

AFRICAN UNION
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SOCIO-ECONOMIC LIVELIHOOD NEEDS ASSESSMENT FOR PRIORITISING LIVELIHOODS IN THE DUSORNO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA) COMMUNITIES IN THE KETA LAGOON COMPLEX RAMSAR SITE (KLCRS)

IMPLEMENTING THE GENDER - SENSITIVE MANAGEMENT PLANS FOR THE NEWLY ESTABLISHED CREMA



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Citation: AU-IBAR, 2025. SOCIO-ECONOMIC LIVELIHOOD NEEDS ASSESSMENT FOR PRIORITISING LIVELIHOODS IN THE DUSORNO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA) COMMUNITIES IN THE KETA LAGOON COMPLEX RAMSAR SITE (KLCRS)

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Published by: AU-IBAR, Nairobi, Kenya

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Key words: Climate Change impact mitigation; Environmental Management; Ecosystem Restoration; and Aquatic Biodiversity and Conservation.

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List of Acronyms

ABES:	African Blue Economy Strategy
AU-IBAR:	African Union – Inter-African Bureau for Animal Resources
IUCN:	International Union for Conservation of Nature
KLCRS:	Keta Lagoon Complex Ramsar Site
CREMA:	Community Resource Management Area
CRMCs:	Community Resource Management Committees
CEC:	Community Executive Committee
SIDA:	Swedish International Development Cooperation Agency

Executive Summary

Within the framework of the African Blue Economy Strategy (ABES), and with support from the Swedish International Development Cooperation Agency (SIDA), the African Union- Inter African Bureau for Animal Resources (AU-IBAR) is implementing a three-year project on "Conserving Aquatic Biodiversity and Ecosystems in the Context of the African Blue Economy Strategy' (AU-IBAR. 2019). The project aims to enhance the policy environment, regulatory frameworks, and institutional capacities of AU Member states and Regional Economic Communities in order to sustainably utilize and conserve aquatic biodiversity and ecosystems.

In line with the implementation of the project, AU-IBAR collaborated with the International Union for Conservation of Nature (IUCN) to achieve integrated protection of fragile ecosystems and biodiversity within mangrove habitats in West Africa and to enhance their resilience to climate change. This support involved the development of gender-sensitive work plans to enhance the role of women in biodiversity protection and environmental governance by applying a Community Resource Management Area (CREMA) model in the Anlo-Keta Lagoon Complex Ramsar Site. Dusorno CREMA is made up of five communities namely; Galo, Sota, Galotse, Klonu, and Korsikope; and is located in the southern part of the Keta Lagoon Complex Ramsar Site (Agyeman, 2023). The Dusorno CREMA aims to conserve the fragile mangrove ecosystem identified in the aforementioned communities and to develop a gender-sensitive plan to enhance the role of women in biodiversity protection and environmental governance. The specific goal of the joint collaboration is to improve stakeholders' engagement in the management of both protected areas and unprotected mangrove sites.

Under this collaboration, the Community Resource Management Committees (CRMCs) and Community Executive Committee (CEC) are in place, CRMCs and CECs capacity on leadership and gender mainstreaming has been built, and a management plan for Dusorno CREMA has been finalized. The last and final activity is capacity building on gender specific livelihoods for the CREMA. In order to determine which livelihood option that would yield the best impact for communities, a preliminary socio-economic livelihood assessment was to be conducted. This assessment would allow communities to collectively deliberate and agree on the best livelihoods options. In that regard, a socio- economic community livelihood needs assessment was conducted from 08 - 12th April 2024 in Ghana. Consequently, a study report was to be developed to capture highlights and recommendations from the training/ workshop.

The study was commissioned with the primary objective of conducting a preliminary socio-economic livelihood needs assessment in order to identify and prioritize gender-specific livelihood options that support the conservation and restoration efforts of the mangrove ecosystems in five coastal communities that constitute the Dusorno Community Resource Management Area (CREMA). The methodology employed involved a desktop literature review, focused group discussions, and face-to-face interviews.

The assessment revealed that a significant proportion of residents across the studied communities have lived in the area for 20 years or more; this demonstrates their deep connections and high levels of engagement with the landscape, implying a profound understanding of local dynamics and cultural norms.

The assessment also explored the existing livelihoods within the Dusorno CREMA and found out that fishing is the dominant livelihood and a source of household income, with women employing diverse processing methods such as smoking, frying, and drying to enhance value. Mangrove harvesting is the second most practiced livelihood option supporting the local economy mainly utilized as fuelwood and construction materials for houses. Farming emerged as the third prominent income source, underscoring the vital role of the agricultural sector in sustaining the local economy of the CREMA. Cassava and maize cultivation in communities like Galo and Galotse highlights their adaptability to local conditions and market demands, as well as their agricultural production capacity and land cultivation patterns. Other income-generating activities such as mat-weaving and food vending were similarly discovered reflecting the communities' adaptive strategies to diversify income sources.

In terms of capacity building and engagement experience, the communities' active engagement in conservation and farming programs demonstrates varying levels of participation in capacity building programs underscoring their readiness to learn and acquire new skills.

After the livelihood identification and prioritization process, fish farming consistently emerged as the preferred livelihood option across four communities (Klonu, Korsikorpe, Sota and Galotse) due to its higher income potential, better market access, greater social and cultural acceptance; compared to other livelihood options such as beekeeping, grasscutter farming, vegetable farming, or coconut farming.

Only one community, Galo, preferred water transportation (canoe fitted with outboard motor) due to its higher income potential, stability, and social acceptance within its community.

Following the prioritization of the livelihoods, communities made some suggestions regarding implementation. Communities suggested that prioritized livelihoods should be implemented at the community level, involving community executives and members taking into consideration gender inclusiveness to maximize impact and ensure collective benefit.

The communities supported with both aquaculture and water transportation as income generation activities should have capacity building in these various livelihoods to enhance sustainability and success. For each of the livelihoods, their respective technical expertise, engineers, and/or consultants should be engaged to carry out further assessments, such as site suitability and other necessary checks as well as develop management plans for effective management.

Based on the above recommendations, some strategies are also made for consideration. It includes the implementation of targeted training programs to enhance the skills of women and youth in areas such as aquaculture, water transportation, value addition, entrepreneurship, and financial literacy. Also financial schemes such as grants, loans, and microcredit targeted at women to support their involvement can be developed. Policies that mandate the inclusion of women and youth in all stages of project development and management should be developed and establish systems for collecting and analyzing gender-disaggregated data to track the participation and impact of livelihood interventions.

Overall, the assessment serves as a crucial step towards empowering local communities to actively participate in the conservation and restoration of mangrove ecosystems while also improving their socio-economic well-being.

Introduction

The Keta Lagoon Complex Ramsar Site (KLCRS) which is found in the south eastern part of Ghana is the largest of all the Ramsar sites in Ghana (Mattah et al, 2024). The KLCRS is made up of a network of lagoons, and thick mangrove forests rich with biodiversity. It is home to species such as the leatherback turtle, the West African Manatee, the endemic Western African Sitatunga (Tragelaphus Spekei), an amphibious antelope and other species that are currently on the IUCN Redlist (EPA, 2004). Other key resources are the beaches and rivers that can be exploited for tourism purposes. There are also offshore coral reefs, dolphins and other important biodiversity that require protection and conservation within the area (Doku et al, 2018).

However, despite being designated as a Ramsar Site, the management of KLCRS has been severely challenged due to inadequate governance. Over-exploitation and destruction of natural resources through livelihood activities such as farming, fishing and mangrove harvesting have led to dwindling fisheries resources, destruction of biodiversity including turtle communities, pollution of aquatic ecosystems and loss of mangroves areas (Adda, 2016). Another major problem in the area is the high incidence of poverty and absence of alternative livelihood and income generation streams (Dogbey, 2015). Similarly, in Bangledesh, the Chunati Wildlife Sanctuary has suffered a lot of degradation due to weak law enforcement and poverty of the surrounding communities (Mollah, 2004). A study by Rahman et al, 2017 indicated that implementing alternative livelihood in the fringing communities around Chunati Wildlife Sanctuary reduced their dependence on the natural and forest resources and improved their socio-economic wellbeing.

There is therefore an urgent need to address the overexploitation of mangrove within the Dusorno communities. Introducing alternative livelihood options can help to reduce dependence on these vital resources. It is imperative that all communities are involved in this process leveraging their rich knowledge and strong connection to the area.

Background and Rationale for the assessment

The purpose of this study is to conduct a preliminary socio-economic livelihood assessment in five communities within the Keta landscape in Ghana, which constitutes the Dusorno Community Resource Management Area (CREMA). These communities include Klonu, Galo, Galotse, Sota, and Korsikorpe. The assessment aims to identify and prioritize livelihood options that will best support their efforts in conserving and restoring mangrove ecosystems.

This initiative is part of a broader project led by the African Union Inter-African Bureau for Animal Resources (AU-IBAR) in collaboration with the International Union for Conservation of Nature (IUCN) and the Wildlife Division of the Forestry Commission in Ghana. The project, funded by the Swedish International Development Cooperation Agency (SIDA), focuses on conserving aquatic biodiversity and ecosystems within the African blue economy.

Specifically, the project aims to enhance the policy environment, regulatory frameworks, and institutional capacities of African Union member states and regional economic communities to sustainably utilize and conserve aquatic biodiversity and ecosystems. In the Anlo-Keta landscape, the Dusorno Community Resource Management Area (CREMA) has been established through the collaborative efforts of the International Union for the Conservation of Nature (IUCN), AU-IBAR and Wildlife Division of the Forestry Commission.

The establishment of the Dusorno CREMA includes the development of a management plan that incorporates gender-disaggregated roles to guide the sustainable and inclusive management of the mangrove ecosystem. As part of the project's activities, capacity-building initiatives for gender-specific livelihoods within the CREMA are being planned.

To inform these capacity-building efforts, a preliminary socio-economic livelihood assessment is being conducted. This assessment will enable the communities within the Dusorno CREMA to collectively deliberate and agree on the most viable livelihood options that align with their conservation and restoration goals.

Objectives of the Livelihood Assessment

The primary objective of the livelihood assessment is to identify and prioritize livelihood options that support the conservation and restoration efforts of the mangrove ecosystems within the Dusorno CREMA.

Specifically, the assessment aims to:

1. Conduct a socio-economic livelihood needs assessment.
2. Identify the preferred livelihood options and income-generating activities that are agreed upon by all communities.
3. Recommend targeted interventions and support mechanisms to enhance the selected livelihood options and promote sustainable development within the CREMA.

The livelihood assessment seeks to empower local communities to actively participate in the conservation and restoration of mangrove ecosystems while improving their socio-economic well-being.

Methodology

Description of the Questionnaire and Data Collection Process:

The methodology employed to gather insights in the Dusorno Community Resource Management Area (CREMA) included a desktop literature review, focused group discussions (Van Eeuwijk & Angehrn, 2017), and face-to-face interviews. A structured questionnaire was designed to gather data on various socio-economic aspects and livelihood practices within Galo, Galotse, Sota, Klonu, and Korsikorpe.

The questionnaire used consisted of both closed and open-ended questions, covering topics such as demographic information, current living and economic perceptions, livelihood preferences, challenges faced, and opportunities for development. Additionally, specific sections of the questionnaire gathered data on the fishing industry, mangrove utilization, previous participation in capacity building initiatives, and identification and prioritization of alternative livelihood options.

Data collection was conducted through focused group discussions and individual face-to-face interviews targeting local stakeholders, including community heads, household heads, opinion leaders, women leaders and local community groups or organizations. Enumerators were trained to administer the questionnaire, taking into consideration their ability to speak the local language. Prior to the interviews, informed consent was obtained from participants, and confidentiality of responses was assured.

Sample Size and Selection Criteria:

The sample size for the livelihood assessment was determined based on feasibility within the timeframe and resources available.A representative sample of 25 participants, including households' heads, community and CREMA leaders, was selected purposefully and randomly from each of the five communities within the Dusorno CREMA.

