Tailored support programs and addressing gender disparities are essential in achieving equitable outcomes.

In conclusion, the findings highlight important implications for policymakers, practitioners, and researchers. In this regard, Gender-sensitive, context-specific interventions are needed to address the already shifting gender dynamics in the fishing and sea-weed farming sector. Awareness campaigns and training programs should focus on the importance of value addition. Climate resilience measures should specifically target women. Efforts should be made to provide women with equitable access to government support and training. Gender-equitable practices and policies should be promoted within women's groups. The gender gap in technology adoption and equipment ownership should be bridged. Women's awareness and participation in Beach Management Units should be increased for equitable resource management.

The research survey offers a comprehensive set of recommendations to advance gender equality and foster sustainable development in the fishing and seaweed farming sector, with the goal of benefiting the entire community. These recommendations include the promotion of gender-sensitive training programs, increased awareness of value addition, advocacy for gender-responsive policies, facilitation of research and knowledge sharing, the implementation of climate-resilient strategies, empowerment of women within Beach Management Units (BMUs), improved access to government support, promotion of inclusive technological advancements, support for empowerment within social groups, and the establishment of effective progress monitoring with a focus on collecting gender-disaggregated data.

The effective realization of these recommendations' hinges upon the collaborative efforts of policymakers, practitioners, and researchers. Promoting gender equality in these sectors will not only benefit women, but also their families and communities, and contribute to the sustainable development of coastal communities. This can only be achieved through collective action and cooperation, to cultivate a more equitable and sustainable fishing and seaweed farming sector that benefits all.

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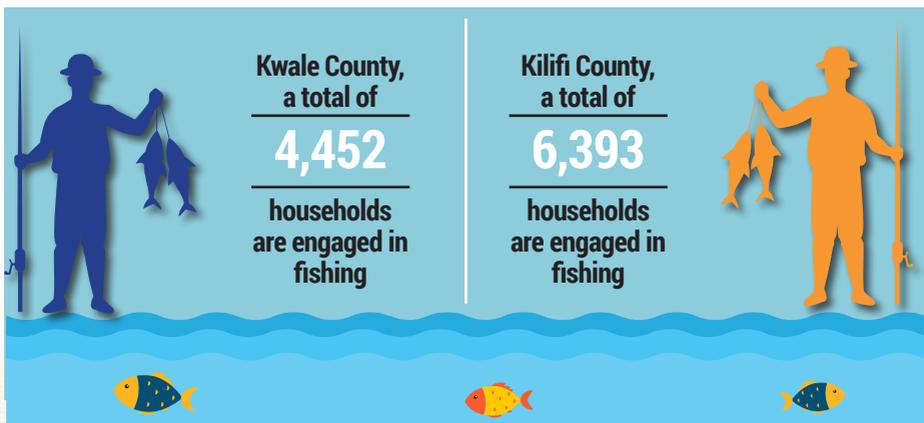


# INTRODUCTION

## 1.1 Background Summary

Kenya's coastal region, with its 536 kilometers of coastline, benefits from a range of ocean-based industries, including fishing, seafood capture, coastal and marine tourism, and shipping. These sub-sectors contribute significantly to the national GDP and provide employment for millions of people. In the context of the aquaculture and fishing sub-sectors, official data shows Kwale and Kilifi counties are the two main coastal counties with the highest number of households practicing fishing, and aquaculture.

In Kwale County, a total of 4,452 households are engaged in fishing, with the highest concentration in Lunga Lunga sub-county (1,879 households). Aquaculture is also practiced in Kwale County, with a total of 220 households involved. Kilifi County has a higher number of households practicing both aquaculture and fishing, with notable numbers in Malindi and Magarini sub-counties. A total of 6,393 households are engaged in fishing in Kilifi County, with the highest concentration in Kilifi North sub-county (1,021 households). Aquaculture is practiced by a total of 366 households in Kilifi County (KNBS, 2019).



However, women's participation in the blue economy is often overlooked or underrepresented (Kleiber et al., 2015; Williams, 2016). Despite this, Women's significant role in the fishery sector is being increasingly recognized, as they are actively engaged in various aspects of coastal fisheries, including middle sellers and buyers, as well as in the development of value-added products. The perception that fishing is predominantly a man's domain is perpetuated by the failure to collect and disaggregate data on women fishers (Kleiber et al., 2015; Williams, 2016). Understanding gender dynamics in fisheries requires moving beyond a simple understanding of men's and women's roles to a deeper analysis of social and cultural norms that influence the experiences and challenges faced by men and women in fishing, especially considering other intersecting dimensions of social differentiation such as economic status, ethnicity, and disability (Aswani & Baird, 2018; Charnley & Garcia, 2018).

Gender inequality in the fisheries sector manifests in various ways, leading to gaps and barriers for women. For example, the number of male-headed households practicing fishing is higher than female-headed households in all sub-counties, indicating men's dominance in fishing activities (Kleiber et al., 2015; Williams, 2016). The success of the fish and aquaculture industry in fostering inclusive and sustainable economic growth is intricately tied to the involvement and engagement of women, whose distinct identities and experiences require context-specific development strategies to address their specific needs (Charnley & Garcia, 2018; Aswani & Baird, 2018).

Building resilience against future environmental and political challenges, preserving the ecological foundation for the local economy, and promoting effective and equitable governance are crucial elements in achieving gender equity and economic empowerment (World Bank, 2022). To gain a comprehensive understanding of the gender dynamics and the extent of women's participation in the Blue Economy fish and aquaculture sector in Kwale and Kilifi Counties, IDRC supported Blue empowerment project baseline survey was conducted. This survey aimed to collect empirical data on various gender-related aspects, including women's status, roles, access to resources, and the challenges they face. The gender analysis of the survey responses provides valuable insights into existing gender disparities and factors influencing women's involvement. These findings will guide evidence-based decision-making and the development of targeted interventions and policies that promote gender equity, economic empowerment, and sustainable development in the Blue Economy sector of Kwale and Kilifi Counties.

## 1.2 Research Problem

The coastal region of Kenya relies on vital economic activities such as fisheries and aquaculture, which play crucial roles in ensuring food security and supporting local livelihoods. However, the deterioration of coastal and marine ecosystems due to environmental degradation and the impacts of climate change have resulted in a concerning decline in fish catches. This decline has particularly affected the livelihoods of over fisherfolks who operate artisanal fishing vessels across 141 landing sites in the region.

These challenges have distinct gendered implications, leading to disparities in income and economic opportunities between men and women. While men primarily engage in fishing activities at sea, women often find themselves constrained to downstream roles that receive inadequate investment and recognition. Consequently, women encounter limited access to ocean resources, heightened insecurity while working at sea, inadequate financial resources for investing in fishing vessels and post-harvest facilities, and enduring social pressures and discrimination within their communities.

Compounding these challenges, the emergence of the COVID-19 pandemic has further aggravated the situation. The pandemic has triggered a significant reduction in labor productivity, trade of commodities, tourism, and domestic investments. The pandemic has also underscored and intensified the existing gender inequalities, as women in coastal fisheries communities continue to fulfill multiple roles as caregivers, nurturers, and providers of unpaid labor. Unfortunately, these roles often go unnoticed and unrewarded, exacerbating the existing gender disparities. The complex interplay between climate change and the pandemic has disproportionately affected women within these fishing communities, including young women, divorced individuals, single mothers, widows, and elderly women. These vulnerable groups have experienced more pronounced setbacks, such as sharper declines in business opportunities and heightened financial losses.

In light of these pressing challenges, it is crucial to comprehensively examine and address the multifaceted gender inequalities within the coastal fisheries sector. A thorough understanding of the nuanced impacts on women and men, particularly in the face of climate change and the ongoing pandemic, is essential for developing effective strategies to promote gender equality, empower women, and enhance the resilience of coastal communities.

## 1.3 Technical Approach and Methodology

The project team conducted a baseline survey in Kilifi and Kwale to assess the gender dynamics within the fisheries sector in the two counties. The study employed five data collection methods, including a comprehensive literature review of fisheries and aquaculture studies. A household survey gathered information from 806 households, focusing on socio-economic characteristics, fishery and seaweed farming activities, and knowledge of climate-smart integrated multi-trophic aquaculture (IMTA) systems. The survey purposely choose Household Heads (HHs) as the respondent whereby HHs were defined as any adult over the age of 18 that was responsible for making or executing decisions on behalf of the other members of the household for a period of at least six months. Mature minors aged 12 to 17 years could be considered heads of HHs if they had been responsible for decision-making in the family for at least the past six months.

Additionally, 14 focus group discussions (FGDs) were conducted in Lungu Lungu and Msambweni sub-counties in Kwale to gain in-depth insights into the perceptions and experiences of fisherwomen and their households regarding IMTA adoption and seaweed farming. Key informant interviews (KIIs) were conducted at the community, sub-county, county, and national levels. The Key Informant Interviews (KIIs) encompassed a diverse range of stakeholders from various sectors and levels of government.

Non-probability sampling was used to identify key informants and Focused Group Discussions (FGD) participants. The purpose of non-probability sampling was to provide in-depth knowledge on some of the key issues as well as elaborate on the answers provided. The selection of Key Informants was meticulously organized to ensure a comprehensive understanding of the project's context and its potential impacts. The identified categories of KII participants represented a wide spectrum of stakeholders, including government officials, government agencies, non-governmental organizations, the private sector, and local community representatives. Their insights and perspectives collected through the KIIs provided a holistic understanding of the context and potential impacts of the current situation.

## 1.4 Data Analysis

All quantitative data collected through Kobo Collect was downloaded from the server and cleaned before being subjected to tests of integrity and normality. Data analysis validation and cleaning procedures realized 773 valid responses suitable for statistical analysis. Descriptive and inferential statistics were applied to summarize and infer trends from the data. All qualitative data from the FGDs, KII and observations were transcribed from the recorders, compared with the notes taken, cleaned and harmonised. The data were then grouped into similar categories and subjected to trends analysis – and deductions made.

A gender analysis was conducted to explore patterns and discrepancies related to gender. The findings were interpreted within the context of the research objectives, and visualizations such as summary tables, frequencies charts and graphs were used for presentation. Ethical considerations were upheld throughout the reporting process to ensure respondents' privacy and confidentiality, and limitations of the survey design were acknowledged.

## 1.5 Survey Limitations and Constraints

This baseline survey provides valuable insights into various aspects of gender and socioeconomic dynamics in the context of fishing and aquaculture activities. However in undertaking this baseline survey several limitations and constraints influenced the study. These factors affected the scope and depth of our findings:

The survey was conducted in specific regions, Kilifi and Kwale Counties in Kenya, and thus, the findings may not be fully representative of the diversity and variations in gender dynamics, economic activities, and cultures in other regions. The results provide insights into this specific context but may not be generalizable to a broader national or global scale.

While the study focused primarily on gender dynamics in the context of fisheries and aquaculture. However, it's important to acknowledge that gender is only one aspect of identity. While the survey incorporated the Gender-Based Analysis Plus (GBA+) framework, Intersectionality, which considers how various identity factors such as gender, age, disability ,intersect, was not explored fully. The study faced limitations in fully applying this framework, particularly the inclusion of Persons with Disabilities (PWDs) during Household survey phase. The survey's design which required random selection of respondents and logistics posed challenges in adequately pursuing the specific experiences of PWDs. This may have resulted in a lack of representation or nuanced insights from this group.

The study included open-ended questions and qualitative interviews to capture in-depth information and personal experiences. However, these posed challenges, especially during data cleaning and analysis. Responses in Kiswahili had to be translated to facilitate data processing, which may have introduced nuances or potential misinterpretations during the translation process.

Data collection for this survey faced challenges such as incomplete responses, recall bias, or social desirability bias. Participants may have been influenced by societal norms or expectations, which can affect the accuracy and depth of their responses. Besides the survey results are based on data collected during a specific timeframe. Social, economic, and environmental conditions can change over time, and this data may not fully capture the evolving nature of gender dynamics, socioeconomic challenges, and adaptation strategies.

Despite these limitations and constraints, this survey contributes to the understanding of gender dynamics, economic activities, and adaptation strategies in the study region. Future research and data collection efforts can aim to address these challenges to provide a more comprehensive and nuanced analysis of gender dynamics, including the experiences of marginalized groups, and to enhance the robustness of findings.

## Pictures: Fish and Aquaculture in Kwale and Kilifi Counties





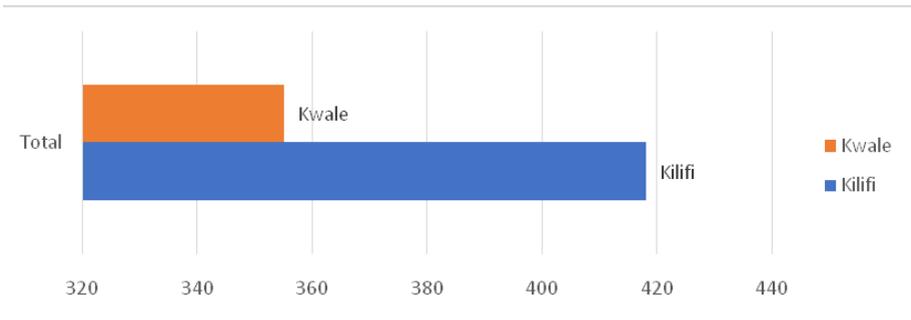
## SURVEY RESEARCH FINDINGS

### 2.1 Demographic Characteristics

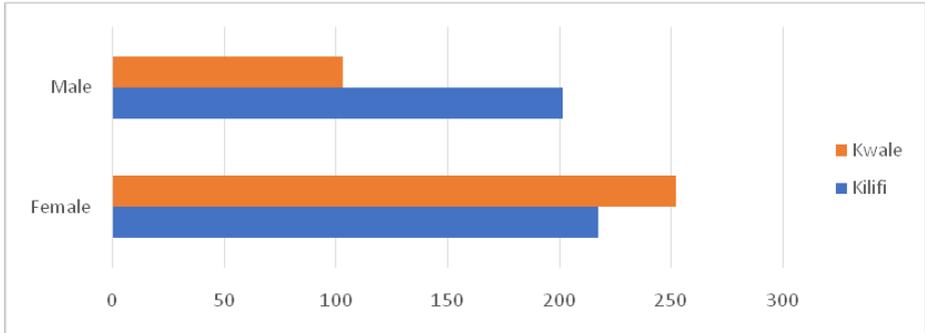
#### *Sex Characteristics of the respondents*

The survey enumerated 773 households. The participant demographic was predominantly composed of females, accounting for approximately 55% of the total respondents, while males constituted the remaining 45%. A noticeable disparity in gender distribution is observed across different counties.

**Figure 1: Gender distribution across counties**



Specifically, Kwale exhibited a higher proportion of female respondents in comparison to Kilifi, whereas Kilifi demonstrates a higher representation of male respondents relative to Kwale.

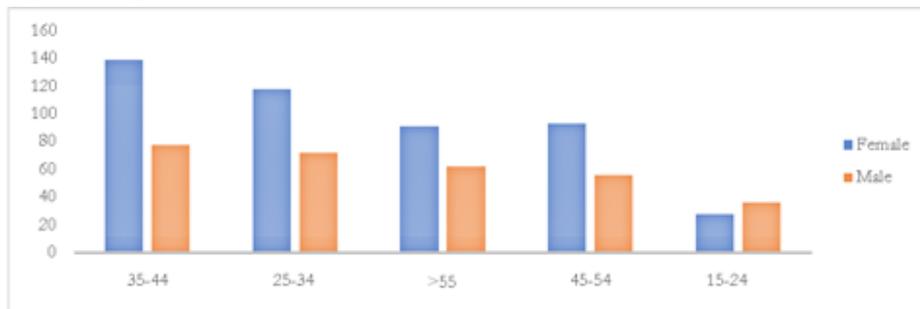
**Figure 2: Gender distribution across counties**

### Age Distribution Analysis

The survey data, shows that a significant majority of respondents, approximately 37%, fall within the age range of 25-34 years. This is followed by around 26% of respondents who are between the ages of 15-24. A noteworthy gender disparity emerges when examining the distribution of age groups. Women are more likely to be situated within the 25-34 age bracket, whereas men are more commonly found within the 45-54 age group. This divergence can likely be attributed to distinct life experiences of women and men within the Kenyan context. For instance, women often shoulder responsibilities related to childcare and domestic work, which in turn may restrict their opportunities for employment and income generation.