Ten out of the 25 participants comprising women, CREMA executives as well community leaders participated in focused group discussion while the remaining 15 were engaged in face to face interviews. Other selection criteria of participants included residency within the study area and

willingness to participate in the survey. Efforts were made to ensure diversity in age, gender, religion and socio-economic status among the respondents, in order to capture a comprehensive understanding of livelihood dynamics and perception within the communities.

Livelihood assessment and prioritization criteria

Criteria for evaluating livelihood options were developed based on relevant literature. These criteria included income potential, skills/resources, market access, environmental impact, seasonality, social acceptance, infrastructure, and education/training requirements (Goba, 2021; Sherifa, 2021 and Scoones, 1998). Each livelihood option was assessed against these criteria, and scores were assigned based on the data collected. The scores were then aggregated to determine the overall suitability and preference for each livelihood option.

Data Analysis:

Upon completion of data collection, the collected survey data were entered into Excel for analysis. Quantitative data obtained from closed-ended questions were analyzed using descriptive statistics such as frequencies, percentages, and means. Qualitative data from open-ended questions and interviews were thematically analyzed to identify recurring patterns, themes, and insights. This involved coding and categorizing responses into meaningful themes related to livelihood practices, challenges, and opportunities within the Dusorno CREMA.

The findings from the data analysis were then synthesized to draw conclusions and develop recommendations to inform interventions and policies aimed at enhancing community livelihoods and promoting sustainable development within the CREMA.

Findings and discussions

The Study Area and Communities

The Dusorno Community Resource Management Area (CREMA) encompasses five communities within the South Tongu and Anloga districts of the Volta Region in Ghana. Located at latitudes 5°49'16.23"N to 5°53'21.73"N and longitude 0°42'17.13"E to 0°42'21.24"E, the CREMA covers a total area of 2,083 hectares. The communities forming the CREMA include Galo, Galotse, Sota, Klonu, and Korsikorpe. The CREMA is accessible from the north east via the main road connecting Dabala and Savietula and from the northern side using the Lolito-Lave road.

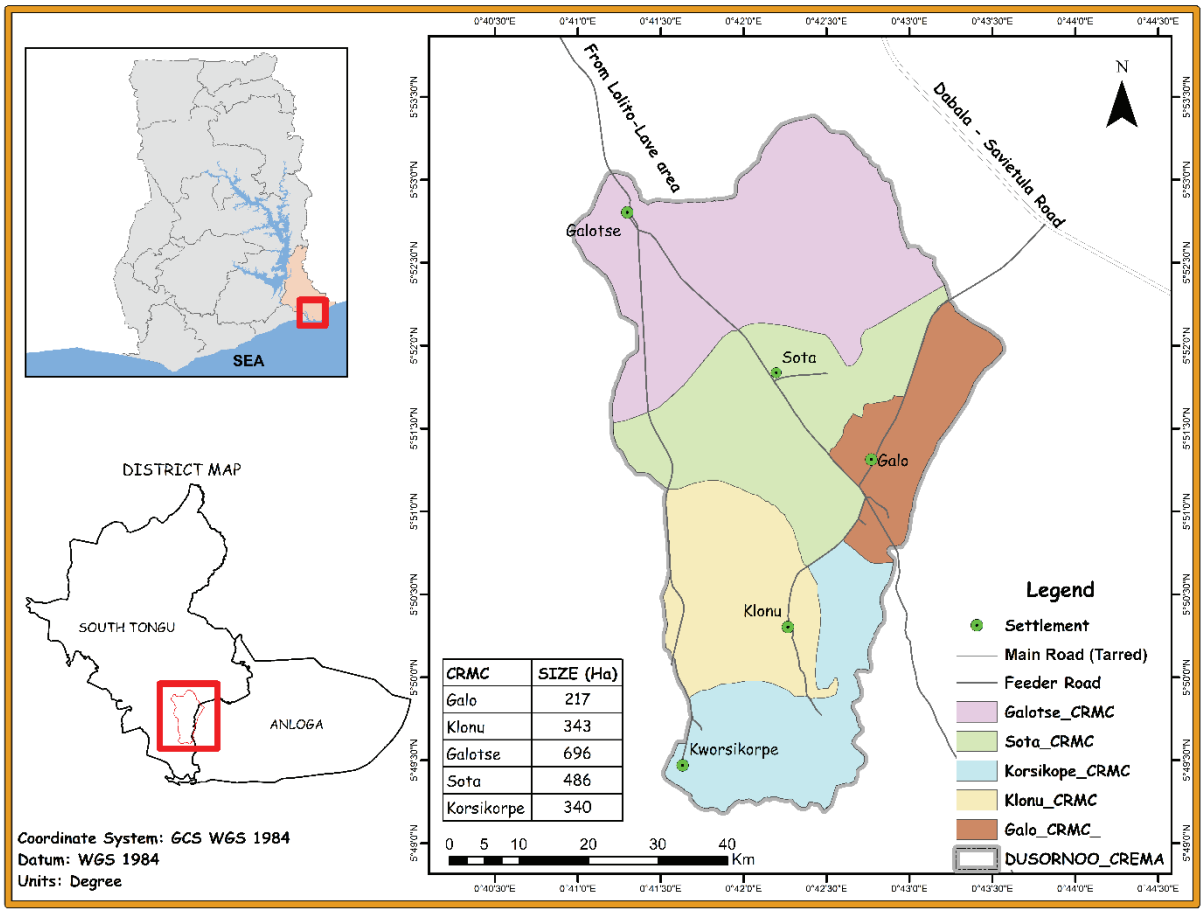


Figure 1.0 Dusorno CREMA

Topography:

The Dusorno CREMA area is situated within the coastal savannah plain, characterized by low-lying terrain that gradually rises to approximately 10 meters above sea level. The topography is generally flat, with some elevated areas scattered throughout the CREMA.

Climate:

The climate of the area is influenced by the southwest monsoon winds, resulting in a double maxima rainfall regime. The main rainy season occurs from late March to July, with an average rainfall of 195 mm. A second rainy season takes place from late September to November, recording an average rainfall of 73 mm.

Drainage:

The CREMA serves as a watershed for several streams due to its predominantly flat terrain. Numerous streams, some originating from the Volta River, traverse the area, contributing to its designation as a watershed. These streams play a crucial role in providing water and benefits such

as fish to the surrounding communities. Additionally, the Aglor lagoon, situated on the northern side of the CREMA, serves as a primary water source, feeding other streams within the area. The large expanse of water in the area presents diverse opportunities for the Dusorno CREMA.

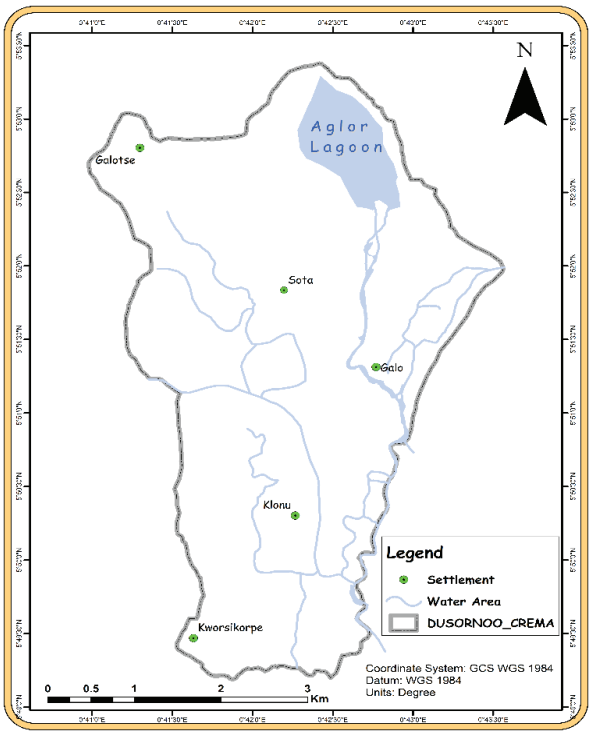


Figure 2.0 Water areas of the Dusorno CREMA

Demographic Profile

The demographic profile offers a snapshot of the communities residing within the Dusorno Community Resource Management Area (CREMA), shedding light on age distribution and educational attainment among residents who took part in the study.

Age Distribution

The age distribution table below illustrates the population composition across different age brackets in each community within the CREMA that took part in the study. It reveals the varying proportions of males and females within distinct age groups, providing insights into the demographic makeup of Klonu, Korsikorpe, Galo, Galotse, and Sota.

Table 1.0 Age distribution of respondents

	Klonu		Korsikorpe		Galo		Galotse		Sota	
Age (years)	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
20-29	**0**	**0**	*2*	*3*	*0*	*0*	*0*	*0*	*0*	*0*
30-39	*5*	*4*	*1*	*1*	*2*	*3*	*3*	*6*	*2*	*4*
40-49	*4*	*2*	*0*	*3*	*4*	*5*	*2*	*4*	*2*	*3*
50>	*6*	*4*	*10*	*5*	*7*	*4*	*5*	*5*	*6*	*8*
Total	*15*	*10*	*13*	*12*	*13*	*12*	*10*	*15*	*10*	*15*

The population in Klonu spans across various age groups, with notable representation in the 30-39 and 50 years and above categories. This community exhibits gender parity in most age cohorts, contributing to a balanced demographic structure.

Similarly, Korsikorpe demonstrates a diverse age distribution, with a significant proportion of individuals aged 50 years and above. Galo showcases a relatively even distribution across age groups, with a considerable number of residents falling within the 30-39 and 40-49 age ranges.

Galotse also exhibits a diverse age profile, with substantial representation across all age brackets. Finally, Sota also presents a varying age distribution, with notable concentrations in the 50 years and above categories.

Overall, the community members' ages range from 20 and above, conventionally referred to as the labour force, implying a large base of population available for productive work.

Educational Level

The educational level attained by respondents enrich the study by providing insights into diverse perspectives, decision-making dynamics, livelihood strategies, and approaches to equitable benefit sharing. The graph below shows the percentage of educational attainment among respondents across the different communities within the CREMA.

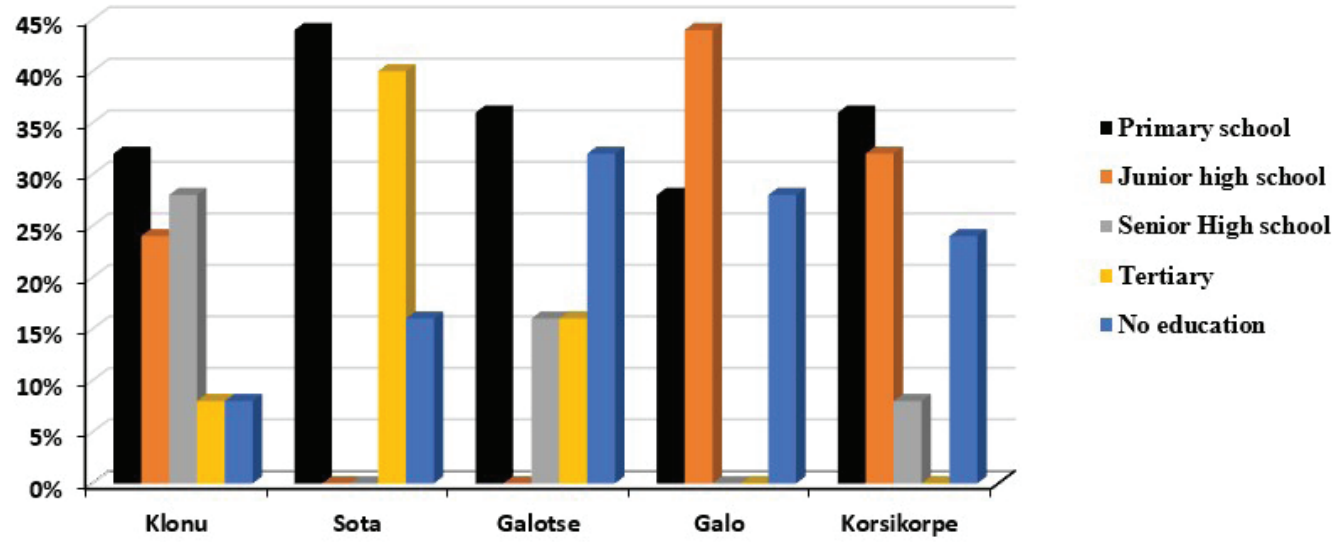


Figure 3.0 Educational levels attained by of respondents

Primary education is prevalent across all communities, ranging from 28% to 44% of the population. The highest proportion is observed in Sota (44%), followed by Galotse and Korsikorpe (36% each), while the lowest is in Galo (28%).

The attainment of junior high school education varies significantly among communities. Galo and Korsikorpe have the highest representation at 44% and 32%, respectively. Klonu also has a considerable proportion (24%), while Sota and Galotse show no reported individuals with junior high school education in this sample.

Senior high school education is less prevalent compared to primary and junior high school levels. Galotse has the highest representation at 16%, followed by Klonu (28%) and Galo (16%). Korsikorpe and Sota have no reported individuals with senior high school education in this sample.

Tertiary education shows a significant variation across communities, with the highest proportion in Sota (40%), followed by Galotse (16%) and Klonu (8%). However, Galo and Korsikorpe have no reported individuals with tertiary education in this study.

Finally, the percentage of individuals with no formal education ranged from 8% to 32% across communities. Galotse has the highest proportion (32%), followed by Korsikorpe (24%), Galo (28%), Klonu (8%), and Sota (16%).

Overview of Current Living Practices and Economic Perception

The assessment of current living and economic perceptions offers valuable insights into the livelihood dynamics and economic activities within the Dusorno Community Resource Management Area (CREMA). This section explores key indicators such as duration of residency, main sources of household income, highest value items produced for the market, and land cultivation patterns.

Duration of Residency:

The table below shows the duration of residency within the communities providing context to understand the level of attachment and familiarity residents have with their environment.

Table 2.0 Duration of residence in community

	Klonu	Sota	korsikorpe	Galo	Galotse
< 5years	0%	0%	8%	0%	0%
5 - 10 years	0%	20%	8%	0%	8%
11 - 20 years	28%	0%	8%	0%	0%
20 years and above	72%	80%	76%	100%	92%

In the study, 72% of the residents have resided in Klonu for 20 years and above, while only 28% have lived there for 11 to 20 years, indicating deep-rooted ties to the community and potentially extensive local knowledge and social networks. Similarly, Sota has a significant proportion (80%) of residents who have lived in the community for 20 years and above, reflecting long-standing connections and community engagement.

Korsikorpe also has a considerable portion (76%) of long-term residents who have lived in the community for 20 years and above, with a small proportion (8%) living there from 1 to 20 years.

Galo and Galotse showcase the highest (100% and 92% respectively) of residents who have lived in the community for 20 years and above, indicating a strong sense of belonging and attachment to the area. This highlights the significant presence of long-standing community members and such communities may exhibit stronger social cohesion and traditional knowledge systems which could influence decision-making processes regarding the prioritization of livelihood strategies and resource management initiatives.

Main Sources of Household Income:

The main sources of household income provide insights into the economic activities driving livelihoods within the communities. Understanding the local income sources of these communities is crucial for effective conservation efforts.

Fishing (23%) emerged as the highest significant source of income in the Dusorno CREMA communities, with Sota (36%), Galotse (28%), Galo (26%) and Korsikorpe (22%) exhibiting notable reliance on this activity (See appendix 3). Klonu (4%) also engages in fishing, albeit to a lesser extent. Fishing is a primary livelihood activity that sustains many households. Women employ various traditional methods for processing fish, including smoking (45%), frying (40%), salting (5%), and drying (10%). The frequency of processing activities varies from 2 to 7 times a week depending on factors such as catch quantity and market demand.

Harvested and processed fish are primarily marketed in the community using small sale tables or stands in front of homes. Some fish are sold to other adjoining communities during market days. The main customers include local and external markets and residents even extending into other regions of Ghana. Besides fishing, community members derive additional benefits from the water bodies, such as transportation.

However, though many fishermen and women have that sense of feeling of togetherness, there is a lack of formal or identified local fishing associations. In recent times the fisher folks and processors face challenges such as declining fish stocks, changes in fish size due to overfishing, and habitat degradation caused by climate change and pollution. Most of the fish catch is predominantly made up of small sized black chin tilapia, tilapia zilli. Other catches include African bonytongue, crabs (Cardiosoma sp.) and shrimps (Penaeus sp.).



Plates 1.0 Fish catch encountered within the Dusorno CREMA

Due to the high presence of mangroves within the CREMA, mangrove cutting/harvesting is also a significant practice relied on for income, fuel and construction activities. Up to 21% of the communities rely predominantly on mangrove cutting/harvesting as a source of household income, emphasizing the significance of mangrove-related activities in livelihood strategies. Three mangrove species predominantly found here are the Red, White and Black mangroves. According to Nunoo and Agyekumhene (2014), mangroves in Ghana are being depleted at a rate of 8.1km^2 per annum.

The dependency level on the mangrove resources is evident in the amount of time spent and distance they have to travel to access these resources. From the current study, Galotse and Sota community members travel between 1 to 3 hours and spend about 3 to 8 hours harvesting mangroves in a day (See appendix 3). This excessive time spent traveling and harvesting the mangroves is a clear indication of the communities' reliance on this resource consequently resulting in overexploitation. This overexploitation threatens the long-term viability of mangrove ecosystems and the other livelihoods such fishing that the mangrove ecosystem support.



Plates 2.0 Red mangroves packed after harvest

In recent times, some members of the communities have had to switch to other sources of fuelwood, such as the neem trees, because most of the mangrove areas have been converted into other landforms by the reason of over-exploitation.

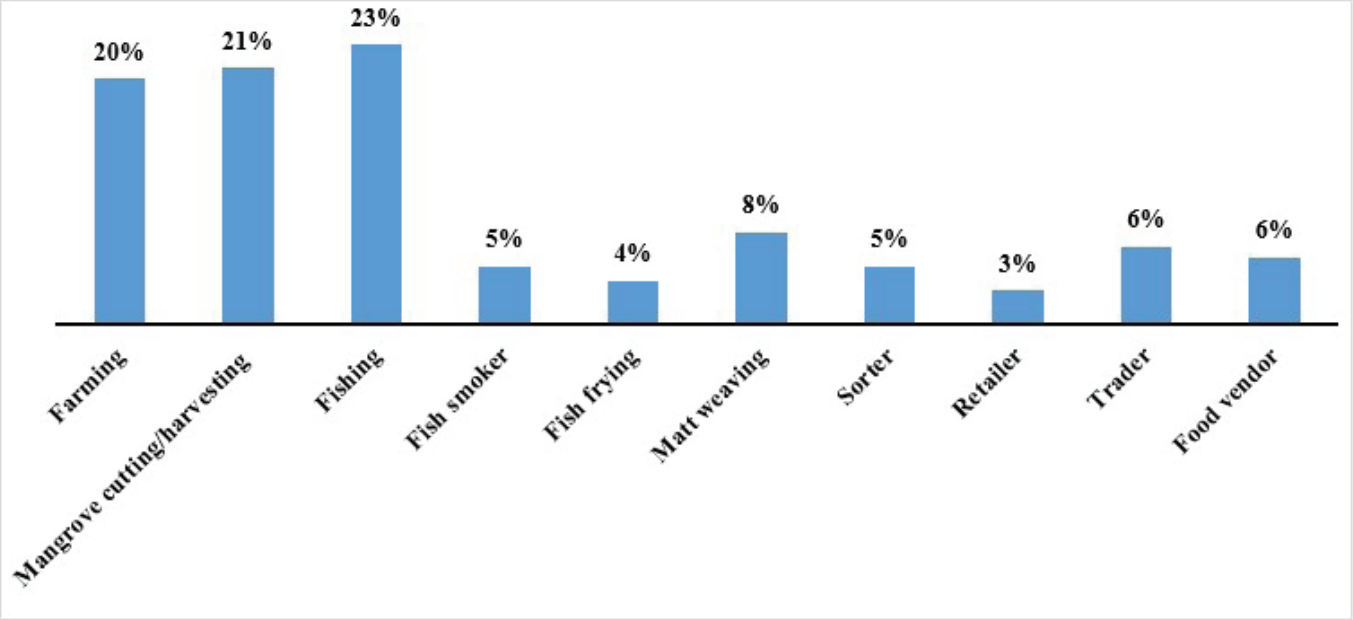


Figure 4.0 Livelihood distribution in the Dusorno CREMA

According to the findings in Figure 6.0, farming (20%) is the third major source of income in the Dusorno CREMA with Klonu community having the highest reliance on farming as a source of household income at 40%, followed by Galotse (28%), Sota (18%) and Galo (16%). This demonstrates a notable reliance on farming reflecting agricultural activities as a cornerstone of the local economy. The Korsikorpe community was observed to have the lowest reliance on farming at 1% in this study.

Other income-generating activities include matt weaving, trading, and food vending, each contributing to the local economy of the communities in their varying levels.



Plates 3.0 Reed harvested and being dried for matt weaving

Land Cultivation Patterns:

The distribution of cultivated land area provides insights into agricultural practices and land utilization patterns within the communities. The distribution of land cultivation varies across communities, with Klonu and Galotse exhibiting diverse patterns. Klonu predominantly cultivates smaller land areas (1 to 2 acres), while Sota and Galotse engage in larger-scale cultivation (2 to 5 acres). While this diversity demonstrates the range of agricultural production and its support for the local economy, the cultivated land area remains insufficient to sustain members of the community (See appendix 3).

Highest Value Items Produced for Market:

The highest value items produced after cultivation for the market shed light on the agricultural produce that significantly contributes to local economies. Cassava emerges as a prominent crop in several communities, with Galo (42%) and Galotse (36%) leading in its cultivation. Maize also holds significance, particularly in Galotse (30%) and Klonu (20%).

Income level of households

Income is a fundamental aspect of socio-economic well-being, serving as a key determinant of individuals' and households' access to essential goods, services, and opportunities. In the context of community livelihood assessment, examining income levels provides valuable insights into the economic dynamics and livelihood challenges faced by residents across various communities.

In Galo, approximately 10% of households earn less than 1,000 GHC, representing a relatively small portion of the community's income distribution; which indicates that a significant portion of the community may face challenges in accessing basic necessities and essential services. Another 8% fall within the income range of 1,000 - 1,990 GHC, suggesting a moderate level of economic stability for this portion of the population. Finally, 2% of households are uncertain about their income levels, indicating some degree of economic uncertainty or lack of financial awareness within the community.

In Sota, a similar income distribution pattern to Galo is observed, with around 9% of households earning less than 1000 GHC, indicating a notable presence of low-income households. Additionally, 9% fall into the 1000 - 1990 GHC income bracket. Like Galo, 2% of households in Sota report not knowing their income levels.

In Galotse, there is a slight shift in income distribution compared to Galo and Sota. While 6% of households earn less than 1000 GHC, there is a notable increase in the proportion of households earning between 2000 - 4900 GHC, making up 5% of the community. This community exhibits comparatively better economic conditions than Galo and Sota. Additionally, 4% of households in Galotse are unsure about their income levels, indicating a need for improved financial training and record-keeping practices within the community.

Korsikorpe exhibits a diverse income distribution, with 7% of households earning less than 1000 GHC and 3% falling within the 1,000-1,990 GHC income range. This implies that there may be varying economic challenges within the community.

A significant portion of households (6%) in Korsikorpe report not knowing their income levels, which may indicate challenges in financial record-keeping within the community.

Similar to Galotse, Klonu has 6% of households earning less than 1000 GHC, with no households falling within the 5,000-10,000 GHC income bracket. Additionally, 4% of households in Klonu are uncertain about their income levels.