Intriguing regional variations come to light in the age distribution analysis. In Kilifi, a majority of respondents fall within the 25-34 age range, while in Kwale, the preponderance lies within the 35-44 age group. These disparities could potentially be linked to differing economic prospects and opportunities in these two counties. The data lends weight to the possibility of gender-based discrimination affecting access to education and employment. Notably, within Kilifi, the proportion of female respondents aged 15-24 surpasses that of their male counterparts within the same age group. This discrepancy raises the question of potential exclusions of women from educational and employment avenues.

Collectively, the data highlights the existence of gender-based variations in age distribution among respondents in the two counties. The observed differences can be attributed to multifaceted factors, including gender-specific life experiences and potential instances of gender-related bias. Further exploration of these dynamics is imperative to gain a comprehensive understanding of their underlying causes.

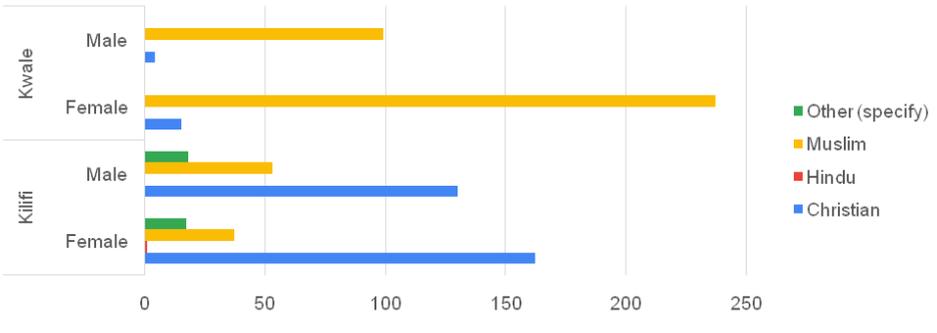
**Figure 3: Age and Gender Distribution**

### **Analysis of Religious Affiliation**

A comprehensive examination of respondents' religious affiliations underscores a clear pattern, with a considerable majority of approximately 63% identifying themselves as Christians. In contrast, about 21% align with the Muslim faith. This trend closely mirrors the national religious demographics of Kenya. An intriguing gender-based divergence emerges when scrutinizing religious affiliations.

Distinct regional disparities come to the forefront when assessing religious affiliations. In Kilifi, a notable majority of respondents align with the Christian faith, whereas in Kwale, a significant portion of respondents identify as Muslim. These variations can be attributed to differing historical and cultural influences that have left their mark on these two counties.

The data reveals a distinctive pattern of religious affiliations among respondents. Gender-based differences in religious identification align with the broader religious demographics of Kenya, while regional variations can be traced back to historical and cultural factors. This analysis sheds light on the intricate interplay of gender, culture, and geography in shaping religious affiliations within the surveyed population.

**Figure 4: Religious affiliation across counties**

### Education Attainment Analysis

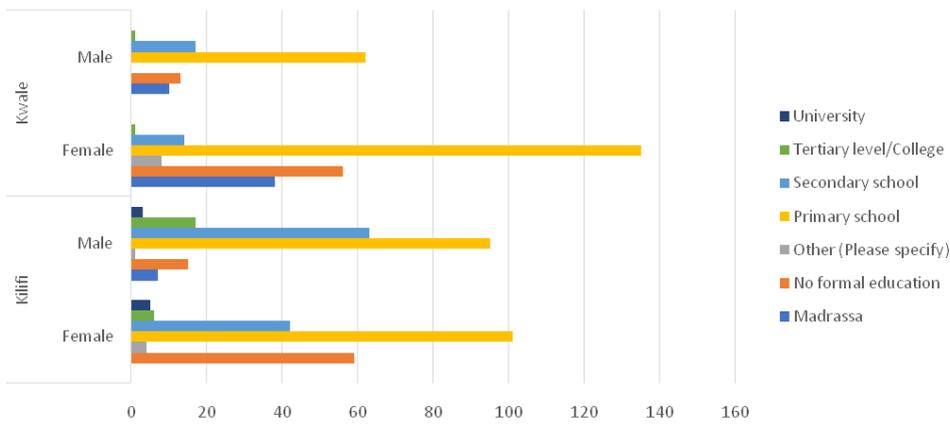
The survey reveals that a significant proportion of respondents have attained primary education, constituting about 47% of the total participants, while an additional 27% have successfully completed secondary education.

An evident gender disparity emerges in educational achievements, where women predominantly possess primary school completion, whereas men exhibit a higher likelihood of having completed secondary school or pursuing higher education. This divergence is likely attributed to multifaceted factors, potentially including instances of gender-based discrimination within the education system.

Moreover, distinct regional patterns in educational attainment come to light. Specifically, in Kilifi, the majority of respondents have accomplished primary education, while in Kwale, a greater portion of participants have achieved secondary education or higher. This discrepancy may be a consequence of varying economic prospects available within these two counties.

A noteworthy observation arises from the data, suggesting the possibility of gender-related discrepancies in access to education. For instance, within Kilifi, the percentage of female respondents who have completed secondary education is considerably lower than their male counterparts, implying a potential exclusion of women from educational opportunities.

**Figure 5: Education attainment across counties**



In the broader context, the data underscores the presence of gender-based disparities in educational attainment across Kenya. These disparities could potentially stem from a range of influences, including instances of gender-based discrimination prevalent within the education sector. This finding highlights the need for interventions that are accessible and responsive to the needs of communities with low levels of education.

### **Respondent’s Marital Status Analysis**

The survey data, indicates that a significant majority of respondents, around 65%, are married, while approximately 22% identify as single. A notable gender disparity surfaces when considering marital status, with women displaying a higher likelihood of being single, while men tend to be more frequently married. This phenomenon is likely influenced by a range of factors, including the presence of gender-based discrimination within the institution of marriage.

Distinct variations in marital status emerge across different regions. In Kilifi, a majority of respondents report being married, whereas in Kwale, the majority describe themselves as single. Further examination of the data points shows that within Kilifi, the proportion of single female respondents significantly outweighs that of their male counterparts. Taken together, the data underscores the existence of gender-based discrepancies in marital status within Kenya. These variations may be attributed to a multitude of factors, including instances of gender-based discrimination embedded within the institution of marriage.



Moreover, the data reveals a striking trend – there are more widowed women than men. This phenomenon can likely be attributed to the longer life expectancy of women compared to men. Additionally, the data indicates a higher prevalence of divorced women compared to men. This may be linked to women's increased likelihood of being widowed or divorced may stem from their comparatively limited ownership of property and financial resources. These patterns underscore the need for further examination of the underlying social, cultural, and economic factors contributing to these disparities.

## 2.2 Livelihood and Incomes

### ***Gender Differences in Household Asset Ownership***

The data reveals that gender disparities exist in the ownership of various household assets in both Kilifi and Kwale Counties. The data clearly demonstrates substantial variations in household asset ownership among different income groups. The ownership percentages for various assets differ significantly between the highest and lowest income groups underscoring the need for equitable access efforts. Specific Asset Ownership is characterized by :

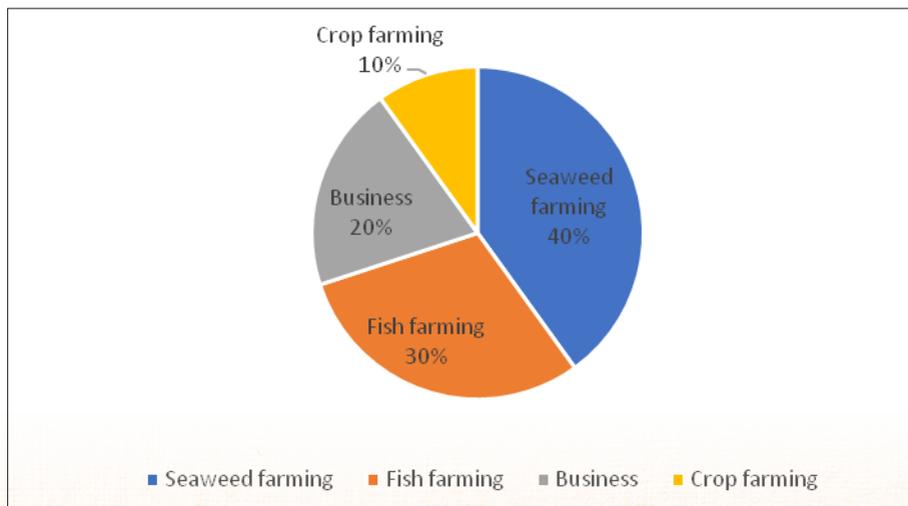
- Television: No significant gender differences in ownership.
- Motorbike: A significant gender gap, with more men owning them.
- Modern Houses: Gender differences observed, with more men owning them.
- Traditional Houses: No significant gender differences.
- Cell Phone: No significant gender differences.
- Water Tank: A significant gender difference, with more women owning them.
- Cooking Gas: No significant gender differences.
- Solar Panel: No significant gender differences.
- Fridge: Significant gender differences, with more men owning them.
- Sofa Set: No significant gender differences.

The data suggests progress in improving access to household assets over time, indicating efforts to enhance access to these assets for all. However, gender differences in asset ownership remain evident, emphasizing the importance of addressing gender inequalities that hinder women’s access to household asset. Substantial gender and income-based disparities in household asset ownership in Kilifi and Kwale Counties, co-exist side by side. These differences can be attributed to factors such as cultural norms, economic opportunities, and access to credit. Overall, these disparities have implications for policymakers and organizations aiming to promote equitable access to household assets and improve the well-being of the population. This can inform targeted policies and programs aimed at promoting equitable access to household assets and improving the well-being of the population.

### Analysis of Source of Income

The data suggest a diversified economic landscape in the study area. An intricate examination of the main sources of income for respondents in Kilifi and Kwale counties reveals noteworthy trends. Across both counties, shows that seaweed farming is the most common main source of income, followed by fish farming and business. Crop farming is the least common main source of income. However, intriguing variations become apparent when considering gender distribution and location.

**Figure 6: Main Source of Income**



In Kilifi, a higher proportion of women list fishing as their primary income source, surpassing the number of men engaged in the same activity. In contrast, in Kwale, a larger number of men identify fishing as their primary source of income. Additionally, a substantial number of women in both counties indicate business as their main income source, outnumbering their male counterparts in this category.

A notable revelation from the data is the involvement of a limited number of individuals, all of whom are women, in seaweed farming. This observation is particularly significant as seaweed farming in other jurisdictions has traditionally been a male-dominated field. The data suggests availability of economic opportunities that are attractive to women.

Further examination underscores the prevalence of business as a primary source of income for respondents in both Kilifi and Kwale counties. This underscores a prevailing entrepreneurial spirit within these regions, potentially driven by economic circumstances and aspirations for improved livelihoods.

The data illuminates a series of compelling insights. Notably, women's increasing involvement in fishing and seaweed farming challenges traditional gender norms in these domains. The prevalence of business as a primary income source highlights a strong entrepreneurial ethos within both counties. This analysis underscores the evolving landscape of income sources, offering avenues for women's economic empowerment and signaling shifting dynamics within traditionally male-dominated sectors.

However, it will be important to assess whether women are equally represented in all economic activities and whether they have equal access to resources and opportunities in these activities. **The formative survey and life histories provide an opportunity to explore more regarding women economic activities in the fish and seaweed sector.**

## 2.3 Utilization of Ocean Resources

### *Gendered Ocean Resource Utilization*

The analysis of responses regarding the utilization of ocean resources provides valuable insights into the roles and activities of individuals in these coastal communities, with a notable focus on gender dynamics. Notably, Of particular interest is the finding that a greater proportion of female respondents (54%) are involved in fishing than their male counterparts (46%). This revelation challenges traditional notions and suggests a more active role for women in fishing, potentially indicating shifts in gender roles within this domain. This observation highlights the pivotal role women play in harnessing ocean-related opportunities. Conversely, a higher percentage of male respondents (25%) are engaged in tourism compared to female respondents (17%).

**Table 1: Gendered Ocean Utilization**

Gender	Ocean Activities	Percentage (%)	Overall Percentage
Female	Fishing	54%),	68%
	Tourism	17%	
	Other	29%)	
Male	Fishing	46%),	32%
	Tourism	25%	
	Other Activities	(29%)	

Comparing the responses from this divergence could stem from various factors, including distinct economic prospects or cultural norms that shape women's participation in ocean-related activities, variations in the extent of participation between genders and different activities necessitate further exploration. The disparities observed could also be influenced by a range of factors, urging a comprehensive examination to unravel the underlying dynamics and contribute to a more nuanced understanding of gender roles and opportunities in ocean-based pursuits.

*"There are many women involved in fishing, but they do not have the same opportunities or resources as men. Let us just say that women, youths and persons with disabilities are disadvantaged in marine fisheries management activities."* **Government KII respondent**

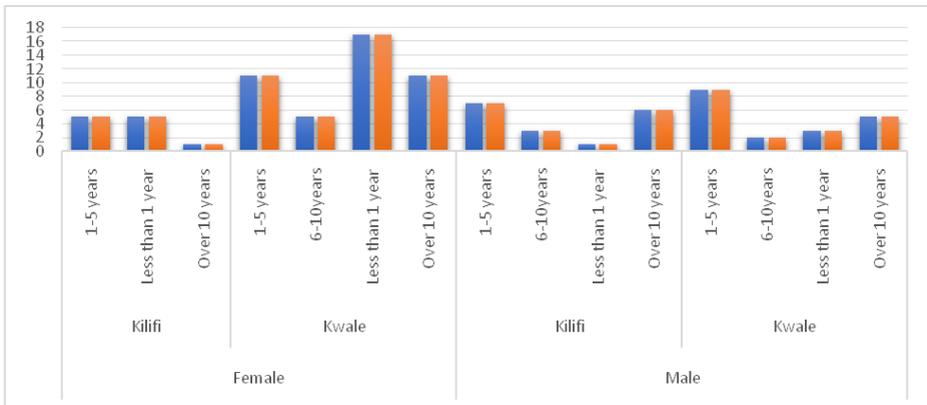
### **Awareness of Value Addition Among Seaweed and Fish Farmers**

The survey aimed to assess the level of awareness regarding the concept of value addition among these farmers. Among both male and female farmers, the prevailing trend indicates a lack of familiarity with the concept of value addition. Notably, there were distinctions in responses between female and male farmers, as well as among farmers in Kilifi and Kwale counties. Female sea weed farmers were more inclined to express a lack of awareness of value addition, while their male counterparts were more likely to claim familiarity with the concept. Furthermore, fish farmers in Kilifi were more prone to acknowledge awareness of value addition, whereas seaweed farmers in Kwale were more prone to indicate a lack of awareness. Overall, the data underscores a noticeable absence of awareness concerning value addition within the community of seaweed and fish farmers in Kenya. This finding raises concerns, as value addition plays a pivotal role in fostering the development of sustainable businesses in the sector.

## Analysis of Length of Engagement in Fish Farming

This survey question aimed to gauge the farmers’ length of involvement in the fish and fish farming activities. The majority of both female and male farmers reported engaging for a period of 1-5 years. Gender-related distinctions surfaced in the responses provided by female and male farmers, as well as among farmers in Kilifi and Kwale counties. Notably, female farmers demonstrated a higher likelihood of having engaged for 1-5 years, while male farmers exhibited a higher tendency to have been involved in such activities for over 10 years. Additionally, differences emerged between farmers in Kilifi and Kwale counties. Farmers in Kilifi showed a greater tendency to have been engaging for 1-5 years, while in Kwale they were more likely to have been involved in these activities for over 10 years.

**Figure 7: Length of time in industry by county and gender**



Gender-related observations from the data include the tendency for female farmers to have a shorter duration of engagement in the fish and fish farming activities. This may be influenced by women’s greater involvement in other economic activities, with the utilization of ocean resources often viewed as a supplementary subsistence activity. On the other hand, male respondents demonstrated a longer duration of engagement, possibly linked to their increased participation in utilization of ocean resources as a commercial activity.

These gender differences imply that women and men may have varying motivations for engaging in the utilization of ocean resources. For women, this engagement may serve as a means to supplement household income, while for men, it may be driven by the pursuit of profit generation. In light of these gender distinctions, it is crucial to consider diverse motivations when designing interventions and programs to support seaweed farmers. A deeper understanding of the diverse motivations of women and men will facilitate the development of more effective interventions, ensuring support for all seaweed farmers in their engagement with ocean resources.