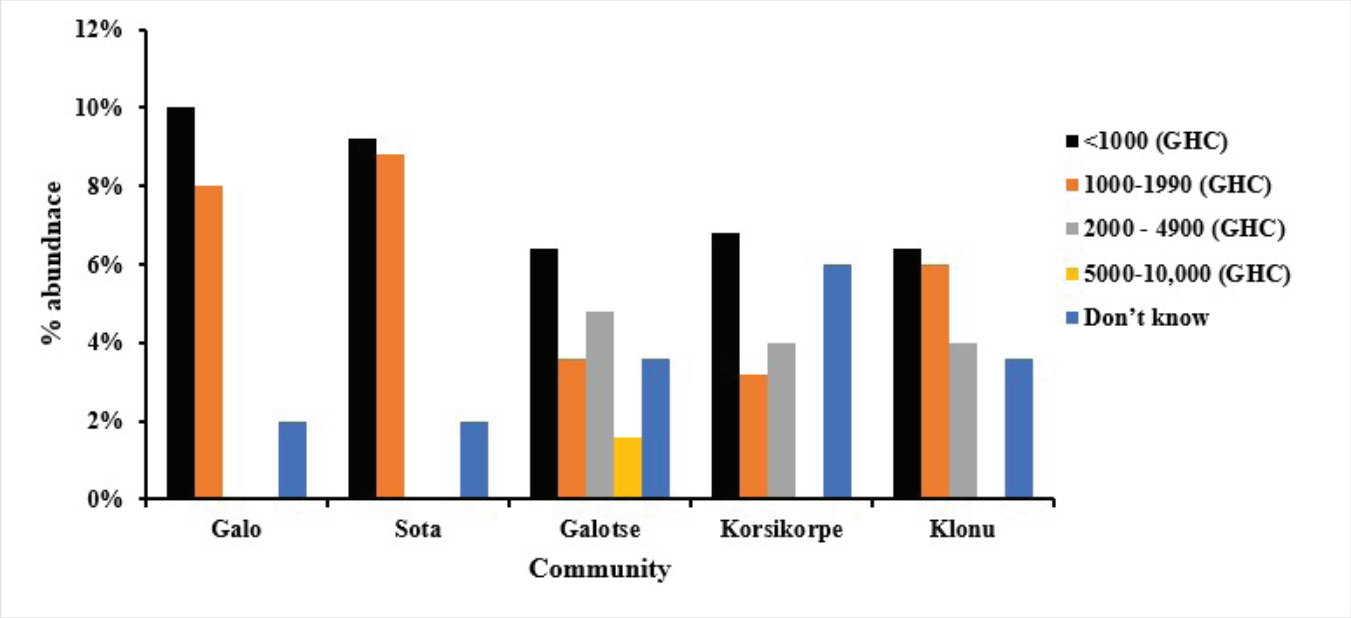


Figure 5.0 Income levels of communities within the CREMA

The majority of households across all communities earn below 2000 GHC, indicating a prevalence of low-income households. This implies that targeted interventions are needed to support low-income households in accessing essential services and improving their economic prospects.

Galotse stands out with a higher proportion of households earning between 2000 - 4,900 GHC, suggesting comparatively better economic conditions in this community.

The presence of households reporting uncertainty about their income levels underscores the importance of improving financial literacy within these communities to improve economic situations and empower communities to make informed decisions about their finances and livelihoods.

Previous participation in capacity building programs

The insight into communities' previous participation in capacity building programs shed light on their readiness to engage in livelihood training programs.

According to the study, Galotse has shown active participation in previous capacity-building initiatives, particularly in mangrove conservation programs facilitated by the NGO, Arocha Ghana. The adoption of new skills from these programs such as farm management techniques, has increased their skills in sustainable farming practices. However, participants have expressed interest in similar training, with a preference for attending them 1-2 times per year.

Sota, despite lacking previous participation in capacity-building programs, presents an opportunity for intervention. Similar to Galotse, Galo has engaged in capacity-building initiatives focused on organic farming facilitated by Arocha Ghana. The community members expressed a willingness to attend similar training 3-5 times per year, indicating a strong commitment to acquiring new skills (See appendix 3). They adopted crop rotation techniques, highlighting their proactive approach to sustainable agriculture.

While Klonu had no previous participation in capacity-building programs, the Korsikorpe community has participated in capacity-building initiatives related to soap making. However, the lack of interest in attending similar training suggests that the previous training may have not benefitted them significantly.

SWOT Analysis for Existing Livelihood Activities and Potential Alternatives:

The Dusorno Community Resource Management Area (CREMA) is endowed with various livelihoods and environmental resources. It is essential to lay hold on the dynamics of livelihood activities within this context to develop effective strategies for conservation and development. This aspect of the report delves into factors that collectively contribute to understanding the livelihood dynamics within the Dusorno CREMA, including residency duration, household income sources, agricultural production, and land use patterns to identify the strengths, weaknesses, opportunities, and threats (SWOT) that is inherent in current livelihood practices and explore pathways for sustainable development.

Strengths:

Deep-rooted community attachment: Residents in the Dusorno CREMA, within the various CRMCs like Klonu, Sota, Korsikorpe, Galo, and Galotse, have lived in their communities for 20 years and above, indicating strong ties and extensive local knowledge of the area.

Diverse income sources: The communities here rely on various income sources such as farming, mangrove cutting/harvesting, fishing, mat weaving, trading, and food vending, diversifying economic activities and consequently reducing vulnerability.

Natural resources abundance: The presence of mangroves and water bodies offers opportunities for livelihood activities like fishing, water transportation which can enhance the economic potential of the area.

Traditional knowledge: Communities exhibit traditional knowledge systems, particularly in fishing and farming, which can be leveraged for sustainable resource management and livelihood strategies.

Weaknesses:

Overreliance on traditional livelihoods: Reliance solely on traditional livelihoods like farming and fishing may lead to vulnerability due to environmental changes, declining fish stocks, and habitat degradation.

Limited Infrastructure: The lack of formal fishing associations and inadequate infrastructure for processing and marketing fish limits the expansion and efficiency of the fishing industry.

Market Dependency: Reliance on local and regional markets for the sale of agricultural produce and fish may expose communities to market fluctuations and price volatility.

Limited Land Cultivation: Variability in land cultivation patterns across communities indicates unequal access to land and potential limitations in agricultural productivity.

Opportunities:

Value Addition: Opportunities exist for value addition to fish and agricultural products like cassava and maize, through processing and packaging, enhancing market value and income.

Community Associations: Establishing formal community associations for fishermen and women can facilitate collective action, resource management, access to support services and markets and promote gender-aggregated aware decision-making.

Diversification: Exploring alternative livelihood options such as ecotourism, eco-friendly crafts, and renewable energy can diversify income streams and reduce dependency on traditional activities, especially resource intensive traditional activities.

Water transport presents an opportunity for the communities due to the abundant presence of river channels.

Climate Resilience: Implementing climate-smart agricultural practices and sustainable fishing techniques can enhance resilience to climate change impacts and ensure long-term livelihood sustainability.

Threats:

Environmental Degradation: Habitat degradation caused by climate change, pollution, and over-exploitation of natural resources threatens the sustainability of livelihood activities like fishing and farming.

Market Risks: Fluctuations in market demand and prices for agricultural produce and fish pose risks to household income and livelihood stability.

Policy and Regulatory Challenges: Inadequate policies and regulations for resource management and market access may hinder the growth and development of livelihood activities.

Social Dynamics: Changing social norms, migration patterns, and demographic shifts may affect traditional livelihood practices and community cohesion, impacting livelihood strategies and resource management efforts.

Livelihood assessment and prioritization

Building on the comprehensive SWOT analysis carried out within the Dusorno Community Resource Management Area (CREMA), the emphasis now shifts to assessing and prioritizing livelihoods. The goal of this crucial stage is to translate the insights acquired from the SWOT into actionable strategies that support sustainable resource management and community development.

Given the diverse challenges and opportunities faced by the communities, selecting the most viable and beneficial livelihood options requires careful evaluation and consideration of various factors. This assessment identified the most suitable livelihood option that aligns with community needs, resources, and aspirations while also supporting the conservation and restoration efforts of the mangrove ecosystems in the Dusorno CREMA.

Klonu Community:

Based on the scores assigned to each criterion, fish farming has emerged as the preferred livelihood option for Klonu CRMC. The Table 3.0 below illustrates the responses from Klonu CRMC.

Table 3.0 Matrix for livelihood prioritization

Criteria	Fish Farming	Beekeeping
A. Income Potential		
Estimated Annual Income	High	Moderate
Income Stability (1-5)	4	3
Income Growth and Diversification (1-5)	4	3
Value Addition (1-5)	4	4
B. Skills/Resources		
Required Skills/Resources	Aquaculture knowledge, access to water	Beekeeping knowledge, access to beekeeping equipment
Availability of Skills/Resources (1-5)	2	2
Training/Capacity Building (1-5)	4	4
Effectiveness of Training Programs (1-5)	4	4
C. Market Access		
Market Accessibility (1-5)	4	3

Criteria	Fish Farming	Beekeeping
Existing Market Linkages (Yes/No)	Yes	No
Quality of Transportation/Infrastructure (1-5)	3	3
D. Environmental Impact		
Estimated Environmental Impact (1-5)	3	3
Sustainability (1-5)	4	3
Potential Negative Impacts (1-5)	3	2
E. Seasonality		
Viability Throughout the Year (Yes/No)	Yes	No
Income Consistency (1-5)	4	3
Seasonal Effects Mitigation (Yes/No)	No	Yes
Mitigation measure		Providing supplemental feeding with fondant or candy boards to sustain bees through periods of low nectar availability
F. Social Acceptance		
Social Acceptability (1-5)	4	3
Cultural/Social Norms (Yes/No)	No	No
Perception of Community Members (Yes/No)	Yes	Yes
G. Infrastructure		
Necessary Infrastructure	Access to water, basic facilities, road networks	Access to beekeeping equipment, basic facilities, road networks
Infrastructure Gaps/Limitations (Yes/No)	Yes	Yes
Gaps	Structure for storage of equipment, good road network	Structure for storage of equipment, good road network
Quality of Infrastructure (1-5)	3	3
H. Education		
Education/Training Requirement (Yes/No)	Yes	Yes
Accessibility of Educational/Training Opportunities (1-5)	4	4
Influence of Education Level (Brief Description)	Enhance effective implementation	Enhance effective implementation

From the assessment above, fish farming demonstrates a higher estimated annual income compared to beekeeping. With fishing being the main livelihood and socially accepted practice in the area, fish farming will benefit from the already established market linkages, consequently influencing high demand for fish products. Conversely, while beekeeping offers moderate income potential, it faces challenges in social acceptance by the people of Klonu. Additionally, market linkages and demand for bee products are not stable, impacting revenue generation and stability.

Both livelihood options require specific skills and resources for successful implementation. Fish farming necessitates aquaculture knowledge and access to water bodies. Leveraging on existing water bodies and available land within the community enhances its' feasibility. Beekeeping similarly requires specialized knowledge and capacity building to enhance beekeeping practices, as well as access to equipment and resources.

Fish farming enjoys better market accessibility and social acceptance due to its alignment with the predominant livelihood of fishing within the community. With fishing being a socially accepted practice, fish products have a broader market reach and established demand, facilitating easier market access for fish farmers. In contrast, beekeeping may face challenges in market penetration and acceptance, requiring targeted efforts to establish market linkages and promote bee products.

Regarding impacts on the environment, both livelihood options have comparable moderate environmental impacts according to the responses. With the implementation of the best and sustainable aquaculture practices, fish farming can be integrated with existing ecosystems, minimizing negative environmental impacts and promoting ecosystem resilience. Similarly, beekeeping, when managed sustainably, contributes to pollinator conservation and biodiversity enhancement by supporting the proliferation of native plant species, which in turn attracts a variety of insects and wildlife, aligning with local environmental conservation efforts.