### ***Fish Price Trends: An Examination of the Last 5 Years***

The survey sought to ascertain the perceived trend in fish prices over the course of the last 5 years. Both male and female farmers predominantly share the belief that fish prices have witnessed an increase over the past 5 years. Notable variations emerged in responses between female and male farmers, as well as among farmers in Kilifi and Kwale counties. Specifically, female farmers were more inclined to assert a significant increase in fish prices over the specified period, whereas male farmers were more prone to indicate a moderate increase. Furthermore, respondents in Kilifi were more likely to report a significant surge in fish prices, while their counterparts in Kwale were more prone to note a comparatively moderate increase. On the whole, the data suggests a prevalent upward trajectory in fish prices within the context of Kenya over the last 5 years. This finding is a matter of concern, given the potential adverse impact on the livelihoods of the population more so of women in the region.

### ***Analysis of Seaweed Farming Duration Among Seaweed and Fish Farmers***

A substantial majority of both female and male farmers indicated an involvement in seaweed farming for a period ranging from 1 to 5 years. Distinct variations in responses emerged between female and male farmers, as well as across farmers from Kilifi and Kwale counties. Notably, female farmers exhibited a higher tendency to have engaged in seaweed farming for 1 to 5 years, whereas male farmers displayed a greater inclination towards a duration exceeding 10 years. This trend was further reflected in the disparity between farmers from Kilifi and Kwale counties, with the former being more prone to a 1-5 year duration and the latter more inclined towards a duration surpassing 10 years.

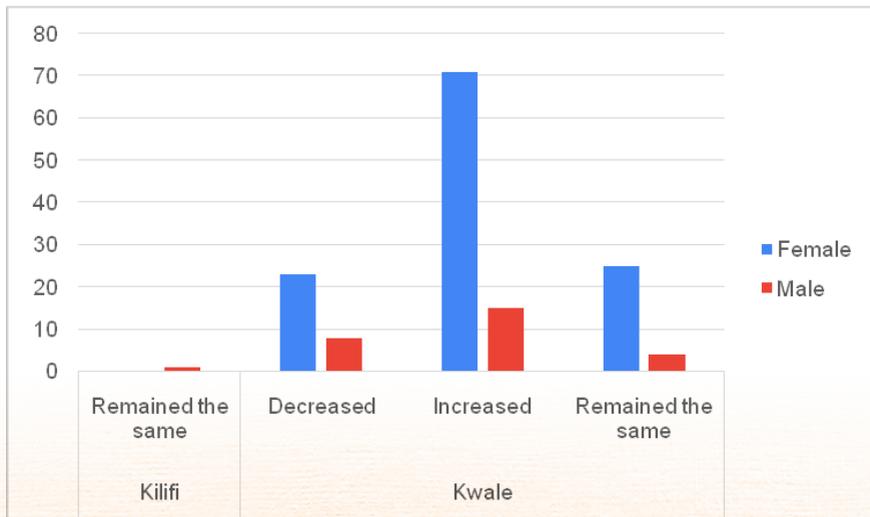
The data underscores the popularity of seaweed farming as an activity embraced by women. This inclination could potentially be attributed to the prevalence of women’s participation in subsistence agriculture, with seaweed farming aligning with subsistence-based activities. Particularly, these gender-based differentials could imply the presence of varied motivations for women and men in their pursuit of seaweed farming. However, given the distinct gender-related disparities, it is imperative to be attuned to these gender-specific distinctions. By gaining insights into the distinct motivations of women and men, interventions can be tailored to effectively engage and support the entire spectrum of seaweed farmers.

### Seaweed Price Trends

The analysis of the survey data indicates a substantial majority of both female and male farmers indicated a belief in the upsurge of seaweed prices over the previous five-year period. Notable variations emerged in the responses provided by female and male farmers, as well as among farmers hailing from Kilifi and Kwale counties.

Specifically, female farmers were more inclined to assert a significant increase in seaweed prices during the last five years, whereas male farmers were more likely to attribute a relatively moderate increase. Farmers in Kilifi were more likely to assert no change in seaweed prices over the past five years, while their counterparts in Kwale indicated a comparatively higher increase.

**Figure 8: Seaweed Price Trends**



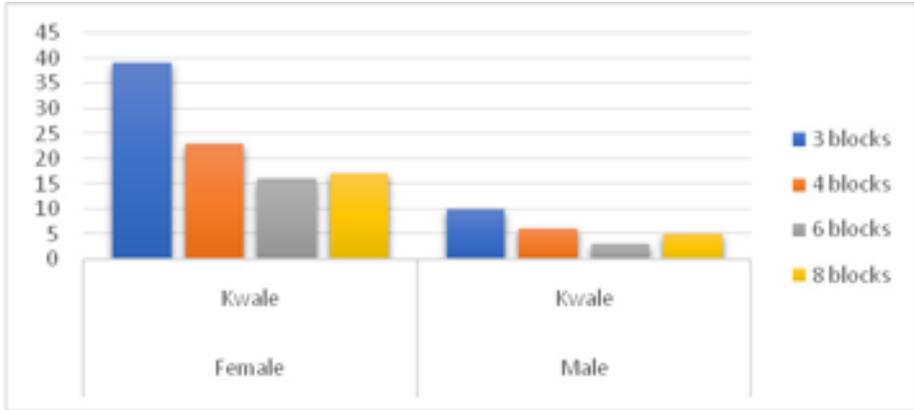
The dataset suggests a prevalent upward trend in seaweed prices over the preceding five-year span.. However, gender-related distinctions within the dataset merit consideration. Notably, female farmers appear to exhibit a heightened awareness of fluctuations in seaweed prices compared to their male counterparts.

### ***Fish Price Trends***

There is a clear trend of increasing fish prices in both Kilifi and Kwale counties. However, the trend is more pronounced in Kwale, where 78% of respondents reported that fish prices have been increasing, compared to 67% of respondents in Kilifi. There are a few possible explanations for this trend. One possibility is that the demand for fish is increasing, while the supply of fish is remaining relatively constant. This could be due to several factors, such as population growth, rising incomes, and urbanization. Another possibility is that the cost of producing fish is increasing. This could be due to factors such as the rising cost of fuel, feed, and other inputs.

### ***Number of Blocks***

The survey participants were queried about the quantity of seaweed blocks they currently maintain. Among the respondents, the proportion of female farmers surpassed that of male farmers. A substantial majority of both female and male farmers reported ownership of either three or four seaweed blocks. Noteworthy divergences in responses emerged between female and male farmers, as well as among farmers based in Kilifi and Kwale counties. For instance, female farmers were more inclined to possess six or eight seaweed blocks, whereas male farmers exhibited a preference for owning three or four blocks. Farmers in Kilifi showed a higher propensity for maintaining six or eight seaweed blocks, while their Kwale counterparts indicated a stronger preference for three or four blocks.

**Figure 9: Number of Blocks**

Collectively, the data underscores a relatively equitable distribution of seaweed block quantities between female and male farmers. Nonetheless, gender-related disparities in block ownership patterns warrant attention and should be factored into the formulation of interventions and programs aimed at supporting seaweed farmers.

### **Seaweed Farming Methods**

Survey participants were asked to specify the method they employ for seaweed farming. The most widely adopted method among both female and male farmers is the off-bottom method. Distinct discrepancies were evident in responses provided by female and male farmers, as well as among farmers from Kilifi and Kwale counties. Female farmers, unlike male counterparts, were more inclined to embrace the off-bottom method. This trend could potentially be attributed to the perception of the off-bottom method as a more traditional approach to seaweed farming, which aligns with the predominant participation of women in traditional agricultural practices.

On the other hand, male farmers exhibited a greater proclivity for the long line method. This inclination could be linked to the perception of the long line method as a more modernized approach, and men's higher engagement in contemporary agricultural practices. Farmers in Kilifi displayed a higher inclination towards the off-bottom method, whereas their Kwale counterparts favored the long line method.

**Figure 10: Seaweed Farming Methods**



Overall, the data underscores the prevalence of the off-bottom method as the favored approach to seaweed farming in Kenya. However, gender-related distinctions suggest that barriers to seaweed farming may differ for women and men. These discernible gender-related variances in the choice of farming methods underscore the need for tailored interventions and initiatives to support seaweed farmers. It is imperative to account for these gender-based disparities when crafting interventions and programs aimed at supporting seaweed farmers. By comprehending the distinct challenges faced by women and men, interventions can be tailored to more effectively serve and empower all seaweed farmers.

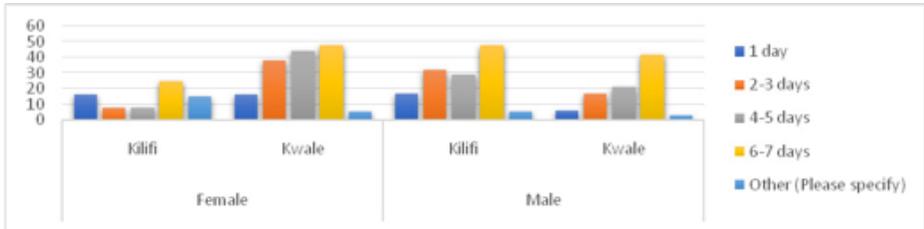
### **Species of Seaweed Planted**

The Survey participants were queried about the specific species of seaweed they cultivate. The most widely cultivated species among both female and male farmers is the *Spinosum* species of seaweed. Clear variations in responses were discernible between female and male farmers, as well as among farmers in Kilifi and Kwale counties. Notably, female farmers demonstrated a greater propensity for cultivating the *Cottonii* species of seaweed, whereas male farmers displayed a preference for the *Spinosum* species. Farmers based in Kilifi exhibited a stronger likelihood of cultivating the *Cottonii* species, while their Kwale counterparts favored the *Spinosum* species. This inclination may be attributed to the perception of the *Spinosum* species as a more lucrative variety, potentially resonating with men’s engagement in contemporary agricultural approaches. The data highlights subtle gender-related discrepancies in the selection of seaweed species and with that the necessity of customized interventions and initiatives to support seaweed farmers.

## Time Use Analysis of Seaweed and Fish Farming

The time use analysis of the study queried about the amount of time they dedicate per week to engage in the seaweed and fish activities. It is noteworthy that the majority of both female and male farmers allocated 6-7 days per week to their involvement in the activities. Significant variations emerged in the responses provided by female and male farmers, as well as among farmers residing in Kilifi and Kwale counties. For instance, female farmers demonstrated a higher tendency to allocate 6-7 days per week to their engagement. Conversely, male farmers were more inclined to dedicate 4-5 days per week to such pursuits. This distinction in time allocation may be influenced by societal roles and responsibilities, wherein women often assume household and caregiving duties that impact their flexibility in committing time.

**Figure 11: Time use**



Further differentiations became evident when comparing farmers from Kilifi and Kwale counties. Farmers in Kilifi exhibited a greater likelihood of dedicating 6-7 days per week activities, while their counterparts in Kwale displayed a preference for dedicating 4-5 days per week. Noteworthy observations regarding gender differences include the tendencies for female farmers to allocate more time, potentially due to their additional responsibilities within the household. Conversely, male farmers appeared to have greater flexibility, possibly attributed to their higher likelihood of participating in external paid work. Overall, the data underscores that both men and women invest considerable time in seaweed and fish farming activities, suggesting their time-intensive nature. Nevertheless, gender-related disparities in time allocation to these activities were apparent. Acknowledging these disparities is essential when devising interventions and programs aimed at supporting the needs of seaweed and fish farmers.

These gender differences underscore potential barriers faced by women and men in seaweed and fish farming. For instance, challenges related to childcare and juggling paid work commitments may disproportionately affect women. Incorporating an understanding of these discrepancies into the design of interventions and programs will enable more effective support for all farmers engaged in seaweed and fish farming activities.

### **Awareness of Integrated Multi-Trophic Aquaculture (IMTA)**

The survey gauged the level of awareness regarding Integrated Multi-Trophic Aquaculture (IMTA) in Kilifi and Kwale County. Overall, respondents in Kwale were more aware of the IMTA while those in Kilifi were not aware. Findings from the survey reveal that among the respondents, (40%) were cognizant of IMTA, (12%) held an uncertain stance, and the majority, encompassing (58%), demonstrated a lack of awareness concerning IMTA. Notably, the survey outcomes also highlight that the primary conduit through which respondents acquired knowledge of IMTA was through extension workers, accounting for 67% of the respondents. The internet played a role as an information source for 20% of respondents, while friends or family served as the avenue of awareness for 13% of participants.

**Table 2: Awareness of IMTA**

<b>Awareness Status</b>	<b>Kilifi County (%)</b>	<b>Kwale County (%)</b>	<b>Overall (%)</b>
Aware	12	40	20
Uncertain	30	12	18
Not Aware	58	48	62

Furthermore, the survey findings indicate that while awareness of IMTA remains relatively low within Kwale County, there exists a discernible interest in this innovative aquaculture practice, as evidenced by the 40% of respondents who displayed awareness. The prominence of extension workers as the principal source of IMTA knowledge suggests the necessity for enhanced efforts to disseminate awareness through extension services.



## Technology Can Improve Seaweed Yield

The survey asked farmers whether they think they can improve their seaweed yield by adopting new technologies. The results show that a majority of farmers (70%) are open to adopting new technologies. However, there is a significant gender difference in the responses, with more male farmers (80%) than female farmers (60%) indicating that they would adopt new technologies. This gender difference could be due to a number of factors, including Men tend to have more access to information about new technologies and more decision-making power in the household This would allow them to make the decision to adopt new technologies. Besides, men may be more confident in their ability to use new technologies.

Overall, the image suggests that there is a potential for new technologies to improve the seaweed yield of farmers in Kenya. However, it is important to address the gender gap in technology adoption in order to ensure that all farmers, regardless of gender, can benefit from these technologies.

## 2.4 Challenges in Seaweed farming and Aquaculture

### Climate Change Effects

The data indicates that the effects of climate change disproportionately affect women, particularly in Kwale and Kilifi Counties where women. This gender disparity is significant, as women are more vulnerable to the impacts of climate change on these sectors. The following gendered observations were deduced:

1. **Disproportionate Impact on Women:** Women's greater involvement in fishing and aquaculture makes them more susceptible to the negative impacts of climate change, such as changes in water temperature, increased ocean acidification, and extreme weather events. Their livelihoods and income are more directly threatened by these changes.
2. **Vulnerability and Livelihoods:** As women are disproportionately engaged in these sectors, their livelihoods, food security, and economic well-being are more directly tied to the health of fish populations and aquaculture activities. Any negative impacts on these activities have a more pronounced effect on women's lives.
3. **Support for Women:** To address the gendered impacts of climate change in Kwale and Kilifi Counties, tailored support mechanisms are needed for women. These include financial assistance, technical training, and political representation, which can help women adapt to changing conditions, diversify their livelihoods, and participate in decision-making processes.

**The formative survey provides an opportunity to explore more regarding impact of emergencies and climatic shock on women economic activities.**

### **Coping Mechanisms**

The survey sought to find common strategies employed by different groups to adapt to changing environmental conditions, as well as obstacles that hinder effective adaptation efforts. Overall, the respondents identified three primary coping mechanisms that communities utilize to address the effects of climate change as follows:

1. **Changing Fishing Grounds:** This strategy is frequently employed by fishermen when they face shifts in water temperature or ocean acidification. By altering their fishing locations, fishermen aim to mitigate the impact of changing marine conditions on their catch.
2. **Shifting to Alternative Livelihoods:** Communities that rely on agriculture often turn to alternative livelihoods when confronted with drought or flooding. This approach allows them to diversify their income sources and reduce vulnerability to climate-related disruptions in their primary activities.
3. **Building Stronger Infrastructure:** In response to challenges posed by storms or erosion, communities invest in constructing more robust infrastructure. This measure aims to enhance resilience and reduce the damage caused by extreme weather events.

In addition to the three primary coping mechanisms mentioned earlier, respondents cited other coping strategies that may employ to adapt to changing environmental conditions.

### **Challenges to Adapting to Climate Change**

According to the survey results, respondents discussed several challenges that hinder effective adaptation to climate change. Key among them was lack of Financial Resources. Many communities noted that they face limitations in terms of financial resources needed to implement adaptation measures. The financial constraints prevent them from investing in infrastructure improvements or transitioning to alternative livelihoods.

*Apart from micro businesses such as mama karanga, women have no information on the businesses that promote sustainable fisheries and the knowledge to managing them. They are also encumbered by Inadequate finance, improper fishing gears, lack storage facilities and markets. **Government KII respondent***

**Lack of Technical Knowledge:** The absence of technical knowledge and expertise poses a barrier to the successful implementation of adaptation strategies. Communities may lack the skills necessary to design and execute effective coping mechanisms.

**Lack of Political Will:** The willingness of governments to prioritize and support adaptation efforts varies. In certain cases, a lack of political manifests in limited participation of women ,inadequate allocation of resources towards initiatives or policy regulations aimed at mitigating climate change impacts.