Fish farming demonstrates better income consistency throughout the year, benefiting from continuous fish production and sales opportunities. The abundance of water bodies ensures year-round viability for fish farming activities, reducing reliance on seasonal variations. In contrast, beekeeping may experience seasonal fluctuations in honey production and market demand influenced by factors such as local climate, flowering patterns, hive health, and ultimately impacting income consistency and livelihood stability.

Leveraging the area's abundant water bodies, social acceptance of fishing practice, fish farming offers higher income potential, better market access, and greater income consistency compared to beekeeping.

It is recommended to prioritize fish farming as the preferred livelihood option for the Klonu community in the Anlo-Keta landscape.

Sota Community

Likewise, the Sota community faces the imperative task of selecting a sustainable livelihood option to support its socio-economic development while ensuring environmental conservation. Two primary options under consideration were fish farming (aquaculture) and vegetable farming. The matrix below shows the breakdown scores assigned to each criteria;

Table 4.0 Matrix for livelihood prioritization

Criteria	Fish Farming	Vegetable Farming
A. Income Potential		
Estimated Annual Income (Local Currency)	High	Moderate
Income Stability (1-5)	4	3
Income Growth and Diversification (1-5)	4	3
Value Addition (1-5)	4	3
B. Skills/Resources		
Required Skills/Resources	Aquaculture knowledge, access to water bodies	Farming knowledge, access to arable land, Access to freshwater
Availability of Skills/Resources (1-5)	4	4
Training/Capacity Building (1-5)	4	4
Effectiveness of Training Programs (1-5)	4	4
C. Market Access		
Market Accessibility (1-5)	4	4
Existing Market Linkages (Yes/No)	Yes	No
Quality of Transportation/Infrastructure (1-5)	3	3
D. Environmental Impact		
Estimated Environmental Impact (1-5)	3	2
Sustainability (1-5)	4	3
Potential Negative Impacts (1-5)	3	4
E. Seasonality		
Viability Throughout the Year (Yes/No)	Yes	No
Income Consistency (1-5)	4	3
Seasonal Effects Mitigation (Yes/No)	No	Yes
List mitigation measure		Irrigation system, Use of salt resilient crops
F. Social Acceptance		
Social Acceptability (1-5)	4	3
Cultural/Social Norms (Yes/No)	No	No
Perception of Community Members (Yes/No)	Yes	Yes
G. Infrastructure		
Necessary Infrastructure	Access to water bodies, basic facilities, equipment	Arable land, basic facilities, equipment
Infrastructure Gaps/Limitations (Yes/No)	Yes	Yes
Gaps	Office space and Structure for storage of equipment, good road network	Office space and Structure for storage of equipment, good road network, Salty water
Quality of Infrastructure (1-5)	3	3
H. Education		
Education/Training Requirement (Yes/No)	Yes	Yes
Accessibility of Educational Opportunities (1-5)	4	4
Influence of Education Level (Brief Description)	Enhance effective implementation	Enhance effective implementation

In the response or matrix above, the estimated annual income from fish farming is rated as high, indicating significant earning potential. Additionally, with a stability rating of 4 out of 5, the income from fish farming is relatively stable, contributing to financial security for community members.

Moreover, there are opportunities for income growth and diversification, with a value addition potential of 4 out of 5, suggesting the ability to enhance the value of fish products for increased profitability.

In comparison, the estimated annual income from vegetable farming is rated as moderate, implying lower earning potential compared to fish farming. While still providing a source of income, the stability rating of 3 suggests slightly more variability in income compared to fish farming. The potential for income growth and diversification is also slightly lower, with a value addition rating of 3 out of 5.

In terms of skills and resources, fish farming requires access to land and water sources, which is available in the Sota community. The availability of skills and resources is rated as 4 out of 5, indicating sufficient access to the necessary expertise for acquiring fish farming knowledge and infrastructure for fish farming. Training and capacity building programs will also help in effective implementation of this preferred livelihood, further enhancing the community's ability to engage in fish farming.

However, vegetable farming also requires farming knowledge and access to arable land and freshwater. While arable land and basic facilities are available in the community, the presence of salty water poses some level of limitation for vegetable farming. The availability of skills and resources is rated as 4 out of 5, similar to fish farming, but the resource gap regarding natural freshwater access affects the feasibility of vegetable farming. Other infrastructural gaps identified for both livelihoods include office and storage structures.

Market accessibility for fish farming is rated as 4 out of 5, indicating good access to local markets for selling fish products. The road network within the Sota community is a feeder one but the main road connecting the CREMA from the two district capitals, Sogakope and Anloga, which the CREMA falls under, and their major markets and towns are tarred and excellent. Existing market linkages further facilitate market access for fish products, contributing to the feasibility of fish farming as a viable livelihood option.

Similarly, market accessibility for vegetable farming is rated at 4 out of 5. The presence of existing market linkages poses a potential for accessing markets locally and outside the area as well.

The estimated environmental impact of fish farming is moderate, rated as 3 out of 5, according to the responses. While fish farming can have some environmental implications, sustainable practices can help mitigate negative effects, ensuring the long-term health of water bodies and ecosystems.

In contrast, vegetable farming has a slightly higher environmental impact, rated as 2 out of 5. This may be primarily due to the need for use of pesticides or fertilizers, which may negatively impact the health of water bodies, and in turn, may cause soil degradation issues in the community.
Fish farming is viable throughout the year, with consistent income generation, rated at 4 out of 5. Seasonal effects are not seen to be a threat, ensuring stable employment and income opportunities for community members.

Similarly, vegetable farming is not viable year-round, but this can be influenced by introducing irrigation systems. Another challenge is the presence of salty water, which may affect crop yields and productivity during certain seasons. Income consistency is rated slightly lower at 3 out of 5, reflecting potential fluctuations in income due to seasonal variations.

Fish farming is socially acceptable in the community, with a rating of 4 out of 5. The community already depends on fishing as a livelihood because of the numerous water distributions in the area. Therefore, it aligns with cultural norms and traditions, making it a favorable livelihood option among community members.

Vegetable farming also enjoys social acceptance, but the perception attached by members of the community is that it does not generate high income as compared to fish farming, hindering it.

Necessary infrastructure, including road access, is readily available for fish farming in the Sota community. However, the absence of structures for equipment storage and necessary equipment affects the overall quality of infrastructure, hence rated at 3 out of 5.

Similarly, infrastructure is available for vegetable farming, but the presence of salty water poses a limitation. Despite this, the overall quality of infrastructure remains the same as fish farming, rated at 3 out of 5.

While education is not explicitly required for vegetable and fish farming, some level of training is required. Access to training opportunities enhances the effectiveness of implementation. With a rating of 4 out of 5 for accessibility, it is clear that training community members as well as women

can help acquire necessary skills and knowledge to optimize these livelihoods.

Overall, the analysis from the scores suggests that fish farming is the preferred livelihood option for the Sota community. It offers higher income potential, better market access, and greater environmental sustainability compared to vegetable farming. Additionally, fish farming aligns well with social norms and traditions, contributing to its acceptance and feasibility as a livelihood option in the community. Despite both options having their merits, the comprehensive assessment indicates that fish farming is the most suitable choice for fostering economic development and sustainability in the Sota community.

Galotse community

After the completion of the assessment in the Galotse community, fish farming once again emerged as the preferred livelihood option. The assessment revealed that fish farming offers higher income potential due to the high demand level for fish as compared to grasscutter farming, better potential for diversification, and greater social acceptance. Additionally, the community already possesses some of the required resources for fish farming, such as land and access to water. With proper training and support, fish farming can provide sustainable income opportunities while aligning with the community's cultural and environmental context. Here is a breakdown of the result for each criteria.

Table 5.0 Matrix for livelihood prioritization

Criteria	Fish Farming	Grasscutter Farming
A. Income Potential	**High**	**Moderate**
Income Stability (1-5)	4	3
Income Growth and Diversification (1-5)	4	3
Value Addition (1-5)	4	3
B. Skills/Resources		
Required Skills/Resources	Aquaculture knowledge, access to water bodies	Knowledge of grasscutter rearing, suitable housing, and feeding
Availability of Skills/Resources (1-5)	4	4
Training/Capacity Building (1-5)	4	4
Effectiveness of Training Programs (1-5)	4	4
C. Market Access		
Market Accessibility (1-5)	4	3
Existing Market Linkages (Yes/No)	Yes	No
Quality of Transportation/Infrastructure (1-5)	4	4
D. Environmental Impact		
Estimated Environmental Impact (1-5)	3	4
Sustainability (1-5)	4	3
Potential Negative Impacts (1-5)	3	2

Criteria	Fish Farming	Grasscutter Farming
E. Seasonality		
Viability Throughout the Year (Yes/No)	Yes	Yes
Income Consistency (1-5)	4	3
Seasonal Effects Mitigation (Yes/No)	No	No
F. Social Acceptance		
Social Acceptability (1-5)	4	3
Cultural/Social Norms (Yes/No)	No	No
Perception of Community Members (Yes/No)	Yes	Yes
G. Infrastructure		
Necessary Infrastructure	Access to water bodies, basic facilities, equipment	Suitable housing for grasscutters, basic facilities
Infrastructure Gaps/Limitations (Yes/No)	No	No
Quality of Infrastructure (1-5)	3	3
H. Education		
Education/Training Requirement (Yes/No)	Yes	Yes
Accessibility of Training /Educational Opportunities (1-5)	4	4
Influence of Education Level (Brief Description)	Enhances effective implementation	Enhances effective implementation

In terms of environmental impacts of the two livelihoods, the results revealed that estimated environmental impact is moderate for fish farming, but with proper management practices, sustainability is achievable. Grasscutter farming, on the other hand, has a relatively lower estimated negative environmental impact, but waste management regarding the livelihood must be carefully taken into consideration.

Both fish farming and grasscutter farming are economically viable throughout the year.. However, income level and social preferences criteria for fish farm out weighs that of grass cutter farming making it a preferred option.

Korsikorpe community

The Korsikorpe community also had the opportunity to select preferred livelihood for implementation. Three different options were identified and assessed; pig, cow and fish farming. Through the exercise, it became evident that all three options yield high income potential. However, the income generation of these livelihoods is influenced by several factors, including price fluctuation due to seasonal variations, affecting income stability. Though pig and cow meat are consumed by people of the area, they are primarily consumed more on special occasions or during festive seasons, while fish is a staple in daily diets, particularly within the community and the CREMA as well as its adjoining towns. Fish stands out for its quicker and continuous sale compared to cow and pig meat within the region.

The skills required for all three options primarily revolve around knowledge of their management. All three options demand expertise in animal care, but pig and cow dung demand access to produce from farmland or pasture. Cow rearing typically necessitates access to open fields for grazing, which is labor-intensive. Moreover, the voracious appetite and maintenance needs of pigs add to the laborious nature of pig farming.

In terms of market accessibility, fish farming benefits from existing market linkages, ensuring a steady demand for fish products. In contrast, pig farming and cow rearing may encounter challenges in market access due to fluctuating demand. Cattle farming is particularly vulnerable to market price fluctuations for beef, milk, and dairy products, as well as input costs such as feed, labor, and veterinary services. Such price volatility and market uncertainties can significantly affect the profitability and viability of cattle farming operations.

Fish farming also boasts a relatively lower environmental impact compared to pig farming and cow rearing. For instance, pigs contribute to intense noise pollution, while cattle dropping may result in the production of methane and nitrous oxide emissions, contributing to global warming and climate change. Implementing sustainable intensification and emission reduction strategies becomes imperative to mitigate the carbon footprint of cattle farming and promote climate-resilient practices. Water bodies are also at risk of being polluted from the droppings.

The grazing of cows in fields may pose threats to other farms or crops and can lead to accidents such as trampling or property damage. Additionally, cows are vulnerable to theft, snake bites, and disease infestations, which can significantly impact income stability.

Moreover, cultural beliefs prohibiting the consumption of pigs limit the profitability of pig farming, as reported by some indigenous members.