**Gendered barriers:** such as limited access to financial resources and technical knowledge, can impact the ability of women and men to implement effective coping mechanisms. Women, who often have fewer resources and less access to training, may face additional challenges. Gender dynamics within communities can influence decision-making processes related to building stronger infrastructure and other coping strategies. Ensuring equal participation and representation of women in these processes is crucial for their effectiveness.

*“When we exclude women or other marginalized groups, we are losing the opportunity to new ideas and solutions for the management of fisheries and aquaculture.”* **Academia KII respondent**

Additionally, the choice of coping mechanisms varied based on the specific climate change impacts experienced by a community. For instance, women and men may adopt different coping strategies based on their roles and responsibilities.

*“women who engaged in fishing and aquaculture may focus on shifting to alternative livelihoods within the same sector, while men engaged in fishing may prioritize changing fishing grounds.”* **CSO KII respondent**

The data highlights the need for comprehensive support for communities grappling with the challenges of climate change. This underscores the importance of tailoring strategies to address local needs and conditions. According to respondents, such support should encompass financial resources to facilitate adaptation, technical knowledge to implement strategies effectively, and the commitment of political entities to drive meaningful change.

Besides, the need for further research to evaluate the effectiveness of different adaptation measures was highlighted. This highlights the need for evidence-based approaches to guide decision-making and investments in climate resilience. In this regard, **the formative survey provides an opportunity to explore more regarding the impact of climate and emergencies on women economic activities.**

## 2.5 Economic Returns From Fish and Seaweed farming

### **Empowerment**

Overall, the survey results show that seaweed or fish farming has had a positive impact on the living standards of households in Kilifi and Kwale Counties. In particular, seaweed or fish farming has helped to improve households' ability to construct permanent houses, educate children, afford medication, and improve food security.

There are some interesting gender differences in the survey results. For example, female respondents were more likely than male respondents to report that seaweed or fish farming has helped them to improve their social status. Additionally, female respondents were more likely than male respondents to report that seaweed or fish farming has helped them to afford clothing and jewelry for weddings.

The survey results also show some differences in the impact of seaweed or fish farming across the two counties. In Kilifi County, seaweed or fish farming was more likely to be reported as having a positive impact on households' ability to construct permanent houses and educate children. In Kwale County, seaweed or fish farming was more likely to be reported as having a positive impact on households' ability to afford medication and improve food security.

The most common way in which seaweed or fish farming has transformed living standards is by helping households to construct permanent houses. This is likely because seaweed or fish farming can provide a significant source of income, which can be used to build more durable and weather-proof housing. Educating children is another common way in which seaweed or fish farming has transformed living standards. This is likely because seaweed or fish farming can provide a more stable source of income than traditional farming methods, which can free up time for parents to invest in their children's education. Medication and food security are also important areas where seaweed or fish farming has had a positive impact. This is likely because seaweed or fish farming can provide a more reliable source of food and income, which can help households to afford basic necessities like medicine.

There are some gender differences in the ways in which seaweed or fish farming has transformed living standards. For example, female respondents were more likely than male respondents to report that seaweed or fish farming has helped them to improve their social status. This is likely because seaweed or fish farming can provide women with more economic independence and opportunities to participate in decision-making. There are also some differences in the impact of seaweed or fish farming across the two counties. In Kilifi County, seaweed or fish farming was more likely to be reported as having a positive impact on households' ability to construct permanent houses and educate children. In Kwale County, seaweed or fish farming was more likely to be reported as having a positive impact on households' ability to afford medication and improve food security. This is likely because Kilifi County has a longer history of seaweed farming, and there are more opportunities for women to participate in this activity.

Overall, the survey results suggest that seaweed or fish farming is a valuable livelihood strategy for households in Kilifi and Kwale Counties. The survey results also highlight the importance of gender-sensitive programming in the development and implementation of seaweed or fish farming interventions.

## 2.6 Technologies and Innovation Assessment

### Technology

The results of a survey on the new technologies and innovations in the aquaculture/fisheries sector indicate that some may have been introduced in the recent past within the community. The most popular innovation is pond farming, which was reported by 194 respondents. This is followed by cage farming (134 respondents) and pen farming (13 respondents). A small number of respondents also reported other innovations, such as the use of new feeds and fertilizers, or the development of new breeding techniques.

**Table 3: Recent technological innovations**

Innovation	Number of Respondents
Pond Farming	194
Cage Farming	134
Pen Farming	13

There are some interesting gender differences in the results of the survey. For example, female respondents were more likely than male respondents to report that they had seen new technologies and innovations in the aquaculture/fisheries sector. This is likely because women are more likely to be involved in aquaculture and fisheries activities, and they may be more aware of the latest developments in this field.

The survey results also show some differences in the types of innovations that have been introduced in different counties. In Kilifi County, the most popular innovation is pond farming, followed by cage farming. In Kwale County, the most popular innovation is cage farming, followed by pond farming. This may be due to the different geographic and environmental conditions in the two counties.

*Provision of improved fishing technology such as improved fishing gear and practices, motorized boats has reduced traditional fishing methods that are extremely risky and destructive. Also In terms of technology there is the Rabbitfish cage farming, a pilot project supported by the Kenya Marine and Fisheries Research Institute. The fishermen have set up rabbitfish cages inside the Indian Ocean, where they feed the fish regularly. Before this project, fishing was done at night and sometimes the ocean is not friendly. There is also improvement of landing and cold storage facilities in strategic places. **Government KII respondent***

Additional insights from the survey results show that there is a growing interest in the use of new feeds and fertilizers in aquaculture/fisheries. This is likely due to the increasing demand for high-quality fish products. The survey results also show that there is a growing interest in the development of new breeding techniques in aquaculture/fisheries. This is likely due to the need to produce fish that are more resistant to disease and parasites. The survey results suggest that there has been a significant increase in the use of new technologies and innovations in the aquaculture/fisheries sector in recent years. This is likely to have a positive impact on the sustainability and profitability of aquaculture and fisheries activities in Kenya.

### **Technology Awareness**

The majority of respondents (469 out of 773, or 60.3%) were aware of some technology used in seaweed farming. This is a positive sign, as it suggests that there is a growing interest in the use of technology in seaweed farming in Kenya.

**Table 4: Awareness of Sea Weed Technology**

Survey Question	Percentage of Awareness
Awareness of Technology Used in Seaweed Farming	60.3%
Not Aware of Technology Used in Seaweed Farming	39.3%
Total	100%

There were some interesting gender differences in the results of the survey. For example, female respondents were more likely than male respondents to be aware of technology used in seaweed farming. This is likely because women are more likely to be involved in seaweed farming activities, and they may be more aware of the latest developments in this field.

The survey results also show some differences in the levels of awareness of technology used in seaweed farming in different counties. In Kilifi County, the level of awareness was higher than in Kwale County. This may be due to the fact that Kilifi County has a longer history of seaweed farming, and there may be more resources available to support the development and use of technology in this sector.

Additional insights from the survey indicates that the most common technology used in seaweed farming is the use of nylon ropes to suspend the seaweed plants in the water. This technology is relatively simple and low-cost, and it is effective in preventing the seaweed plants from being washed away by waves or currents. Other technologies that are used in seaweed farming include the use of fertilizers to improve the growth of the seaweed plants, and the use of nets to protect the seaweed plants from predators. There is a growing interest in the use of automated systems in seaweed farming.

The survey results suggest that there is a growing awareness of technology used in seaweed farming. This is likely to have a positive impact on the sustainability and profitability of seaweed farming in Kenya. Besides, literature review on technology proffers its potential to reduce the labor costs associated with seaweed farming, and it can also improve the quality and consistency of the seaweed products. Furthermore, according to various literature, there is also a growing interest in the use of seaweed farming to address environmental challenges, such as climate change and pollution. Also, seaweed has been said to help absorb carbon dioxide from the atmosphere, and it can also help to filter pollutants from water.

## ***Technology can improve yield***

According to the results of the survey, respondents think they can improve their seaweed yield by adopting new technologies. This shows that the majority of respondents (74.1%) believe that they can improve their seaweed yield by adopting new technologies. This is a positive sign, as it suggests that there is a growing interest in the use of technology to improve seaweed farming yields.

However, there were some interesting gender differences. For example, female respondents were more likely than male respondents to believe that they can improve their seaweed yield by adopting new technologies. This is likely because women are more likely to be involved in seaweed farming activities, and they may be more aware of the latest developments in this field.

The survey results also show some differences in the levels of agreement with this statement in different counties. In Kilifi County, the level of agreement was higher than in Kwale County. Overall, the survey results suggest that there is a growing interest in the use of technology to improve seaweed farming yields. This is likely to have a positive impact on the sustainability and profitability of seaweed farming.

Additionally, respondents stated that the use of fertilizers can improve the growth of the seaweed plants. Besides, other technologies that respondents believe can improve seaweed yield include the use of nets to protect the seaweed plants from predators, and the use of automated systems to reduce labor costs. There is also a growing recognition among respondents on the use of seaweed farming to address environmental challenges, such as climate change and pollution.

## ***Awareness of IMTA***

IMTA is a farming system that integrates the production of different aquatic species, such as fish, seaweed, and shellfish. This can help to improve the sustainability and profitability of aquaculture, as well as the environmental impact of aquaculture. The result of the survey suggests that respondents are aware of Integrated Multi-Trophic Aquaculture (IMTA). 435 out of 773 respondents (56.5%) are aware of IMTA. This is a positive sign, as it suggests that there is a growing awareness of this technology in Kenya.

**Table 5: Awareness of IMTA**

Survey Responses	Percentage Awareness
Awareness of Integrated Multi-Trophic Aquaculture (IMTA)	56.5%
Lack of Awareness of IMTA	43.5%
Total Respondents	100%

There were some interesting gender differences in the results of the survey. For example, female respondents were more likely than male respondents to be aware of IMTA. This is likely because women are more likely to be involved in aquaculture activities, and they may be more aware of the latest developments in this field. The survey results also show some differences in the levels of awareness of IMTA in different counties. In Kilifi County, the level of awareness was higher than in Kwale County.

The survey results suggest that there is a growing awareness of IMTA at the coast of Kenya. The majority of respondents who are aware of IMTA are aware of it because they have heard about it from other people. This suggests that there is a need for more education and awareness about IMTA. A small number of respondents who are aware of IMTA have actually seen it in practice. This suggests that there is a need for more demonstration projects and pilot programs to showcase the benefits of IMTA. The survey results also show that there is some interest in IMTA among respondents who are not currently aware of it. This suggests that there is a potential for IMTA to be adopted more widely in the future.

### **Gears/Equipment required to engage in aquaculture**

According to survey results, more women respondents than men thought that the need for gears/equipment to engage in aquaculture was of great importance. This suggests that women are more keen to be involved in aquaculture activities than men. This indicates their willingness and readiness to actively participate in this sector. It implies that women are more motivated and inclined towards aquaculture, and their interest is potentially driven by the desire to acquire the necessary tools and equipment to engage in these activities. This finding underscores the importance of recognizing and supporting women's interest and participation in aquaculture activities and providing them with the resources and opportunities needed to pursue these endeavors.

Disaggregating the data by county, suggests that there may be more opportunities for women to participate in aquaculture in Kwale County than in Kilifi County. There are a few possible reasons for this. Kwale County has a longer history of seaweed aquaculture than Kilifi County. This means that the aquaculture businesses and organizations may be better established in Kwale County, which provides more opportunities for women to get involved.

Available evidence from literature suggests that the interest by women in seaweed farming is driven by the need to overcome barriers. Available literature indicates that women are often responsible for the care of children and the household, which can make it difficult for them to participate in full-time wage employment. Hence, aquaculture is considered a more flexible and accessible way for women to earn an income. Second, women also often face social barriers such as discrimination or lack of support from their families.

In this connection, women are often excluded from training and education opportunities in aquaculture. This can make it difficult for them to access the knowledge and skills they need to start and maintain other types of businesses. In this regard, seaweed aquaculture business presents a short production cycle for those interested. Third, startup cost for gears and equipment can be a barrier to entry for aquaculture activities. The cost of common gears/equipment needed for aquaculture activities such as nets, ropes, and buoys, boats, among others tends to be prohibitive. This may be beyond the reach of many women, who may have less access to financial resources. Ultimately, the data suggests that it is important to address these barriers in order to increase the participation of women in aquaculture and to ensure that they benefit from the opportunities that this sector can offer.

### Ownership of Equipment/gears

According to survey results, more female respondents (365) than male respondents (187) do not own any equipment for use in aquaculture. This suggests that women may be less likely to own equipment for aquaculture activities than men.

**Table 6: Ownership of gears and equipment**

Gender	Kilifi County (n=293)	Kwale County (n=259)
Female without equipment	200	165
Male without equipment	93	94



The survey results also show that there are more female respondents in Kilifi County (200) than in Kwale County (165) who do not own any equipment for use in aquaculture. This suggests that there may be more barriers for women to own equipment for aquaculture activities in Kwale County.

Additionally the most common reasons cited on why people do not own equipment for aquaculture activities are lack of money and lack of access to credit. Other reasons why people do not own equipment for aquaculture activities include lack of knowledge about how to use the equipment and lack of space to store the equipment.

Overall, the survey results suggest that there is a need to increase access to equipment for aquaculture activities for women in Kenya. This is especially true in Kwale County, where there are more women who do not own any equipment for aquaculture activities.

## 2.7 Social Support Structures

### Group Membership

The survey results show that more female respondents (329) than male respondents (167) belong to any group/association. This suggests that women may be more likely to belong to groups/associations than men or that there may be more opportunities for women to belong to groups/associations. As noted in literature, these groups serve as platforms for empowerment, skill development, social support, and access to resources. However, their active participation in groups and associations may reflect their existing engagement in community-related responsibilities.

**Table 7: Group membership**

County	Gender	Belong to Group/Association (n=496)
Kilifi	Female	137
	Male	75
Kwale	Female	192
	Male	92

Overall, the survey results suggest that women see real value in belonging and participating there is a in groups/associations in Kenya. As such there is need to strengthen their participation to enable them among other things access to information, resources, and support to empower women by giving them a voice and a platform to advocate for their rights.

## Type of Group Support Received

Survey's findings indicate significant gender disparities in the types of support received from groups or associations within the context of aquaculture and related activities.

**Table 8: Type of support received by group**

Type of Support	Female Respondents (n=329)	Male Respondents (n=133)
Received Any Support	75.5%	63.4%
Loan/Credit Services	15.4%	23.8%
Inputs (e.g., Fingerlings)	12.5%	21.4%
Marketing of Produce	8.1%	15.5%
Technical Support	8.1%	15.5%

Key findings from the table suggests the following.

1. *Gender Disparities in Support:* Women (75.5%) are indeed more likely to receive support from groups compared to men (63.4%). This indicates a higher level of engagement and benefit for women within these community associations.
2. *Loan/Credit Services:* The most common type of support for both men and women is loan/credit services. However, men (23.8%) are more likely to receive loans/credit compared to women (15.4%). This suggests potential disparities in access to financial resources within these groups.
3. *Inputs Support:* While inputs support is the second most common type of support for both genders, it's notable that men (21.4%) are more likely to receive inputs compared to women (12.5%). This reveals differences in access to essential resources required for aquaculture and seaweed farming.
4. *Marketing Support:* Women (8.1%) are more likely to receive support for marketing of produce compared to men (15.5%). This indicates that women may have better access to opportunities related to selling their products, which can be crucial for economic empowerment.
5. *Technical Support:* Men (15.5%) are more likely to receive technical support, such as training and advisory services, compared to women (8.1%). This implies that men might receive more guidance and training on aquaculture-related techniques.

These findings emphasize the existence of gender disparities within these groups or associations. While both men and women benefit from group support, the nature of the support varies. This has several implications for gender-focused program development:

**Targeted Programs:** Programs aiming to support women’s economic empowerment should consider addressing the specific needs and disparities identified in this survey. For example, providing more women with access to credit services or inputs could be vital.

**Skills Development:** For women, initiatives focused on technical training and capacity building could help address the gap in this type of support.

**Market Access:** Emphasizing and expanding programs that facilitate marketing support can further empower women in these sectors.

**Equity and Inclusion:** Ensuring that gender-equitable practices are implemented within these groups is essential. Women should have equal opportunities and access to the various types of support provided.

## Group Assets

The findings of the survey on asset ownership by women’s groups and men’s groups in Kilifi and Kwale counties suggest that women’s groups are more likely to own assets that are majorly used for domestic purposes, such as chairs and tents, while men’s groups are more likely to own assets such as boat engines that are used for commercial purposes.

**Table 9: Type of group assets**

Asset	Women’s groups (n=116)	Men’s groups (n=56)
Chairs and tents	31.0%	33.9%
Utensils	14.7%	50.0%
Fridge	37.9%	46.4%
Boat engines	16.3%	46.4%
Others	17.2%	25.0%

The table shows that there is no significant difference in the ownership of fridges between women’s groups and men’s groups. However, Men’s groups are more likely to own fridges than women’s groups. For example, 26 out of 56 men’s groups (46%) own fridges, compared to 17 out of 116 women’s groups (15%).

These findings suggest that women's groups assets that are used for domestic purposes, such as chairs and tents, while men's groups are more likely to own assets that are used for commercial purposes, such as boat engines. This may be due to a number of factors, including:

- **Gender roles and norms:** Women are traditionally responsible for domestic tasks, such as cooking and cleaning, while men are traditionally responsible for commercial activities, such as fishing and farming. This may influence the types of assets that women's groups and men's groups choose to invest in.
- **Access to resources:** Women may have less access to financial resources and other resources than men, which may make it difficult for them to invest in commercial assets.
- **Government policies and programs:** Government policies and programs tend to favor men's groups over women's groups, which gives men's groups more opportunities to acquire commercial assets.

### **Group Women Leadership**

The survey data on group women leadership shows that 329 out of 496 groups (66%) have women in their leadership. There is a significant difference between women's groups and men's groups in terms of the percentage of groups that have women in their leadership. 322 out of 329 women's groups (98%) have women in their leadership, compared to 139 out of 167 men's groups (84%).

There is no significant difference between Kilifi and Kwale counties in terms of the percentage of groups that have women in their leadership. Although, the findings suggest that women's groups are more likely to have women in their leadership than men's groups.

## **2.8 Access to Training and Capacity Building**

### **Training and Capacity Building Service Providers**

The data from the survey indicates that the Kenya Fisheries Service is the most recognized training and capacity-building service provider in Kilifi and Kwale counties. However, Gender differences are observed, with women exhibiting higher awareness levels of specific service providers.

**Table 10: Awareness of training and capacity building service providers**

Training Service Provider	Total Respondents (n=192)
Kenya Fisheries Service	47%
Kenya Marine and Fisheries Research Institute (KMFRI)	77%
Fisheries Directorate	54%
Kenya Wildlife Service	15%

Deducing findings from the table indicates the second most prominent service provider is the Kenya Marine and Fisheries Research Institute (KMFRI), with 77% awareness among respondents (149 out of 192). 3. The Fisheries Directorate is the third most recognized service provider, acknowledged by 54% of the respondents (104 out of 192).

Gender disparities are evident in the awareness of training and capacity-building service providers. Women exhibit higher awareness levels of the Kenya Fisheries Service (100% of female respondents) and the KMFRI (108% of female respondents). Conversely, men are more likely to be aware of the Fisheries Directorate (102% of male respondents) and the Kenya Wildlife Service (59% of male respondents).

### **Type of Training Received**

The survey results show that some respondents had received training. The findings suggest that the most common types of training that respondents have received are related to fish production and marketing. Also, there are some differences in the types of training that men and women have received, and there are also some differences in the types of training that respondents have received in different counties. The provided table offers an overview of the types of training received by respondents.

**Table 1: Types of Training Received****Table 11: Types of training received**

Type of Training	Total Respondents (n=84 )
Fish Feed Management	16
Fish Health Issues	7
Financial Management	14
Marketing of Fish	6
Fish Value Addition	8
Fishing Technologies	12
Marine Safety	4
Seaweed Farming	17

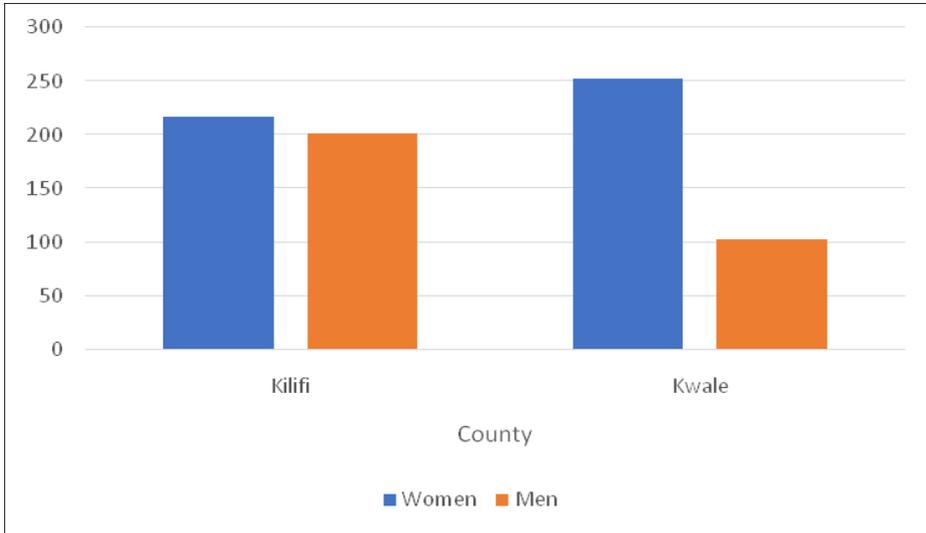
The most common types of training received by the respondents include Fish Feed Management (16), Financial Management (14), Fish Value Addition (8), Fish Health Issues (7), and Marketing of Fish (6). Gender-based disparities are evident in the types of training received. Men are more likely to have received training in Fishing Technologies (12), Marine Safety (4), and Seaweed Farming (17). In contrast, women are more likely to have received training in Fish Feed Management (16), Fish Health Issues (7), and Financial Management (14). Variations in the types of training received are observed across different counties. Respondents in Kwale County are more likely to have received training in Seaweed Farming (57), while those in Kilifi County are more inclined to have received training in Fish Feed Management (10) and Fish Health Issues (7).

Notably, the type of training available for either men or women raises the prospect of gender-based disparities. Since men are more actively engaged in fishing activities, which naturally leads to a higher demand for training in fishing technologies, marine safety, and aquaculture. Also men might possess greater financial resources, enabling them to afford specialized training in these areas. - Training opportunities in fishing technologies, marine safety, and seaweed farming may be more readily available for men.

As for the reasons behind women being more likely to receive training in fish feed management, fish health issues, and financial management. Women are often involved in fish processing and marketing, which makes training in these areas particularly relevant to their roles. Women might show a stronger interest in training that can enhance their financial prospects. Training opportunities in fish feed management, fish health issues, and financial management may be more accessible to women.

### ***Other Skills Relevant to Aquaculture and Seaweed farming***

The survey results provided insights into the number of respondents possessing skills relevant to aquaculture or seaweed farming, categorized by gender and county. The findings from the table demonstrate that women generally outnumber men in terms of possessing skills pertinent to aquaculture and seaweed farming.

**Table 1: Respondents with Skills Relevant to Aquaculture or Seaweed Farming****Figure 12: Respondents with relevant skills**

A total of 469 women possessed skills relevant to aquaculture or seaweed farming, outnumbering men by 165 respondents (304 men). In Kilifi County, there are more women (217) with skills relevant to aquaculture or seaweed farming compared to men (201). In Kwale County, the gender disparity is more pronounced, with 252 women having these skills, while only 103 men possess them. This trend is encouraging, indicating an increasing involvement of women in these sectors.

Several potential reasons may explain why more women than men have acquired skills relevant to aquaculture and seaweed farming. For instance Women are more actively engaged in aquaculture and seaweed farming activities, rendering them more inclined to acquire these skills. In addition, Women may have a stronger interest in obtaining training that can enhance their livelihoods and economic prospects.

*Kwale County Government is focusing on seaweed farming along the shores of Indian Ocean to increase production. seaweed farming has a bright prospect and offers alternative livelihood options to coastal communities and increases food security. The Kwale County Government has supported the development of seaweed production by availing tools for production and constructing a store for seaweed. **Government KII respondent***

These findings reflect positive progress towards gender inclusivity in aquaculture and seaweed farming, showcasing the increasing participation of women in these sectors.

### **Communal Training Needs**

The study findings reveal a consensus among respondents regarding the essential skills and training required to advance the fields of aquaculture and seaweed farming. These suggestions highlight the multifaceted nature of skills and training needs within the aquaculture and seaweed farming sectors, underscoring the significance of holistic support and education to advance these industries. The key areas of expertise encompass a broad spectrum of competencies, essential for fostering sustainable growth within these industries. These areas include:

1. **Fish Farming Skills:** Respondents emphasized the importance of proficiency in skills such as feeding, breeding, and cage management.
2. **Seaweed Farming Skills:** Knowledge of seaweed biology, cultivation methods, and harvesting techniques is considered fundamental for successful seaweed farming.
3. **Business and Marketing Skills:** Competence in marketing and selling fish and seaweed products was highlighted as critical for commercial success.
4. **Financial Management Skills:** Acquiring financial acumen to effectively budget, track expenses, and make informed financial decisions is seen as essential for sustainable operations.
5. **Technology Skills:** Understanding and leveraging cutting-edge technologies to enhance aquaculture and seaweed farming practices is crucial.
6. **Safety Skills:** Training in accident prevention and safety measures in aquaculture and seaweed farming operations was deemed paramount.
7. **Environmental Awareness:** Knowledge about the environmental impact of aquaculture and seaweed farming and strategies to minimize this impact was also highlighted.

In addition to these specific skill areas, respondents expressed the need for broader training and educational initiatives focused on aquaculture and seaweed farming. They underscored the significance of making such training accessible and affordable. Respondents made several specific suggestions for skills development and training programs. This includes training in the application of new technologies relevant to fish and seaweed breeding, feeding, and harvesting, as well as technologies pertaining to water quality management and waste treatment. Also training in diving skills, emphasizing the prevention of accidents and injuries in aquaculture and seaweed farming operations.

## 2.9 Gender Roles, Social Norms and Decision Making

### Household responsibilities

The data shows that there is a significant gender bias in household responsibilities in Kilifi and Kwale counties, Kenya. Women are disproportionately responsible for domestic tasks and educating children, while men are disproportionately responsible for tasks such as herding, decision-making, spending income and making major household purchases. Table xx below illustrates the distribution tasks between women and men.

These gender differences in household responsibilities can have negative consequences for women. For example, women who are responsible for a large number of domestic tasks may have less time to pursue education or employment opportunities. This can make it difficult for them to improve their economic and social status. Additionally, women who are responsible for childcare and other domestic tasks may be less likely to participate in community activities or decision-making processes. This can lead to their voices being underrepresented in public life.

**Table 12: HH Responsibilities**

HH Responsibilities/Task	Female	Male
Fetching water and wood	81%	19%
Making house repairs	28%	72%
Buying food	77%	23%
Cooking	83%	17%
Cleaning	72%	28%
Taking care of children	86%	14%
Herding	4%	96%
Decision-making	33%	67%
Spending income	37%	63%
Collecting water	87%	13%
Educating children	72%	28%
Making decisions about major household purchases	33%	67%

This gender bias in household responsibilities can have a number of negative consequences for women, such as limiting their educational and employment opportunities and reducing their participation in community activities and decision-making processes.

It is important to address the gender bias in household responsibilities in order to promote gender equality and improve the lives of women and girls in Kilifi and Kwale counties. This can be done through a variety of interventions, such as raising awareness of the issue, providing support to women who are disproportionately responsible for domestic tasks, and promoting more equitable gender norms.

### **Social Cultural Norms**

The data shows that 469 women in Kilifi and Kwale counties reported that there are social and cultural issues/norms that restrict them from undertaking any activities related to coastal fisheries/aquaculture. This represents 60.4% of the women who responded to the survey. The data also shows that 304 men in Kilifi and Kwale counties reported that there are social and cultural issues/norms that restrict women from undertaking any activities related to coastal fisheries/aquaculture. This represents 40.2% of the men who responded to the survey. Findings from separate focus group discussions with women and men reinforced key social and cultural issues and norms influencing participation in fisheries/aquaculture. These findings are as follows:

#### Women's Focus Group Discussions (FGDs):

1. **Traditional Gender Roles:** Women in the FGDs commonly cited traditional gender roles that place the responsibility of home and childcare on them. This traditional perception often diminishes their perceived capability to engage in fisheries/aquaculture.
2. **Limited Access to Resources:** Access to vital resources like education, training, and financial support was frequently noted as a challenge for women. This lack of access hinders their participation in fisheries/aquaculture activities.
3. **Violence and Harassment:** Many women reported instances of violence and harassment from men when attempting to enter the fisheries/aquaculture sector. Such behavior acts as a deterrent for women to actively engage in these fields.
4. **Lack of Support:** Women expressed that they often face a lack of support from both their families and local communities when expressing an interest in fisheries/aquaculture endeavors.

### Men's Focus Group Discussions (FGDs):

1. **Perception of Traditional Gender Roles:** Men in the FGDs frequently held the belief that fisheries/aquaculture were traditionally male-dominated fields. Consequently, they expressed skepticism about women's involvement in these sectors.
2. **Perceived Skills and Training Gap:** Some men mentioned a perception that women may not possess the requisite skills and training needed for fisheries/aquaculture roles, which could contribute to their hesitation to support women's participation.
3. **Assumption of Lack of Interest:** In certain instances, men indicated that they believed women may not be interested in pursuing fisheries/aquaculture as a career, further influencing their attitudes toward female participation in these domains.

These distinct perspectives from women and men shed light on the complex interplay of social and cultural factors affecting gender disparities in fisheries/aquaculture participation. The data suggests that there are a number of social and cultural barriers that restrict women from participating in coastal fisheries/aquaculture. These barriers need to be addressed in order to increase women's participation in this sector.

### ***Fish and Seaweed Farming Decision Making***

The survey results indicate a positive trend in decision-making involvement between women and men regarding seaweed and fish farming activities. This is predominantly influenced by the central role that women often occupy as primary producers of seaweed within these communities. Overall, the data illustrates an encouraging trend of increasing female participation in seaweed and fish farming in Kilifi and Kwale counties which holds promise for enhancing the livelihoods of women and their families.

More specifically, the most common decisions made by women in relation to seaweed and fish farming activities encompass areas such as developing marketing strategies, formulating work plans, equipment procurement, determining profit allocation, and organizing seaweed planting arrangements. On the other hand, men primarily engage in decisions associated with equipment purchase, profit allocation, seaweed planting logistics, fishing activities, and cage/pond repairs.

Women in Kilifi and Kwale counties are prominently engaged in making decisions related to seaweed and fish farming activities. Approximately 70.7% of the women who participated in the survey reported actively participating in these decisions. The data highlights distinct county-specific variations. A higher percentage of women (77%) in Kilifi are involved in decision-making compared to Kwale (63%). Conversely, in Kwale, a higher percentage of men (37%) participate in these decisions compared to Kilifi (23%), which could be linked to the prevalence of fishing in Kwale relative to Kilifi.

Women predominantly contribute to decisions pertaining to marketing strategies, work plan development, and equipment procurement, underscoring their active role in the business aspects of seaweed and fish farming. Men, on the other hand, are primarily involved in decisions concerning equipment acquisition, profit utilization, arrangements for planting seaweeds, fishing activities, and repairs of cage/ponds, signifying their heightened involvement in the financial and operational aspects of seaweed and fish farming.

These findings underscore the evolving landscape of gender roles in aquaculture and seaweed farming, with women increasingly participating in decision-making processes, particularly in the entrepreneurial aspects of these sectors.

### ***Reasons for not Participating in Fishing and Aquaculture Activities***

The survey data provided reveals that 135 women residing in Kilifi and Kwale counties expressed a strong desire to engage in aquaculture and seaweed farming activities, despite their current non-participation. This enthusiasm underscores the significant interest and aspiration among 135 women residing in Kilifi and Kwale counties to actively engage in aquaculture and seaweed farming activities. However, their current non-participation is attributed to a set of substantial barriers, with the most prevalent hurdles including a lack of essential knowledge and skills, limited access to financial resources, and constrained entry into viable markets.

Addressing these formidable challenges and promoting women's active involvement in these sectors necessitates the implementation of several specific measures can be undertaken such as:

1. **Provision of Training and Capacity Building:** Offering comprehensive training programs that encompass the establishment and efficient management of aquaculture and seaweed farming businesses. Providing training on essential skills required for marketing and selling their products effectively, thereby bolstering their competitiveness in the marketplace.