In general, the scores assigned to fish farming clearly indicate its superiority over the other options.

The table below is the set of criteria and scores assigned to each option;

Table 6.0 Matrix for livelihood prioritization

Criteria	Pig Farming	Cow Rearing	Fish Farming
A. Income Potential	Moderate	Moderate	High
Income Stability (1-5)	3	3	4
Income Growth and Diversification (1-5)	3	3	4
Value Addition (1-5)	2	3	3
B. Skills/Resources			
Required Skills/Resources	Animal care, breeding, access to farmland	Animal care, grazing, access to pasture	Aquaculture knowledge, access to water bodies
Availability of Skills/Resources (1-5)	4	4	4
Training/Capacity Building (1-5)	3	3	4
Effectiveness of Training Programs (1-5)	3	3	4
Criteria	**Pig Farming**	**Cow Rearing**	**Fish Farming**
C. Market Access			
Market Accessibility (1-5)	3	3	4
Existing Market Linkages (Yes/No)	Yes	Yes	Yes
Quality of Transportation/ Infrastructure (1-5)	3	3	4
D. Environmental Impact			
Estimated Environmental Impact (1-5)	3	3	3
Sustainability (1-5)	3	3	4
Potential Negative Impacts (1-5)	2	2	3
E. Seasonality			
Viability Throughout the Year (Yes/ No)	Yes	Yes	Yes
Income Consistency (1-5)	3	3	4
Seasonal Effects Mitigation (Yes/ No)	N/A	N/A	N/A
F. Social Acceptance			
Social Acceptability (1-5)	3	3	4
Cultural/Social Norms (Yes/No)	Yes	No	No
Perception of Community Members (Yes/No)	Yes	Yes	Yes
G. Infrastructure			
Necessary Infrastructure	Suitable housing for pigs, basic facilities	Suitable housing for cows, basic facilities	Access to water bodies
Infrastructure Gaps/Limitations (Yes/No)	No	No	No
Quality of Infrastructure (1-5)	3	3	3
H. Education			
Education/Training Requirement (Yes/No)	Yes	Yes	Yes
Accessibility of Educational Opportunities (1-5)	3	3	4
Influence of Education Level (Brief Description)	Enhances effective implementation	Enhances effective implementation	Enhances effective implementation

Galo community

In Galo, there were two main options that were suggested and contended for namely: water (canoe fitted with outboard motor) transportation and coconut farming. Each option offers distinct opportunities and challenges that were carefully evaluated to determine the most suitable livelihood for the community's sustainable development.

According to the scores assigned to income criteria, canoe fitted with an outboard motor for water transportation demonstrates high income potential compared to coconut farming. The stability, growth, and diversification of income in the former are notably higher due to the steady demand for transportation services in coastal areas. The Galo community is also known as one of the main transport points from the CREMA to adjoining communities. Additionally, the value addition opportunities, such as offering transportation for goods and passengers, contribute to its higher income potential. It was further said that weekly income is evident as there are activities that demand transportation almost every week.

Coconut farming also has high income potential due to the high demand of coconut in many parts of the country. But some challenges regarding the long gestation period of three years and above before they become productive were mentioned.

Again, both livelihood options require specific skills and resources. Canoe operation, navigation, and maintenance are essential for water transportation, while coconut cultivation expertise is necessary for coconut farming. While both options have similar availability and effectiveness of training programs, water transportation requires fewer resources, making it more accessible to community members.

Both livelihood options demonstrate viability throughout the year, ensuring income consistency. However, Coconut farming may experience seasonal fluctuations in income due to factors such as variations in coconut yield and market demand during specific seasons, making it unstable regarding the income. Disease incidence may also affect the income consistency

Finally, in terms of social and cultural acceptance, both options are acceptable within the community, with positive perceptions among community members. Both endeavors require land space for production and income generation.

However, the analysis highlights water transportation (canoe fitted with outboard motor) as the preferred livelihood option by the respondents for the Galo community. Its high income potential and social acceptance make it a viable choice.

The matrix below shows the criteria used and the various scores assigned;

Table 7.0 Matrix for livelihood prioritization

Criteria	Water Transportation (Canoe Fitted with Outboard Motor)	Coconut Farming
A. Income Potential	High	Moderate
Income Stability (1-5)	4	3
Income Growth and Diversification (1-5)	4	3
Value Addition (1-5)	3	3
Criteria	**Water Transportation (Canoe Fitted with Outboard Motor)**	**Coconut Farming**
B. Skills/Resources		
Required Skills/Resources	Boat operation, navigation, maintenance	Agricultural practices, coconut cultivation
Availability of Skills/Resources (1-5)	4	4
Training/Capacity Building (1-5)	4	4
Effectiveness of Training Programs (1-5)	4	4
C. Market Access		
Market Accessibility (1-5)	3	3
Existing Market Linkages (Yes/No)	Yes	Yes
Quality of Transportation/Infrastructure (1-5)	3	3
D. Environmental Impact		
Estimated Environmental Impact (1-5)	3	3
Sustainability (1-5)	3	3
Potential Negative Impacts (1-5)	2	2
E. Seasonality		
Viability Throughout the Year (Yes/No)	Yes	Yes
Income Consistency (1-5)	3	3
Seasonal Effects Mitigation (Yes/No)	No	No
F. Social Acceptance		
Social Acceptability (1-5)	3	3
Cultural/Social Norms (Yes/No)	No	No
Perception of Community Members (Yes/No)	Yes	Yes
G. Infrastructure		
Necessary Infrastructure	Boat docks, maintenance facilities	Agricultural infrastructure, irrigation systems
Infrastructure Gaps/Limitations (Yes/No)	No	No
Quality of Infrastructure (1-5)	3	3
H. Education		
Education/Training Requirement (Yes/No)	Yes	Yes
Accessibility of Educational Opportunities (1-5)	3	3
Influence of Education Level (Brief Description)	Enhances effective implementation	Enhances effective implementation

Implementation and Benefit Sharing:

Another critical aspect that was examined was the community's perspectives on the implementation and benefit sharing associated with the prioritized livelihood activities. The study focused on exploring key aspects related to the implementation and benefit sharing of the prioritized livelihood option by each community. Through a series of structured inquiries, insight into the community's perspectives on the practical implementation of this livelihood choice and the equitable distribution of its benefits were gained. The following section outlines the findings derived from our engagement with community members, shedding light on their proposed strategies, anticipated challenges, and suggestions for ensuring the success and sustainability of the chosen livelihood option.

Fish farming as an income generating activity

The implementation strategy for fish farming as an income-generating activity stems from the findings of a comprehensive livelihood assessment conducted across the five communities. This strategy aims to translate the prioritization of fish farming into actionable steps that can be undertaken to enhance its' sustainability within the beneficiary communities.

Implementation Approach: Communities suggested that the prioritized livelihood option, that is fish farming, should be implemented at the community level to maximize its impact and ensure collective benefit. The establishment of community fish ponds on lands in the communities should be done collectively in collaboration with the executives of the various CRMCs as well as with the members of the communities (Galotse, Klonu, Korsikorpe and Sota). Furthermore, it was suggested that gender inclusiveness in all stages of planning and implementation should be considered, ensuring that both men and women equally benefit and participate in the fish farming initiatives.

Specific Steps and Strategies: Some identified steps to consider for effective implementation as suggested by respondents include conducting;

- Training programs on aquaculture techniques,
- Securing access to water bodies or establishing water holding ponds,
- Sourcing fish fingerlings, and
- Providing ongoing support and guidance to selected farm hands from the community.

Role of Local Community Members: Local community members should actively be engaged in various aspects of implementation, including decision-making, resource allocation, and hands-on involvement in fish farming activities. One reason is that their knowledge of local conditions and cultural practices will be invaluable in ensuring successful implementation.

Potential Challenges and Mitigation: Some potential challenges in implementation may include technical know-how, and environmental constraints. These can be addressed through capacity-building initiatives, access to funds, and sustainable farming practices that minimize environmental impact.

Benefit Sharing Mechanisms: Benefits generated from fish farming should be shared equitably among community members. It was suggested that some profit-sharing arrangements could be reached towards this, or considering other simple approach such as reinvestment of profits into community development projects.

Equitable Distribution Criteria: Criteria for benefit allocation may include factors such as level of participation, investment (land donated by family/ individual or clan), and contribution to the success of the initiative. Also, transparent and inclusive decision-making processes should guide benefit distribution. Setting up committees to oversee benefit sharing can be instrumental in collectively determining the allocation of benefits. These committees can ensure that general benefits accrued can be used to support other project initiatives that will benefit the entire community, while also considering allowances for workers involved in the fish farm activity. Additionally, special consideration should be given to vulnerable members of the community to ensure they receive equitable access to benefits.

To promote fairness and inclusivity in benefit distribution, it is essential to ensure equitable sharing of resources with an emphasis on gender-aware allocations. Women should be similarly included in the decision-making processes. These suggested approaches aim to foster a sense of ownership and cohesion within the community by promoting fairness and inclusivity in benefit distribution.

Support for Vulnerable Members: Provisions should be in place to support vulnerable or marginalized community members in accessing the benefits of fish farming. This could include targeted training, subsidies for inputs, or preferential access to market opportunities.

Monitoring and Evaluation: Implementation should be monitored and evaluated through regular assessments of fish yields, income generated and participation. Feedback mechanisms should be established to address challenges and adapt strategies for improved outcomes. Community-based monitoring committees could be formed to oversee the implementation process and ensure its long-term sustainability.

Water transportation (Canoe fitted with outboard motor) as an income generating activity

Implementation Approach: The prioritized livelihood option of water transportation using a canoe fitted with an outboard motor should be implemented through a community-level approach. A community-based committee or group can be established to oversee the operation, and maintenance of the canoes and outboard motors.

Specific Steps and Strategies: It is also suggested that the CRMC should select community members to operate the canoe. These members should undergo comprehensive training on safe operation of the canoe to ensure efficiency and longevity.

Some other strategies that emerged include;

- The collaborative development of operational guidelines and schedules for the use of the canoes must take into account factors such as tidal patterns, weather conditions, and peak demand periods.
- Regular maintenance checks and repair workshops should also be scheduled to prevent downtime and optimize service delivery.

Collaboration with local authorities is crucial to ensure compliance with regulations and safety standards. This includes obtaining necessary permits, adhering to safety protocols to safeguard passengers and cargo.

Role of Local Community Members: In addition, local community members should play a pivotal role in various aspects of implementation. They can actively participate in the selection of those who will operate the canoe based on predetermined criteria by the CREMA executives such as experience level on the use of canoe for transport and willingness to undergo training.

Beyond selection, community members should also help promote the venture by patronizing it.

Potential Challenges and Solutions: Some of the challenges may arise from adverse weather conditions, natural disasters, equipment damage, or competition from other transport providers. To address these challenges, a comprehensive risk management strategy should be developed, encompassing safety measures, emergency response protocols, and contingency plans.

Some proposed solutions also mentioned include establishing a maintenance fund financed through a portion of the earnings, implementing insurance schemes to cover repair costs, and diversifying income streams by offering value-added services such as guided tours, fishing excursions, or eco-tourism packages.

Benefit Sharing Mechanisms: Benefits generated from water transportation services can be shared by allocating a percentage of the earnings to a community fund dedicated to infrastructure development, social welfare projects, or educational initiatives. Transparent decision-making processes and regular reviews should be encouraged to ensure fairness and accountability in benefit distribution. Additionally, periodic meetings or assemblies should be carried out to allow community members to provide feedback, voice concerns, and collectively decide on resource allocation priorities.

Equitable Distribution Criteria: Criteria for benefit allocation may include factors such as participation in the implementation and time spent on the livelihood. Transparent and inclusive decision-making processes should guide benefit distribution, with regular assessments to ensure alignment with community needs and aspirations.

Support for Vulnerable Members: Provisions should be in place to support vulnerable or marginalized community members, such as subsidies for water transportation services, priority access during emergencies, or targeted assistance programs. Collaborating with local NGOs, government agencies, or international organizations can enhance the effectiveness of these initiatives.