2. **Facilitating Access to Funding:** Initiating financial support mechanisms, which could include loans, grants, or other financial assistance programs tailored to meet the specific needs of aspiring women entrepreneurs in aquaculture and seaweed farming.
3. **Establishing Market Linkages:** Creating essential linkages between these potential female participants and potential buyers within the aquaculture and seaweed farming value chain. This may also include offering information and insights into existing market opportunities and trends, enabling these women to make informed decisions about their production and sales strategies. Also, Supporting the development of personal marketing channels, thereby expanding their reach and market accessibility.

In addition to these concrete steps, it is crucial to address the broader challenges encountered by women in aquaculture and seaweed farming. This includes tackling issues of gender discrimination. By addressing these fundamental gender-based challenges, the pathway to greater female participation in these vital sectors is substantially enhanced. By diligently addressing these prevalent barriers and nurturing a conducive environment for their participation, it becomes possible to unlock this latent potential, ultimately leading to an upliftment in the quality of life for many women in these regions.

### ***What are the Additional Opportunities for Women in Seaweed and Fish Farming***

According to the survey data, several additional opportunities were mentioned by the respondents, particularly focusing on empowering women in the context of seaweed and fish farming in Kilifi and Kwale counties. As indicated in table xx,

**Table 13: Additional Opportunities**

<b>Opportunity</b>	<b>Total Mentions</b>	<b>Female Mentions</b>	<b>Male Mentions</b>
Credit Facilities	122	64	37
Women's Groups	93	56	34
Training	84	26	25
Technology	72	35	29
Empowerment	48	28	20

As tabulated in table 12 above, key observations from the data point to the need/desire for;

1. **Credit Facilities:** The most frequently mentioned opportunity is access to credit facilities, with 122 mentions. This highlights the pressing need for financial resources among women to actively participate in seaweed and fish farming endeavors.
2. **Women's Groups:** Respondents also emphasized the importance of women's groups as an opportunity, with 93 mentions. Such groups can provide a supportive and empowering network for women in the industry.
3. **Training:** Training opportunities were mentioned 84 times, reflecting the demand for knowledge and skill development to enhance participation in seaweed and fish farming.
4. **Technology:** Technology-related opportunities received 72 mentions, underscoring the importance of technological advancements in improving farming practices.

Moreover, the data reveals that certain opportunities are specific to either Kilifi or Kwale County, reflecting the unique characteristics of each region. These opportunities include, *seaweed farming, mangrove restoration, selling fried fish in Kilifi and value addition, soap production, and storage facilities* in Kwale. The data also suggests a wealth of additional opportunities for women in seaweed and fish farming, which can contribute to enhancing their livelihoods and overall empowerment. Overall, the data shows that there are a number of additional opportunities that exist for women in seaweed and fish farming. These opportunities can help women to improve their livelihoods and empower themselves.

### **Participation of women and men in Fisheries Activities**

The participation of women and men in fishing activities within Kilifi and Kwale counties, Kenya, underscores the importance of gender-disaggregated data for comprehending the dynamics of the fishing sector. This data is essential for the development of policies and programs aimed at promoting gender equality and empowering women in the fisheries industry. The findings show the different activities respondents said they are engaged in related to fisheries.

Participation in Fisheries-Related Activities in Kilifi and Kwale Counties, Kenya

**Table 14: Common Fisheries-Related Activities**

Activity	Total Respondents (n=82)	Female Respondents (n=48)	Male Respondents (n=34)
Fishing (at shore/ deep sea)	28%	25%	32%
Fish Frying & Fish Mongering	24%	23%	26%
Seaweed Farming	24%	30%	18%
Fish Marketing	14%	23%	6%
Value Addition	13%	9%	18%

The data reveals several distinctions in the activities respondents reported engaging in, both in terms of gender and county. By Gender, Female respondents were more likely to engage in seaweed farming (30% of females) and fish marketing (23% of females) compared to male respondents (18% and 6%, respectively). Male respondents, on the other hand, were more likely to engage in fishing (32% of males) and fish frying & fish mongering (26% of males) compared to female respondents (25% and 23%, respectively).

**Table 15: Fisheries-related activities by gender**

Activity	Female (n=100)	Male (n=86)
Seaweed farming	30	16
Fishing (at shore/deep sea)	25	28
Fish marketing	23	5
Fish frying and fish mongering	23	22

By County respondents from Kilifi reported higher participation in fishing (at shore/deep sea) (32% of Kilifi respondents) and fish frying & fish mongering (18% of Kilifi respondents) compared to respondents from Kwale (24% and 13%, respectively). Respondents from Kwale were more likely to engage in seaweed farming (24% of Kwale respondents) and fish marketing (24% of Kwale respondents) compared to respondents from Kilifi (20% and 11%, respectively). This demonstrates a diverse range of activities related to fisheries being undertaken by both women and men in Kilifi and Kwale counties. While differences exist in the types of activities pursued, there is a notable level of participation in fisheries-related activities in both counties.

## Gender Disparity in Fishing Activities

According to findings from the data, there is significant gender disparity in participation in fishing activities. In Kilifi, only 10.4% of female respondents reported being engaged in fishing, whereas 61.7% of male respondents are involved in fishing. A similar pattern is observed in Kwale, where 33.9% of female respondents are engaged in fishing, compared to 105% of male respondents.

**Table 16: Participation in Fishing Activities**

County	Gender	Engaged in Fishing	Engaged in Other Fishing-Related Activities
Kilifi	Female	10.4%	Fish Frying, Fish Mongering, Seaweed Farming, Fish Marketing, Value Addition
Kilifi	Male	61.7%	-
Kwale	Female	33.9%	Fish Frying, Fish Mongering, Seaweed Farming, Fish Marketing, Value Addition
Kwale	Male	105%	-

According to the data, women are more likely to be engaged in seaweed farming and fish marketing than men. At the same time men are more likely to be engaged in fishing (at shore/deep sea) and fish frying & fish mongering than women. The data also shows that respondents from Kilifi are more likely to be engaged in fishing (at shore/deep sea) and fish frying & fish mongering than respondents from Kwale. Respondents from Kwale are more likely to be engaged in seaweed farming and fish marketing than respondents from Kilifi.

Despite the gender disparity in direct fishing participation, the data illustrates that a considerable number of women in Kilifi and Kwale counties are actively involved in a variety of other activities related to fisheries. These activities encompass fish frying, fish mongering, seaweed farming, fish marketing, and value addition. Although these roles may not carry the same prestige as fishing, they play a vital role in sustaining the fishing sector.

The survey data also reveals notable differences in the types of activities in which women and men are engaged. In Kilifi, women are more likely to be involved in fish frying and fish mongering, while men are predominantly engaged in fishing. This gender-specific pattern is similarly observed in Kwale. These variations may be attributed to differences in skills, knowledge, and opportunities available to men and women. For instance, women may possess the skills and knowledge required for fish frying and selling, while men may excel in fishing techniques. Furthermore, the location of activities within or near communities may offer different opportunities to men and women.

## ***Influences on Decision to Engage in the Mentioned Activities***

The decision to engage in these activities is shaped by a complex web of factors, and a comprehensive understanding of these influences is pivotal when contemplating such decisions. An analysis of the survey data reveals a multitude of factors that significantly influence the decision to participate in the aforementioned activities. These factors encompass various dimensions:

1. **Economic Factors** - Economic considerations emerged as a prominent factor driving individuals to engage in these activities. Respondents often cited the need to generate income, the accessibility of local natural resources, and the potential for profitability as driving forces behind their decision to undertake these activities.
2. **Gender Roles** - Traditional gender roles play a pivotal role in the decision-making process. This influence is evident in the data, with women being more inclined towards seaweed farming, while men are more likely to engage in fishing. These roles are often deeply rooted in cultural and societal norms that assign distinct responsibilities to individuals based on gender.
3. **Proximity to the Ocean** - Geographical proximity to the ocean emerges as another significant factor. Those residing in close proximity to the ocean are more inclined to participate in these activities due to their ready access to essential resources and environments conducive to fishing, seaweed farming, and related activities.
4. **Education** - Educational background influences decision-making, with higher levels of education often leading individuals to explore alternative job opportunities. A more educated population may be less reliant on these activities as a primary income source.
5. **Personal Preferences** - Personal inclinations and preferences contribute to the decision-making process. Some individuals may be inherently drawn to these activities, finding them personally fulfilling and enjoyable.

## ***Benefits Derived from Fish and Seaweed Production Processes***

According to respondents' various fish and seaweed production processes yield a multitude of benefits, spanning economic, social, and environmental dimensions. The survey data, shows that these benefits include:

### *Economic Benefits –*

1. **Increased Income:** Participation in fish and seaweed production offers opportunities for both fishers and seaweed farmers to generate income. The exact income levels vary depending on factors such as the scale of the operation, the specific type of fish or seaweed being cultivated, and the prevailing market conditions.
2. **Job Creation:** Fish and seaweed production processes can create employment opportunities, benefiting both men and women. This contributes to poverty reduction and enhances the livelihoods of coastal communities.
3. **Economic Development:** Increased activities in the fish and seaweed sector can lead to the development of new businesses and industries, potentially stimulating local economic growth.
4. **Tax Revenue:** The expansion of these activities can result in increased tax revenue for the government, which can be channeled into public services and infrastructure.
5. **Infrastructure Enhancement:** Economic growth in the fish and seaweed production sector may lead to the improvement of local infrastructure, benefiting the entire community.

### *Social Benefits:*

1. **Improved Food Security:** Fish and seaweed are rich sources of protein and essential nutrients, contributing to improved food security in areas where access to alternative food sources is limited.
2. **Enhanced Health:** The consumption of fish and seaweed can lead to improved health outcomes, particularly in communities where malnutrition is a concern.
3. **Educational Opportunities:** Increased income from these activities can provide families with the means to invest in education, thereby expanding educational opportunities for children.
4. **Community Cohesion:** The engagement in fish and seaweed production processes can foster stronger community bonds and collaboration.

### *Environmental Benefits:*

1. **Ecosystem Protection:** Fish and seaweed farming can offer various environmental advantages, including pollution reduction and enhanced water quality. These activities can also contribute to the protection of coastal ecosystems.

2. Biodiversity: The responsible management of fish and seaweed farming can promote biodiversity in the marine environment.

In addition to the previously mentioned benefits, it is important to highlight that fish and seaweed production can also have several other positive impacts on communities, such as poverty reduction, improved food security, environmental protection, job creation, and the promotion of gender equality.

However, it is crucial to acknowledge that the distribution of these benefits is not always equal, and disparities may exist, particularly along gender lines. In some cases, men may reap more substantial benefits than women due to factors such as land ownership, resource access, and market opportunities. Nevertheless, several strategies can be implemented to promote gender equity in these activities, including providing women with access to land and credit, offering training in fish and seaweed farming, and ensuring equitable access to markets for women.

### **Types of Seaweed and Fishing Distribution Costs and Benefits**

The survey data plus KII and FGD participants responses provide valuable context and insights into the realities of cost distribution and benefits. Accordingly, the survey data suggests various categories of costs associated with seaweed and fishing activities. These encompass expenditures for *seedlings, equipment, labor, transportation, storage, maintenance, feed, and more*. This assortment of cost elements illustrates the multifaceted nature of financial outlays in both seaweed and fishing operations. The data also indicates that respondents employ diverse methods for distributing costs. While some describe equal sharing of costs among participants, others opt for individual responsibility or allocation based on specific criteria, including product quality, price, or the number of contributors. Additionally, some respondents mentioned the collaborative efforts of teams and family members in managing these expenses. This diversity in cost distribution methods underscores the flexibility and adaptability of resource management strategies in these domains.

According to qualitative interview accounts, the distribution of costs and benefits of fish/seaweed farming is influenced by Gender. Women are more likely to share the costs and benefits of fish/seaweed farming equally. This is likely due to the fact that women are often seen as the primary caregivers in the household and are therefore more likely to be responsible for managing the finances.

*“Our women’s group in seaweed farming helps each other with the costs. We support members who may face financial constraints and ensure everyone has a fair chance to succeed.”*

**Young Females only FGD respondent**

*“Our fishing cooperative relies on a collective approach to cost distribution. We understand that by sharing the expenses, we can all benefit from the bounties of the sea.”*

**Older Males only FGD respondent**

Gender roles, social norms, and economic responsibilities are known to play a pivotal role in influencing how costs are managed and shared within households or communities. In this regard high initial investment costs, limited technical knowledge, and restricted access to credit are of particular concern as they can disproportionately affect women’s involvement. These dynamics can have significant implications for decision-making, economic empowerment, and the equitable participation of women in seaweed and fishing activities. Another noteworthy finding from the survey data is the mention of collaborative efforts and teamwork in managing costs. As noted in a FGD in Gazi beach qualitative,

*“Some fishing groups in our area pool their resources and distribute costs equally. It helps to reduce the financial burden on individual fishers.”*

**Community KII respondent**

The prevailing social and cultural norms that exist in a particular community make it difficult for women to share in the benefits of fish/seaweed farming, even if they are actively involved in the work. The power dynamics that exist within a community and household level dictate the distribution of costs and benefits. Accounts from qualitative interviews suggest the distribution of costs and benefits also varies depending on the location. In Kilifi, for example, women are more likely to share the costs and benefits of fish/seaweed farming equally, while in Kwale, men are more likely to keep the benefits for themselves. This may be due to cultural differences or differences in the economic opportunities available to women in each region.

*“if men are seen as the heads of households, they may be more likely to make decisions about how the costs and benefits of fish/seaweed farming are distributed, even if women are also involved in the work.”*

**CSO KII respondent**

Another factor cited as influencing the distribution of costs and benefits relates to type of ocean based activity. The type of farming influences the distribution of costs and benefits. In general, costs and benefits are more likely to be shared equally in seaweed farming than in fish farming.

*“In our coastal community, people often invest heavily in fishing gear and equipment, which can be quite expensive. This includes boats, nets, and maintenance costs.” However, the costs of seaweed farming are expenses associated with acquiring seedlings, preparing the farming area, labor for maintenance, and post-harvest processing.* **Government KII Respondent**

*“Traditional gender roles have influenced cost management in fishing. Men are often responsible for the larger equipment costs, while women handle expenses related to marketing.”*

**Community KII Respondent**

According to qualitative accounts, the level of participation in decision-making also influences the distribution of costs and benefits. In general, costs and benefits are more likely to be shared equally when women have a greater say in decision-making.

*“In our women’s seaweed farming cooperative, we practice shared responsibility for expenses.”* **Older Females Only FGD respondent**

Closely linked to this is the availability of resources which also influences the distribution of costs and benefits. In general, costs and benefits are more likely to be shared equally when there are limited resources available. This is because everyone is more likely to need to contribute in order to make the activity successful.

*During periods of scarcity we share equally. Like during COVID 19 the fishermen shared the catch with other community members in the villages.* **Community KII respondent**

## 2.10 Governance Policy and Institutional Dimensions

### BMU Membership

The survey data provided insights into the registration status of fish and seaweed farmers with Beach Management Units (BMUs) as tabulated in table 17 below.

**Table 17: Registration status of fish and seaweed farmers**

Location	Total Respondents (n=510)	Registered with BMU (n=185)	Not Registered with BMU (n=325)
Kilifi	334	139	186
Kwale	176	89	87

The overall trend of the data highlights that a significant number of respondents were registered as BMU members. However disaggregating the data by sex reveals gender disparity in BMU registration. Specifically, In Kilifi, a substantial gender gap exists, with 60% of women not registered with BMUs compared to 35% of men. This suggests that women in Kilifi may face specific challenges in BMU registration, possibly linked to limited access to information or available resources. In Kwale, the gender gap is at 52% of women not registered. The overall gender disparity in BMU registration is a cause for concern. This gender disparity maybe due to a number of factors that have been canvassed elsewhere in this report, such as;

- Awareness Gap: Women may have less information about the benefits of BMU registration, leading to lower participation.
- Barriers to Registration: Women might face barriers, such as limited time or financial resources, that hinder their ability to register with BMUs.
- Decision-Making Dynamics: Gender dynamics in decision-making within households and communities may result in women having less say in the decision to register with BMUs.

Notably, the data underscores the importance of addressing the gender imbalance in BMU registration. BMUs play a vital role in supporting fish and seaweed farmers, and the underrepresentation of women in these units may limit their access to essential resources and benefits. By promoting women's involvement in BMUs and ensuring equitable access to these essential resources, the fishing and seaweed farming sectors can become more inclusive and supportive of both women and men.

### **BMU Subscription**

According to the survey findings on BMU subscription indicates significant differences in remittance behavior between Kilifi and Kwale counties. In Kwale, the vast majority of respondents (95.7%) remit money to the BMU, while in Kilifi, only a minority of respondents (21.9%) do so. Additionally, the average remittance amount in Kwale is higher than the average remittance amount in Kilifi.