Monitoring and Evaluation: Regular monitoring of the canoe operation and financial performance of the water transportation service is essential to gauge its impact and effectiveness. Key performance indicators (KPIs) such as passenger volume, revenue generated, customer satisfaction ratings, and safety records should be tracked and analyzed.

In addition, feedback mechanisms involving community members enable continuous improvement and informed decision-making. Periodic reviews, audits, and impact assessments provide valuable insights into the success and sustainability of the project, guiding future interventions and resource allocation.

Summary and Conclusion

In the community livelihood assessment conducted across multiple villages, the major several key findings emerged, shaping the rationale for prioritizing specific livelihood options:
The assessment revealed that a substantial proportion of residents across the studied communities have deep-rooted ties, boasting residency periods of 20 years or more. This prolonged tenure suggests extensive local knowledge and robust social networks, fostering strong community cohesion. Particularly noteworthy is the fact that Klonu, Sota, Galotse, and other communities showcased significant portions of long-standing residents, indicative of entrenched connections and high levels of community engagement. Such longevity in residency implies a profound understanding of local dynamics, traditional knowledge systems, and cultural norms, all of which significantly influenced decision-making regarding livelihood strategies and resource management initiatives. Communities with longstanding residents exhibited stronger social cohesion and possessed a rich repository of traditional knowledge. These factors helped shape the prioritization of livelihood strategies to better align with community needs and aspirations.

The assessment once again highlighted agricultural activities such as farming and mangrove cutting/harvesting, as prominent sources of income across the communities. This underscored the agricultural sector's crucial role in sustaining local economies and livelihoods.

The assessment again revealed that cassava and maize as prominent crops significantly contributing to local economies, particularly in Galo and Galotse. The cultivation of these high-value crops underscored the communities' adaptability to local agricultural conditions and market demands. Furthermore, the diversity of crops tailored to specific community needs and market preferences demonstrated the communities' resilience and capacity to optimize agricultural production for economic gain.

Analysis of land cultivation patterns across communities unveiled diverse agricultural practices and land utilization patterns. Notably, Klonu and Galotse exhibited varying patterns of land cultivation, with Klonu predominantly cultivating smaller land areas while Sota and Galotse engaged in larger-

scale cultivation. This diversity in land utilization reflected the communities' adaptability to local environmental conditions and resource availability, which in turn influenced the prioritization of livelihood options tailored to their specific contexts.

Fishing which also emerged as a significant contributor to household income, provided sustenance for many families. Moreover, the diverse processing methods employed by women in handling fish underscored the importance of value addition in enhancing income streams within the communities. Additionally, other income-generating activities like mat weaving, trading, and food vending made varying contributions to the economic landscape, and reflected the communities' adaptive strategies to diversify income sources.

Communities demonstrated varying levels of participation in capacity-building initiatives, with some that exhibited engagement in livelihood training programs. For instance, Galotse had active participation in mangrove conservation programs facilitated by an NGO, resulting in enhanced skills in sustainable farming practices. Similarly, Galo engaged in capacity-building initiatives focused on organic farming, indicating a strong commitment to acquiring new skills. Conversely, Klonu had no previous participation in capacity-building programs, and this highlighted potential opportunities for intervention to enhance community capacity and resilience.

The livelihood assessment process involved evaluating multiple livelihood options based on criteria such as income potential, market accessibility, environmental impact, and social acceptance.

Fish farming consistently emerged as a preferred livelihood option across the four communities (Klonu, Korsikorpe, Sota and Galotse) due to its higher income potential, better market access, and greater environmental sustainability compared to alternatives like beekeeping, grasscutter farming, vegetable farming, or coconut farming.

Only one community, Galo, preferred water transportation (canoe fitted with outboard motor) due to higher income potential, stability, and social acceptance. The comprehensive evaluation of livelihood options underscored the importance of aligning strategies with community needs, capacities, and aspirations, while also considering environmental sustainability and market dynamics.

Within the domain of implementing these livelihoods, communities have also recommended that prioritized livelihoods should be implemented at the community level to maximize impact and ensure collective benefit. This should be done in collaboration with community executives and members.

Capacity building on the various livelihoods should be carried out to enhance sustainability and success. In addition, it is important to include women in the canoe transport livelihood system to promote gender inclusivity. Women can receive training to actively participate, ensuring that the initiative benefits from diverse contributions and supports gender equality within the community. Committees should be established to oversee the operation and management of livelihoods, ensuring regular monitoring of income generation. Participation is essential to ensure success and sustainability, as well as to establish feedback mechanisms and community-based monitoring committees that facilitate adaptive management and continuous improvement. Indeed, the findings highlight the diverse and complex nature of livelihood strategies within these communities.

Recommendation

Based on the findings of the study, the following recommendation should be considered;

1. **Support with alternative Livelihood:** Considering the social and cultural acceptance of both aquaculture and water transportation, communities should be provided with support to establish these income-generating activities. While these options may require significant initial investment, their alignment with local norms and potential for sustainable income generation make them viable choices for community development.

2. **Strengthening Community Capacities:** Community capacity-building initiatives should be prioritized and carried out to enhance local skills, knowledge, and resources essential for sustainable livelihood implementation and management. This includes training programs focused on aquaculture, water transportation, value addition, entrepreneurship, and financial literacy. By equipping community members with relevant skills and resources, they can effectively manage and diversify their livelihood activities.

3. **Seek Technical Expertise:** Collaborate with aquaculture experts, engineers, and environmental consultants to assess site suitability and other necessary factors as well as develop management plans for effective management of venture.

4. **Gender-Inclusive Strategies:** Implement gender-sensitive approaches to actively involve women and youth in all aspects of livelihood implementation and management. Promoting gender inclusiveness ensures that women and youth have equal opportunities to participate in decision-making processes, access resources, and benefit from livelihood initiatives, ultimately fostering more equitable and sustainable community development.

5. **Implementing Monitoring and Evaluation Systems:** Establish mechanisms for monitoring and evaluating the progress and impact of livelihood interventions, including regular assessments of needs, challenges, and successes.

Strategic directions/ measures for mainstreaming gender in aquatic biodiversity conservation

The integration of gender-sensitive strategies into aquatic biodiversity conservation is vital for sustainable community development across African Union (AU) member states. The proposed livelihood options of fish farming and water transportation offer significant potential not only for economic empowerment but also for environmental sustainability. This section explores the strategic directions and measures that AU member states can consider to mainstream gender in aquatic biodiversity conservation. It outlines best practices, lessons learned from previous initiatives, and the environmental benefits that can be accrued by adopting these livelihood options. By emphasizing community engagement, capacity building, and gender inclusivity, these strategies aim to create a more equitable and sustainable framework for aquatic resource management and conservation.

To effectively mainstream gender in aquatic biodiversity conservation, other AU Member States (MS) can consider the following strategic directions and measures based on the above stated recommendations:

☐ Support with alternative livelihood

Promotion of Gender-responsive livelihood projects:

Encourage the development of aquaculture and water transportation projects that are designed to be inclusive of both men and women. Ensure that women have equal access to resources, training, and financial support.

Financial support mechanisms:

Develop financial schemes such as grants, loans, and microcredit targeted at women to support their involvement in these income-generating activities. Partner with financial institutions to make these resources accessible.

☐ **Strengthening community capacities**

Targeted Training Programs (TTP):

Implement training programs specifically designed to enhance the skills of women and youth in areas such as aquaculture, water transportation, value addition, entrepreneurship, and financial literacy. This can include workshops, hands-on training sessions, and mentorship programs.

Resource allocation for training:

Allocate sufficient resources for capacity-building initiatives that prioritize gender equality. This includes funding for training materials, trainers, and follow-up support.

Partnerships with educational institutions:

Collaborate with universities, vocational schools, and NGOs to provide continuous education and capacity-building opportunities for women in aquatic biodiversity sectors.

☐ **Seeking technical expertise**

Inclusive technical collaboration: Engage aquaculture experts, engineers, and environmental consultants with a mandate to include gender perspectives in their assessments and planning. Ensure that technical advice is accessible to both men and women.

Community consultations: Conduct community consultations that actively involve women to gather input and ensure their needs and perspectives are incorporated into technical planning and implementation.

Development of gender-sensitive management plans: Develop management plans for aquaculture and water transportation projects that explicitly address gender issues, ensuring equitable involvement and benefit-sharing.

☐ **Gender-inclusive strategies**

Gender-sensitive policy frameworks: Develop and implement policies that mandate the inclusion of women and youth in all stages of project development and management. This includes decision-making, planning, implementation, and evaluation.

Capacity building for gender mainstreaming: Provide training for government officials, community leaders, and project managers on gender mainstreaming and the importance of gender equality in conservation projects or initiatives.

Promotion of women's leadership: Encourage and support women to take on leadership roles within conservation projects. This can be facilitated through leadership training programs and the establishment of women's groups or committees.

☐ **Implementing Monitoring and Evaluation Systems**

Gender-disaggregated data collection: Establish systems for collecting and analyzing data disaggregated by gender to track the participation and impact of livelihood interventions on women and men. This helps in understanding the effectiveness of gender-inclusive strategies.

Regular impact assessments: Conduct regular assessments to evaluate the outcomes of livelihood projects from a gender perspective. This includes understanding the specific benefits and challenges faced by women.

Feedback mechanisms: Create platforms for women to provide feedback on the interventions and suggest improvements. This can be through community meetings, surveys, and focus group discussions

The above measures not only promote gender equality but also contribute to more sustainable and effective conservation outcomes.

Best practices, lessons and potential benefits of proposed livelihoods

Below is an outline detailing the best practices, lessons learned, and environmental benefits that communities can accrue from adopting the proposed livelihood options of fish farming and water transportation.

1. Best practices

a. Fish Farming

Community Involvement and Acceptance:

- Engage community members in the decision-making process to ensure that the selected livelihood options align with their cultural norms, existing skills, and aspirations.
- Prioritize livelihoods that are socially accepted and build on existing practices (e.g., fish farming in fishing communities).

Site Selection and Preparation

- Conduct thorough environmental and social assessments to ensure the suitability of the site.
- Ensure adequate water quality and availability.
- Design ponds to minimize environmental impact, considering factors like soil type, water flow, and proximity to natural water bodies.

Capacity Building and Training:

- Provide targeted training programs to equip community members with the necessary skills and knowledge for successful implementation of the chosen livelihood options.
- Focus on enhancing existing skills and introducing new techniques that improve productivity and sustainability.

Market Linkages and Infrastructure Development

- Strengthen market linkages to ensure consistent demand and better prices for the products.
- Invest in improving infrastructure such as roads, storage facilities, and transportation to facilitate easier access to markets.

a. Water Transportation

Sustainable Vessel Design

- Promote the use of eco-friendly materials and fuel-efficient engines in boat construction.
- Implement regular maintenance schedules to ensure boats operate efficiently and safely.

Regulatory Compliance and Safety

- Ensure that all water transport activities comply with local regulations and safety standards.
- Provide training on navigation, safety protocols, and environmental regulations for boat operators.

Community Involvement

- Engage local communities in the planning and management of water transportation activities.
- Foster community-based organizations to oversee and regulate transportation activities.

2. Lessons Learned from Previous Initiatives

Community Engagement is Crucial

- Successful implementation requires active involvement and buy-in from the community.
- Engaging local leaders and stakeholders from the outset helps in tailoring projects to community

needs and gaining support.

Capacity Building Enhances Sustainability

- Providing continuous training and support builds local capacity and ownership, leading to more sustainable outcomes.

Gender Inclusivity Yields Better Results

- Projects that actively involve women and youth often tend to be more effective and equitable.
- Ensuring equal access to resources and decision-making processes empowers communities and improves project success.