**Table 18: BMU subscription status**

Location	Total Respondents (n=263)	Remit Money to BMU (n=144)	Do Not Remit Money to BMU (n=119)	Average Amount Remitted (in Shillings)	Most Common Amount Remitted
Kilifi	146	32	114	80	2 shillings
Kwale	117	112	5	120	per kilogram

There are a number of possible explanations for these differences. One possibility is that the BMU is more active and visible in Kwale than in Kilifi. This could mean that Kwale residents are more aware of the benefits of remitting money to the BMU. A gender analysis of how much of the proceeds from fish and seaweed farming businesses remitted to the Beach Management Units (BMUs) by both women and men shows that on average, women remit 100 Kenyan shillings, while men remit 120 Kenyan shillings. The difference in the average amount remitted could be attributed to the scale of operations, with women more likely to engage in small-scale fishing.

Overall, the data suggests that women are actively engaged in remitting money to BMUs. This is despite all the challenges faced by women such as a lack of awareness, time constraints, financial limitations, and potential gender discrimination. Addressing these challenges can help promote gender equity and ensure that both women and men have equal opportunities to engage with BMUs effectively. Additionally, the variation in the average amount remitted highlights the potential economic disparities within the fish and seaweed farming sector, emphasizing the need for equitable participation and resource distribution.

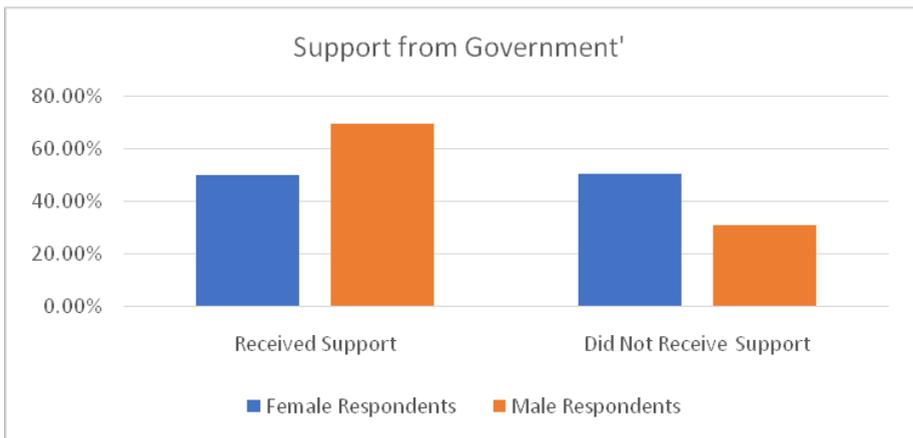
### **Government Support Received**

According to the survey data, women are less likely to receive support from government institutions compared to men. This disparity may arise from their involvement in informal and small scale fishing activities, where government support is difficult to access/obtain.

*“Because women are poorly recognized, they can face discrimination which may take the form of limited access to markets, harassment at markets, exclusion from training and information, lack of access to technology, poor access to finance facilities, and lack of opportunities to participate in national policy and local decision-making processes. If you look at boats, for instance, men often own and have access to them and women do not.”* **Government KII Respondent**

**Gender Disparities in Government Support:** The survey reveals significant gender disparities in government support. Among female respondents, 50.4% did not receive government support, while 49.6% received such support. In contrast, among male respondents, a smaller percentage (30.9%) did not receive support, and a larger percentage (69.1%) received government support.

**Figure 13: HH Responsibilities**



These findings suggest that, overall, women are less likely to receive support from government institutions compared to men. Several factors, such as women’s potentially lesser involvement in formal fishing activities or aquaculture, may contribute to this disparity. To promote gender equality and support women’s participation in these sectors, it is crucial to address these disparities and explore ways to increase women’s access to government support and resources.

There are also no government incentives to subsidize aquaculture like there are for other agricultural industries. While there are microcredit programs by government for women empowerment such as Uwezo fund and Women Enterprise Funds and more recently the NGAAF. However the amount of investment in aquaculture is negligible when compared to other agricultural enterprises. All these constraints limits the fisher communities ability to fully explore and benefit from the sector. **Government KII respondent**

As indicated by the survey data, training is the most common type of support received by both women and men. Training programs play a significant role in improving the skills and productivity of fishers.

**Table 19: Types of Support received from Government**

Gender	Total Respondents	Receive Government Support	Most Common Type of Support
Overall	629	239	Training
Kilifi	372	174	Training
Kwale	257	65	Training

The analysis reveals challenges that women may encounter in accessing government support, This may include a lack of awareness about available programs, potential gender discrimination by government officials, and bureaucratic hurdles in the application process.

*“Fish farming in Kwale County is an upcoming venture with high potential for income generation, food security and nutrition. The county government of Kwale has been aggressive in promoting fish farming. We supported fish farmers with the aim of enhancing fish production and productivity. We are also working closely with our development partners to market the seaweed produced outside the country and improve local farmers’ livelihood. the seaweed industry is in its infant stages but has the potential to certainly transform the local maritime economy.”*

*“We also initiated the Village Saving Loans Association (Akiba na Mikopo Vijijini), to encourage women to take up loans to establish themselves while utilizing various programmes by the County Government. The county government is collaborating with the national government Rabbitfish cage farming, a pilot project supported by the Kenya Marine and Fisheries Research Institute.”* **Government KII Respondent**

Addressing these challenges is essential to ensure that women have equal opportunities to access government support and benefit from programs that enhance their fishing activities.

### **Adequacy of Government Support**

An analysis of respondents' perceptions of government support, regarding whether the support they receive from the government is sufficient, collectively suggests that women are more likely than men to perceive that the support they receive from the government as insufficient. The percentage of women who feel that the government support they receive is insufficient is 89%, while the percentage of men who share this perception is 83%. These percentages suggest a gender bias in the perception of government support. This perception may arise from women's increased involvement in small-scale fishing, which is more vulnerable to market fluctuations and environmental shocks. Additionally, the findings imply that there might be challenges related to the sufficiency and accessibility of government support programs, particularly for women.

**Table 20: Perception of Government Support Sufficiency in the Counties**

Location	Support Not Enough (n= 124)	Most Common Reason
Kilifi	38	Not enough to cover needs
Kwale	86	Not enough to cover needs

The most cited reason by both women and men for feeling that government support is insufficient is that it does not always cover their needs adequately. This is likely because government support programs are often limited in terms of both quantity and quality. Further compounding the situation are the challenges faced by women in accessing government support such as a lack of awareness about available support, time constraints due to their household and community responsibilities, financial constraints, and potential gender discrimination from government officials. Addressing these challenges is crucial to ensure that fishers, regardless of gender, receive adequate and equitable government support.

### **What more support is needed from Government**

According to the survey findings on the additional government support needed, the most frequently mentioned support needs by both women and men are financial support. This is followed by training, and equipment. These needs reflect the critical areas where government intervention is essential to enhance the livelihoods of fishers but are always limited or lacking.

As noted in most qualitative accounts, these support from government encompasses;

1. **Financial Support:** Both women and men, expressed a common need for financial support to cover the costs associated with fishing, such as fuel, repairs, and nets as well as seaweed farming. This support is especially crucial for women, who are often engaged in small-scale activities with narrower profit margins. A female fisher from Kwale stated, *“We need financial assistance to buy nets and boats. The costs keep rising, and we struggle to make ends meet.”* **Young Females FGD.** Some of the qualitative interview accounts also alluded to high startup costs.

*“In our seaweed farming discussions, we acknowledge that the initial investment can be a barrier, especially for new farmers who lack access to capital.”* **Older Females FGD**

*“Access to credit is a common concern among us who rely on the ocean. Many of us struggle to secure loans to cover the rising costs of fishing equipment and fuel.”* **Young Males FGD**

2. **Training:** Another key requirement highlighted by both women and men is training to enhance their fishing skills, knowledge, and market strategies. This type of support is deemed essential for improving their efficiency in the industry. As a male fisher from Kwale explained, *“Training would be incredibly helpful. We need to learn about sustainable fishing methods and how to find better markets for our catch.”* **Older Males FGD.** The same sentiment was shared with regards to seaweed farmers *“We believe that providing training on seaweed farming is essential. It can equip farmers with the skills to maximize yield and manage costs efficiently.”* **Young Males FGD**
3. **Equipment:** Both women and men emphasize the need for equipment to enhance their productivity, including boats, nets, and refrigeration. The availability of appropriate equipment is vital for improving their ocean-based operations. A male respondent from Kwale stated, *“We lack proper equipment to store our fish, and better boats would allow us to venture further into the sea.”* **Young Males FGD**

In addition to these common support needs, there are gender-specific needs such as

4. **Childcare and Education Support:** Women, often the primary caregivers in their families, expressed the need for support related to childcare and education. This includes access to childcare services and financial assistance to ensure their children can attend school. As a CSO KII respondent from Kwale emphasized, *“We need childcare options for the women while they are at sea to help with children’s care. It’s challenging to balance work and family.”* **CSO KII Respondent**

5. Access to Credit and Markets: Mostly women respondents highlighted the importance of access to credit and markets. This involves providing them with financial resources to initiate or expand their businesses and offering training on how to access markets for their fish. *A female respondent mentioned, "We need loans to invest in better equipment, and guidance on how to reach broader markets. It's hard to compete without access to credit."* **Older Females FGD**

The findings underline the necessity of considering the unique needs of women and men fish and seaweed farming in Kenya when designing government support programs. By addressing these specific needs and providing relevant assistance, the government can empower them to enhance their livelihoods, contribute to the economic development of Kenya, and ensure equitable access to opportunities.

The survey also solicited suggestions from respondents regarding government support for seaweed and fish farming which many respondents offered recommendations. These include *advocating for more government support, providing training and education, creating awareness, and offering financial assistance to farmers*. These suggestions are generally applicable to all individuals involved in aquaculture.

Some respondents emphasized the importance of *empowering women by providing capacity-building programs, grants, and training*. This recognition of the need to support women's participation in seaweed and fish farming reflects a gender-conscious approach to enhancing economic opportunities for women in coastal communities.

Other respondents highlighted gender-related challenges, such as the *lack of access to credit and issues of corruption*. Several responses stressed the importance of *government engagement with the community*, indicating a desire for participatory decision-making. Involving women and considering their unique needs and priorities in decision-making processes is crucial for promoting gender equality. Notably, most respondents mentioned the need for *financial support, equipment, and technology*. Ensuring equal access to these resources for both men and women is essential to promote gender equality in the aquaculture sector.

Other suggestions related to *training and awareness-building programs* designed to address the specific needs and constraints of both men and women involved in aquaculture, contributing to equitable outcomes. It was also suggested that sensitization and education on aquaculture, to help bridge knowledge gaps and empower women with limited exposure to formal education and information.

## Ideas for Ocean Utilization

The survey data shows a variety of ideas provided by respondents regarding ocean resource utilization. Majority of respondents provided ideas that focused on *improving fishing practices, conserving the environment, introducing modern technology, and raising awareness about sustainable practices*. These suggestions, if implemented equitably, can benefit both men and women engaged in ocean-based activities. Several respondents recognized the need to *empower women and encourage their active involvement in activities such as seaweed farming, fish processing, and gutting/cleaning*. Also suggested was *promoting women's participation and ensuring they have equal access to training and resources*.

Alongside, many respondents emphasized the importance of *training, capacity building, and awareness campaigns*. While not gender-specific, these initiatives were seen as capable of enhancing the capabilities of both men and women in ocean-based activities. In this regard, tailoring training programs to address the specific needs of each gender group can promote inclusivity. Some suggested providing *modern fishing gear, technology, and equipment*. Ensuring that both men and women have equal access to these resources is crucial for promoting gender equality in the sector. A number of respondents stressed the need for *environmental conservation and proper fishing methods*.

Certain respondents recommend *improving policies, enforcement, and governance* related to ocean resource utilization. Effective implementation of these recommendations can contribute to sustainable practices benefiting the entire community. Also mentioned were suggestions related to *value addition, processing, and marketing of fish products* that have the potential to benefit both men and women involved in the fishing sector. Ensuring that women have access to these economic opportunities is essential for gender equality. Some responses highlight the importance of *involving the community in decision-making processes*. Engaging women and men in community decisions ensures that the diverse needs and perspectives of different gender groups are considered.

While not all the responses provided explicitly present a gender-focused perspective, they provide opportunities to consider gender considerations when developing ideas for utilizing ocean resources more effectively. Recognizing the potential roles of women, promoting their empowerment, ensuring equitable access to resources and opportunities, and addressing the unique challenges they may face are crucial steps toward achieving gender equality in ocean resource utilization.

## Challenges in Actualization of Ideas

The survey data delved into the factors hindering the actualization of ideas in the context of fishing and seaweed farming activities. According to respondents, this was informed by the following issues:

1. **Lack of Resources:** The data indicates that both male and female respondents frequently encountered difficulties related to inadequate financial resources required for ocean based activities. A gender-oriented analysis may unveil that women often face greater barriers in accessing financial resources due to prevailing gender disparities, making it more challenging for them to invest in fishing equipment.
2. **Educational Disparities:** Respondents identified the absence of education and skills as a hindrance. A gender perspective might reveal that women, particularly in specific regions, have historically faced educational disadvantages, limiting their capacity to effectively engage in fishing activities that demand knowledge and skills.
3. **Gender Norms and Roles:** Female respondents cited household responsibilities and duties as obstacles to participating in fishing activities. Traditional gender roles and societal expectations disproportionately burdened women with domestic work, constraining their pursuit of other activities like fishing and seaweed farming.
4. **Access to Information:** The dataset underscores "limited access to information as a factor impeding engagement. Women tended to have limited access to information due to societal norms or their underrepresentation in decision-making spheres.
5. **Limited Mobility:** Female respondents grappled with mobility challenges, particularly in regions where cultural norms restrict women's movement. This affected their ability to access fishing sites and resources.
6. **Market Access and infrastructure:** Some respondents mentioned the absence of a market or proper infrastructure. Women often faced difficulties in accessing markets and encounter barriers to selling their products at fair prices due to discriminatory practices.
7. **Government and Institutional Support:** While both genders confront issues related to accessing government authorities, women tended to encounter additional hurdles stemming from unequal participation and decision-making.

8. **Safety and Security:** Female respondents also faced safety and security risks when engaging in fishing and seaweed farming activities, potentially affecting their willingness to participate.
9. **Cultural and Social Barriers:** The dataset alludes to cultural limitations and a lack of community support. These barriers disproportionately affect women due to cultural norms that curtail their involvement in specific activities.
10. **Climate Change and Environmental Factors:** Environmental changes impact both genders, but women's roles in resource management and adaptation strategies exposed them to much more risks and shocks.

## Pictures: Baseline Survey Training





## CONCLUSION AND RECOMMENDATIONS

### 3.1 Discussion of the Findings

#### *Summary of the Findings*

The analysis of the dataset through a gender lens has provided profound insights into the unique challenges and opportunities experienced by women and men within the fishing and sea weed farming sector. Gender disparities in various aspects of this sector have been unveiled, underscoring the necessity of tailored interventions for different groups in Kilifi and Kwale counties, Kenya.

#### *Demographic Characteristics*

The survey findings have revealed significant gender-based disparities in the socio-demographic characteristics of respondents in Kilifi and Kwale counties. Women are overrepresented in the survey sample, and distinct differences emerge in age distribution, religious affiliation, educational attainment, and marital status. These disparities emphasize the intersection of gender, culture, and geography in shaping the lives of respondents in these counties.

### **Livelihoods and Income**

The survey findings shed light on gender disparities in household asset ownership within Kilifi and Kwale Counties. While equitable access efforts have made progress in improving access to household assets over time, the data clearly reveals that substantial gender differences persist. The ownership of assets such as motorbikes, modern houses, fridges, and water tanks exhibits significant disparities between men and women, indicating the need for targeted interventions to address these disparities. These gender inequalities can be attributed to a variety of factors, including cultural norms, economic opportunities, and access to credit. It is essential for policymakers and organizations to recognize these disparities and formulate specific policies and programs aimed at promoting equitable access to household assets and improving the overall well-being of the population.

Regarding the sources of income in Kilifi and Kwale Counties, the data illustrates a diversified economic landscape. Seaweed farming, fish farming, and business activities are the primary sources of income for most respondents. Notably, there is a shift in traditional gender norms, with a higher proportion of women involved in fishing and seaweed farming, challenging the male-dominated history of these activities. The prominence of business as a primary income source highlights the entrepreneurial spirit within these regions, potentially driven by aspirations for improved livelihoods. This analysis emphasizes the changing dynamics in traditionally male-dominated sectors and the potential for women's economic empowerment.

Further research and exploration of women's representation in various economic activities, as well as their access to resources and opportunities in these sectors, will be vital to ensure gender equality and promote sustainable economic growth in the region. Understanding these dynamics is crucial for designing effective policies and interventions that address gender disparities and support the economic well-being of both men and women in Kilifi and Kwale Counties.

### **Utilization of Ocean Resources**

The analysis of fish and aquaculture participation highlights shifting gender dynamics. Women's increasing involvement in fishing challenges traditional gender roles, while men are more engaged in tourism-related activities. These disparities require further investigation to guide targeted interventions that promote equity in the sector.

The findings underscore limited awareness among seaweed and fish farmers regarding value addition, a critical factor for sustainable business development. Gender-related disparities in the duration of engagement in fish farming are evident, with women often having shorter engagement periods. Recognizing these differences is essential for designing effective support programs.

Fish and seaweed price trends indicate overall increases, with gender-related differences, especially in the perception of price changes. These differences can significantly impact women's livelihoods and should be addressed. While the ownership of seaweed blocks appears relatively equitable, variations in block quantities exist. Understanding these gender-related differences is crucial for designing support programs. Seaweed farming methods and species choices differ between genders, necessitating customized interventions. Time allocation for seaweed and fish farming also shows gender-related disparities influenced by societal roles.

Raising awareness about Integrated Multi-Trophic Aquaculture (IMTA) is crucial, particularly in Kilifi. Enhanced awareness can promote IMTA adoption. However, a gender gap in openness to adopting new technologies exists, with more men willing to embrace these advancements. Bridging this gap is essential to ensure equitable access to technological benefits.

### ***Challenges in Seaweed Farming and Aquaculture***

Climate change has a disproportionate impact on coastal communities, particularly affecting women who are more engaged in fishing and aquaculture. Women's livelihoods and income are directly threatened by changes in water temperature, ocean acidification, and extreme weather events. To address these gendered impacts, tailored support mechanisms are essential, including financial assistance, technical training, and political representation.

Common coping mechanisms employed by communities to adapt to changing environmental conditions were identified. Challenges related to financial resources, technical knowledge, and political will were identified as barriers to effective adaptation. Gender-specific barriers, such as limited access to financial resources and technical knowledge, particularly affect women. Equal participation and representation of women in decision-making processes are crucial for effective coping mechanisms.

The choice of coping mechanisms varies based on specific climate change impacts and gender roles, emphasizing the need for comprehensive, gender-sensitive support encompassing financial resources, technical knowledge, and political commitment. Further research is needed to evaluate the effectiveness of different adaptation measures and guide decision-making and investments in climate resilience.

### ***Economic Returns from Fish and Seaweed Farming***

Seaweed and fish farming have significantly improved living standards by empowering local communities in Kilifi and Kwale counties. These activities have led to improvements in housing, enhanced education opportunities, access to medication, and increased food security. Notable gender differences were observed, with female respondents reporting improvements in social status, clothing, and jewelry for weddings, reflecting the economic independence and increased decision-making opportunities these activities offer to women.

Differences in the impact of seaweed and fish farming between Kilifi and Kwale counties were noted. These distinctions are linked to the longer history of seaweed farming in Kilifi County and the greater participation of women in this activity. The findings underscore the value of seaweed and fish farming as a livelihood strategy for households in these counties, emphasizing the need for gender-sensitive programming to maximize the benefits and empower women economically and socially.

### ***Technology and Innovation Assessment***

The survey on technologies and innovations in the aquaculture and fisheries sector provided insights into the adoption and awareness of new advancements in Kilifi and Kwale counties. The adoption of innovations, including pond farming, cage farming, and pen farming, has the potential to enhance the sustainability and profitability of these sectors in Kenya. Gender plays a role in the awareness of these innovations, with female respondents exhibiting higher awareness levels due to their active involvement.

Significant county-specific differences were observed in the types of innovations adopted, reflecting variations in geographic and environmental conditions. Additionally, awareness of technology used in seaweed farming and Integrated Multi-Trophic Aquaculture (IMTA) is growing, with more female respondents being aware, especially in Kilifi County.

A substantial majority of respondents believed that adopting new technologies could enhance seaweed yield. However, gender disparities in ownership of equipment and gears exist, with more female respondents lacking these resources. Removing barriers to equipment ownership, especially for women, and promoting technological advancements are crucial for inclusive and sustainable growth in aquaculture and fisheries.

## **Social Support Structure**

The survey on group dynamics in Kilifi and Kwale counties revealed that women are more likely to belong to groups or associations compared to men. These groups provide platforms for empowerment, skill development, social support, and access to resources, making them vital for the community. There are significant gender disparities in the types of support received, with women more likely to receive support, particularly for marketing their produce. Ownership of group assets also varies between women's and men's groups, reflecting different needs and purposes.

Gender-focused programs and initiatives should aim to provide more women with access to credit services and inputs for their aquaculture and fisheries activities. They should also offer technical training, promote marketing support for women, and ensure gender-equitable practices within groups. Policies and programs supporting women's leadership within these groups should be encouraged, as it is essential for the empowerment and representation of women.

## **Access to Training and Capacity Building**

The survey on training and capacity building in aquaculture and seaweed farming within Kilifi and Kwale counties provided insights into the training service providers, types of training received, skills held by respondents, and communal training needs. There are significant gender-based disparities in training and skills acquisition, reflecting the active engagement of women in these sectors.

Communal training needs identified include skills in fish farming, seaweed farming, business and marketing, financial management, technology, safety, and environmental awareness. Recognizing these gender-based differences and addressing them is vital for fostering inclusivity and equitable development in these fields.

## **Governance, Policy, and Institutional Dimensions**

The survey data has provided valuable insights into governance, policy, and institutional dimensions related to fish and seaweed farming in Kilifi and Kwale Counties, with a particular focus on gender disparities and challenges. Several critical issues emerge from this data:

1. **BMU Membership:** The data highlights that a significant number of respondents are registered as Beach Management Unit (BMU) members, indicating the importance of these units in the fishing and seaweed farming sectors. However, a gender disparity in BMU registration is evident, with a higher percentage of women not registered, particularly in Kilifi. This suggests that women face specific challenges in BMU registration, possibly linked to an awareness gap, barriers to registration, and gender dynamics in decision-making. Addressing this gender imbalance in BMU registration is vital to ensure equitable access to resources and benefits for both women and men.
2. **BMU Subscription:** There are significant differences in remittance behavior between Kilifi and Kwale counties, with more respondents remitting money to BMUs in Kwale than in Kilifi. The average remittance amount is also higher in Kwale. Gender analysis shows that women actively participate in remitting money to BMUs, despite the challenges they face. Addressing these challenges can promote gender equity and equal opportunities in engaging with BMUs.
3. **Government Support Received:** Women are less likely to receive support from government institutions compared to men, with factors such as their involvement in informal and small-scale fishing activities contributing to this disparity. Efforts should be made to provide more information to women, address gender discrimination, and simplify the process of accessing government support to promote gender equality in the sector.
4. **Adequacy of Government Support:** A notable gender bias is observed in the perception of government support, with more women perceiving the support they receive as insufficient. The challenges faced by women in accessing government support include a lack of awareness, time constraints, financial limitations, and potential gender discrimination. Addressing these challenges is crucial to ensure equitable government support for both women and men.
5. **Additional Government Support Needs:** Both women and men express a need for financial support, training, and equipment. Women also highlight the importance of childcare and education support, access to credit, and markets. Tailoring support programs to address the specific needs of each gender group is essential for promoting inclusivity and gender equality in the sector.



6. Ideas for Ocean Resource Utilization: Respondents provide a range of ideas focused on improving fishing practices, conserving the environment, introducing modern technology, and raising awareness about sustainable practices. These ideas can benefit both men and women, but it is essential to ensure that women have equal access to resources and opportunities.
7. Challenges in Actualization of Ideas: The factors hindering the actualization of ideas include lack of resources, educational disparities, gender norms and roles, access to information, limited mobility, market access and infrastructure, government and institutional support, safety and security, cultural and social barriers, and climate change and environmental factors. A gender perspective reveals that these challenges often disproportionately affect women due to cultural norms and gender roles.

### 3.2 Key Highlights, Implications and Recommendations

The baseline data from the highlights significant gender-based disparities reflecting the complex interplay of gender, culture, and geography in shaping individuals' lives in Kilifi and Kwale counties. The gender analysis conducted on the fishing and sea weed farming sector in the two counties in Kenya reveals several key highlights and important implications.

#### Key Highlight

1. Shifting Gender Dynamics: The analysis highlights the ongoing changing gender dynamics in the fishing and seaweed farming industry, with women increasingly involved in challenging traditional gender roles. Cultural norms and societal conventions that previously played a significant role in restricting women's participation in aquaculture are being eroded. Stereotypes, such as the belief that women are less capable of engaging in strenuous tasks, are no longer a hinderance to women's involvement in the industry. However, women's contributions in fisheries and aquaculture remains unrecognized, and undervalued.
3. Limited Awareness and Value Addition: The analysis underscores the limited awareness among seaweed and fish farmers generally and more specifically on value addition. Women's participation in aquaculture is still associated with inadequate knowledge and awareness. While value addition is a crucial factor for sustainable business development, this remains lightly exploited. This indicates a need for greater awareness and training especially in value addition techniques.

4. **Climate Change Impacts:** The adverse effects of climate change disproportionately affect women, who are more engaged in fishing and aquaculture. Their livelihoods and income are directly threatened by changes in water temperature, ocean acidification, and extreme weather events.
5. **Social Support and Gender Disparities:** Women are more likely to belong to groups or associations, which serve as platforms for empowerment, skill development, and access to resources. However, there are significant gender disparities in the types of support received, with implications for equitable participation and benefit sharing.
6. **Training and Capacity Building:** The data reveals gender-based disparities in training and skills acquisition, with women possessing more skills relevant to aquaculture and seaweed farming. This reflects the increasing involvement of women in these sectors.
7. **Government Support and BMU Membership:** Women are less likely to receive government support and register with Beach Management Units (BMUs), indicating gender disparities in access to resources and support. Despite the awareness of gender inequalities in the sector, government policies and programs in the aquaculture sector tended to favor men over women, even when targeted at women, which gives men more opportunities in the aquaculture sector. The government agencies have not taken sufficient steps to address these disparities and socio-economic constraints faced by women. This highlights the importance of removing barriers and empowering women to access these resources.

### **Implications**

The gender analysis underscores the importance of addressing gender disparities in the fishing and sea weed farming sector while promoting equitable participation, access to resources, and support.

1. **Tailored Interventions:** The findings emphasize the need for gender-sensitive and context-specific interventions in the industry to address the specific challenges and opportunities faced by different groups within the communities. These interventions should consider the evolving gender dynamics in the sector.
2. **Value Addition Awareness:** Raising awareness about value addition techniques among seaweed and fish farmers is essential for sustainable business development and improved income opportunities. Training and support programs should focus on this aspect.

3. **Gender-Responsive Climate Change Measures:** Given the disproportionate impact of climate change on women in the industry, there is a need for climate resilience and adaptation measures that specifically target women, including financial assistance, technical training, and political representation.
4. **Equitable Support and Training:** Efforts should be made to provide women with equitable access to government support programs, training, and capacity-building opportunities in the fishing and aquaculture sectors. Removing barriers and empowering women to access these resources is crucial.
5. **Empowering Women in Social Groups:** Women's active participation in groups and associations presents an opportunity for empowerment. Gender-equitable practices and policies within these groups should be promoted to provide equal access to different types of support.
6. **Inclusive Technological Advancements:** Promoting technological advancements in aquaculture and fisheries must consider gender-based differences in technology adoption, equipment ownership, and training. Efforts should be made to bridge the gender gap in this regard.
7. **Support for BMU Membership:** Increasing women's awareness of and participation in Beach Management Units (BMUs) is crucial for enhancing community governance of ocean resources and ensuring equitable participation and resource distribution.

## Recommendations

Addressing the challenges requires a comprehensive mix of interventions that can work towards a more equitable and sustainable fishing and sea weed farming sector that benefits all community members, regardless of gender. This approach fosters economic development, social well-being, and environmental stewardship while empowering women in the sector. To promote gender equality and sustainable development in the sector the following is recommended.

Recommendations for Blue Empowerment Project Implementation Consortium

### 1. Promote Gender-Sensitive Training Programs:

*Recommendation:* Develop and implement gender-sensitive training programs that cater to the evolving roles of women and men in the fishing and sea weed farming sector. Focus on skills development, including modern fishing techniques, seaweed farming methods, and value addition.

*Way Forward:* Collaborate with local training institutions, NGOs, and government agencies to design and deliver training programs that address the specific needs and preferences of women and men in the sector. Encourage women's active participation in these programs through awareness campaigns and tailored content.

### **2. Raise Awareness about Value Addition:**

*Recommendation:* Launch awareness campaigns to educate fish and seaweed farmers about the importance of value addition in increasing income and sustainability. Promote the adoption of value addition practices within the communities.

*Way Forward:* Collaborate with local extension services and women's groups to conduct workshops and training sessions on value addition techniques. Create informational materials and leverage digital platforms for outreach.

### **3. Advocate for Gender-Responsive Policies:**

*Recommendation:* Advocate for gender-responsive policies at the local, regional, and national levels to ensure that gender considerations are integrated into fisheries and aquaculture planning and development.

*Way Forward:* Engage with government agencies and policymakers to raise awareness about the importance of gender-responsive policies. Collaborate with women's advocacy groups to lobby for policy changes that promote gender equality and sustainable development in the fishing and sea weed farming sector.

### **4. Promote Research and Knowledge Sharing:**

*Recommendation:* Encourage further research on gender dynamics in the fishing and sea weed farming sector to inform evidence-based policies and interventions. Share research findings and best practices among stakeholders.

*Way Forward:* Facilitate research partnerships between universities, research institutions, and local communities to deepen the understanding of gender dynamics in the sector. Create platforms for sharing knowledge and experiences through workshops and conferences.

## Recommendations for County Governments of Kwale and Kilifi

### 5. Implement Climate-Resilient Strategies:

*Recommendation:* Develop and implement climate-resilient strategies that specifically address the vulnerabilities of women in the fishing and sea weed farming sector. These strategies should encompass adaptive practices, access to climate information, and alternative livelihood options.

*Way Forward:* Collaborate with climate resilience organizations and government agencies to integrate gender considerations into climate adaptation and mitigation initiatives. Ensure that women are actively involved in decision-making processes related to climate change.

### 6. Strengthen Support for Women in BMUs:

*Recommendation:* Promote women's participation and leadership within Beach Management Units (BMUs) to ensure equitable resource management and decision-making. Remove barriers that deter women from registering with BMUs.

*Way Forward:* Facilitate capacity-building programs for women interested in BMU leadership roles. Ensure gender-responsive policies and practices within BMUs. Raise awareness about the benefits of BMU participation through community outreach and educational campaigns.

### 7. Enhance Access to Government Support:

*Recommendation:* Simplify the process for women to access government support programs and ensure that these programs are gender-responsive. Address the specific needs of women engaged in informal and small-scale fishing.

*Way Forward:* Collaborate with government agencies to streamline support program applications and approvals, making them more accessible to women. Develop targeted support programs that address the unique challenges faced by women in the sector.

### 8. Foster Inclusive Technological Advancements:

*Recommendation:* Promote technological advancements that are inclusive and consider gender-based differences in technology adoption, equipment ownership, and training. Bridge the gender gap in access to technological benefits.

*Way Forward:* Work with technology providers and other government institutions to ensure that technology adoption is accessible and equitable. Provide training and resources that specifically target women's participation in the digital transformation of the industry.

### **9. Support Social Groups Empowerment:**

*Recommendation:* Encourage the empowerment of women through group participation by promoting gender-equitable practices and policies within these groups. Ensure equal access to different types of support and resources.

*Way Forward:* Collaborate with women's groups and associations to develop and implement gender-sensitive policies and practices that enhance the inclusion of women. Support the capacity-building of women leaders within these groups.

### **10. Monitor Progress and Collect Gender-Disaggregated Data:**

*Recommendation:* Regularly monitor and evaluate the progress of gender-sensitive interventions in the fishing and sea weed farming sector. Collect and analyze gender-disaggregated data to assess the impact of these interventions.

*Way Forward:* Establish a monitoring and evaluation framework that includes gender-sensitive indicators. Collaborate with local research institutions and organizations to ensure data collection and analysis is gender-inclusive.

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