Monitoring and Adaptability

- Regular monitoring and evaluation allow for the timely identification of issues and the adaptation of strategies.
- Flexibility in project design and implementation is essential to address emerging challenges and opportunities

3. Environmental Benefits

Reduced Pressure on Wild Fish Stocks

- By providing alternative livelihoods, fish farming can help reduce overfishing and allow wild fish populations to recover. This contributes to the preservation of aquatic biodiversity.

Enhanced Water Quality

- Sustainable aquaculture practices can improve water quality through the use of natural filtration systems, such as wetland plants, which help to reduce nutrient loading and pollution.

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Appendix

Appendix 1: List of participants from the five communities

Forestry Commission IUCN Sweden Sverige

LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Vida Hormeku	Sota	0547045078	
2	Agbeko Dorimenyo	Sota	0535053318	
3	Mawuenyoe Gati	Sota	0241831284	
4	Felicia Ekpor	Sota	0247715283	
5	Mawusi Fiagbedu	Sota	0547258896	
6	Mawufemor Kafuro	Sota	0549712447	
7	Mary Akpli	Sota	0240452528	
8	Anapey Gifty Justina	Sota	0240824489	
9	Eli Kokomi	Sota	0248557645	
10	Kosi Gabiena	Sota	0241054824	

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Forestry Commission IUCN Sweden Sverige

"LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Fausting Anapey	Sota	0247633216	
2	Faustina Kuku	Sota	0246879519	
13	Worlanyo Akahoho	Sota	0247658159	
4	Hudzenyor Nafey	Sota		
5	Akpeangeshi Kwadzo Azizi	Sota	0240589484	
6	Vida Nzamesi	Sota	0249510715	
7	Cynthia Hobada	Sota	0547678677	
8	Kwame Akpeangeshi	Sota	0242337029	
9	Vivian Azumah	Sota	0557397666	
10	Lawrence K. Dzikoo	Sota/TC	0244695892	

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"LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Duse Jesfree	Kwasikope		
2	Atikeama Adiabu	Kwasikope		
3	Dora Badasu	Kwasikope		
4	Adzeyba Theodore	Kwasikope		
5	Ayitey Godfred	Kwasikope		
6	Awo Mary Ayitey	Kwasikope		
7	Ayitey Akuya	Kwasikope		
8	Asantewaa Abigail	Kwasikope		
9	Dey Alice	Kwasikpe		
10	Solomon Adzamli	Kwasikope		

"LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Grace Agorda	Galotse	0248737775	
2	Gladys Gborgla	"		
3	Sandra Banima	"	0548251578	
4	Zydith Banimi	"	0532628018	
5	Lydia Nyadzi	"	0245992704	
6	Akos Abofia	"		
7	Francisca Adika	"	0243944652	
8	Bofe Mattey	"	0595742872	
9	Felicia Banini	"	0240991676	
10	Sena Azieingti	"	0536284421	

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"LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Beatri John	Klonu	0245000631	
2	Akrong Godwin	Klonu	0243464313	
3	Gershon Klosornu	Klonu	0546513706	
4	Berthan Alordzi	Teekofe	0557437039	
5	Francis K Klue	Teekofe	0242327871	
6	Sampson Ameyiavi	Klonu	0245616847	
7	Aku Nosornu	Bewukofe	0549070585	
8	Emmanue Amenyui	Tsalakpo	0246879086	
9	Sonehoe Fumador	Bewukofe	—	
10	Blukusi Hedonu	Bewukofe	—	

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"LIVELIHOOD ASSESSMENT IN THE DUSORNOO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)"

REGISTRATION OF PARTICIPANTS

8TH TO 12TH APRIL, 2024.

S/N	NAME	COMMUNITY	PHONE NUMBER	SIGN
1	Peace Ahiadzegbe	Galo	0	
2	Hon. Gladys Dogbe	Galo	0248808723	
3	Galaxy Semo.	Galo	0547154620	
4	Esinam Adika	Galo	0248225764	
5	Francis Tetteh	FC/WA	0548533717	
6	Seth Habadi	FC/WD	0244167742	
7	Ayrah Francis	FC W/A	0540824076	
8	Larnea Kpodo	FC/WD	0247677852	
9	Gershon Ashiley	GALO	0248615177	
10	Simm Zigah	Galo	0242285857	

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Appendix 2: Interview Guide

QUESTIONNAIRE

"LIVELIHOOD IDENTIFICATION AND PRIORITIZATION IN THE DUSORNO COMMUNITY RESOURCE MANAGEMENT AREA (CREMA)" - Interview guide

District: …… Community: ……

Date……. Gender……..

Start: …… End: …… Facilitator: ……..

Respondent

Age of respondent: 20-29yrs 30-39yrs 40-49yrs 50yrs & above

Education level: (Underline the one applicable)

No education Basic (primary & JHS) Senior high school Vocational/technical college Tertiary education

Current living/ economic perception

How long have you lived in this community?

Less than 5yrs 5 – 10yrs 11 – 20yrs 20yrs & above

What are the main sources of income for your household?

Which item that you produce sells for the highest value at market?

What total area of land do you currently have under cultivation? (You can use local measurement standards)

How many people are involved in the management/production/sale of your products?

Does your family and/or community support female participation in livelihoods?

Mention livelihoods dominated by women

Mention livelihoods dominated by men

Has the productivity of your land improved in the last 2 years? Yes No

Has the health of the environment (water, soil, etc.) where you live improved in the last 2 years? Yes No

THE FISHING INDUSTRY

1. How is fish processed in your community?
2. How often do processing activities occur in a week?
3. How do you market your harvested fish?
4. Who are your main customers?
5. Apart from fish, does the community have other benefits from the other waters bodies in the community? Yes No

a. If yes, which benefits?

b. Are you a member of a fishermen/ women association? Yes No

c. If yes, what is the name of the association?

6. Have you noticed any changes in the quantity of fish available in the past 5 years

   Yes No

a. If yes, what changes have you noticed?

7. Have you noticed any changes in the size of fish available in the past 5 years?

   Yes No

a. If yes, what changes have you noticed?

8. What are some of the challenges that you face in your line of work?
9. Apart from the challenges above, are you currently experiencing any of these obstacles:

a. Overfishing? Yes No

b. Habitat modification? Yes No

c. Climate change? Yes No

d. Ocean pollution? Yes No

e. Disease and toxins? Yes No

10. How does the community perceive their current living standards?
11. What accounts for their current living standards and way of life?
12. In the last year, were you ever hungry or didn't eat because there wasn't enough money for food? Yes No

MANGROVE UTILISATION AND OPTIONS

13. Do you prefer any other way to smoke your fish?
14. How many times in a week do you use mangrove wood for firewood?
15. What other types of wood do you use for fish smoking'?
16. What is the average distance you must travel to harvest mangrove wood?
17. How much time do you spend in a week harvesting the required quantity of mangrove wood?
18. Has it become more difficult to access and harvest mangrove wood in the past 5 years?

    Yes No

PREVIOUS PARTICIPATION IN CAPACITY BUILDING

19. Have you received training or capacity building on any livelihood related programme, farming, fishing and/or fish processing?

Yes No

a. Which trainings did you attend?

b. Who/Which organization was responsible for this training?

c. Do you believe you would benefit from similar trainings? Yes No

20. How often would you be interested in attending trainings?

A. 1 – 2 times per year B. 3-5 times per year C. 5 times or more per year

21. Have you adopted any new skill(s), technique(s), or management practices as a result of attending skills and capacity building trainings? Yes No

a. If yes, which ones?

LIVELIHOOD IDENTIFICATION AND PRIORITIZATION

In addition to mangrove related income generating activities, farming, fishing and fish processing. What other new set of activities can be carried out for income generation that haven't been given much attention. They may mention an activity that is already practiced as well which they want investments in. (That you want preference for)? Consider the following for determining alternative livelihood. Ask the question with regards to the following:

22. Mention one or two of any livelihood (s) or incoming generation activity (ies):

23. To what extent are these alternative livelihoods accessed or used by members of your community?

24. How much time (in hours) are you prepared to spend each day on alternative livelihood activities?

A. Income Potential:

What is the estimated annual income (in local currency) that can be generated from this livelihood option?

On a scale of 1 to 5, how stable and reliable is the income from this option?

1: Very unstable - Income fluctuates significantly, making it unreliable, 2: Unstable, 3: Moderately stable, 4: Stable, 5: Very stable - Income remains consistent over time, with minimal fluctuations

On a scale of 1 to 5, what is the potential for income growth and diversification within this livelihood option?

1:Very low potential - Limited opportunities for increasing income or diversifying revenue streams, 2: Low potential, 3: Moderate potential, 4: High potential, 5: Very high potential - Numerous opportunities for expanding income and diversifying revenue streams

On a scale of 1 to 5, how much value can be added to the resources produced by this option to maximize their trading value?

1:Very low potential - Limited opportunities for increasing income or diversifying revenue streams, 2: Low potential, 3: Moderate potential, 4: High potential, 5: Very high potential - Numerous opportunities for expanding income and diversifying revenue streams

Skills/Resources:

What specific skills and resources are required to engage in this livelihood option? (e.g., technical skills, equipment)

On a scale of 1 to 5, how readily available are the necessary skills and resources within the community? (1 = not readily available, 5 = readily available)

1: Not readily available - Skills and resources are scarce or difficult to access within the community.

2: Limited availability

3: Moderate availability

4: High availability

5: Readily available - Skills and resources are abundant and easily accessible within the community.

Are there any or can there be training or capacity-building programs available to enhance skills related to this livelihood option? Yes No

On a scale of 1 to 5, Will this training existing or new training and capacity-building programs in enhance and make your skills effective in relation to this livelihood option?

1: Not effective - Training programs will have little or no impact on enhancing skills related to this livelihood option.

2: Somewhat effective

3: Moderately effective

4: Effective

5: Highly effective - Training programs will significantly enhance skills related to this livelihood option.

B. Market Access:

On a scale of 1 to 5, how accessible are local markets for selling products or services related to this livelihood option?

1: Very inaccessible - Limited access to markets, hindering sales opportunities.

2: Inaccessible

3: Moderately accessible

4: Accessible

5: Very accessible - Easy access to markets, facilitating sales opportunities.

Are there existing market linkages or value chains that facilitate market access? (Yes/No)

What are the transportation and infrastructure facilities available for reaching markets?

On a scale of 1 to 5, what is the quality of transportation and infrastructure facilities available for reaching markets?

1: Poor quality - Transportation and infrastructure are inadequate, hindering market access.

2: Fair quality

3: Good quality

4: Very good quality

5: Excellent quality - Transportation and infrastructure are well-developed, facilitating market access

C. Environmental Impact:

On a scale of 1 to 5, what is the estimated environmental impact of this livelihood option? (1 = high negative impact, 5 = low or positive impact)

On a scale of 1 to 5, how sustainable and eco-friendly is this option in terms of resource use and waste generation? (1 = not sustainable, 5 = highly sustainable)

On a scale of 1 to 5, what is the potential for negative impacts on biodiversity, soil, water, or air quality associated with this livelihood option? (1 = high potential, 5 = low potential)

D. Seasonality:

Is this livelihood option viable throughout the year, or is it seasonal?

On a scale of 1 to 5, how consistent is income generation throughout the year for this livelihood option?

1: Highly seasonal - Income generation is heavily dependent on specific seasons, resulting in significant fluctuations or limited opportunities during certain times of the year.
2: Moderately seasonal
3: Somewhat seasonal
4: Minimally seasonal
5: Consistent throughout the year - Income generation remains stable and consistent across all seasons, with minimal or no fluctuations
How do seasonal variations affect income and employment opportunities within this option? (Describe briefly)
Are there strategies in place to mitigate the effects of seasonality on livelihood activities? (Yes/No)
Mention them if possible

E. Social Acceptance:

On a scale of 1 to 5, how socially acceptable is this livelihood option within the community?
1: Not socially acceptable - The livelihood option is strongly stigmatized or rejected by the community, leading to social conflicts or marginalization.
2: Somewhat socially acceptable
3: Moderately socially acceptable
4: Socially acceptable
5: Highly socially acceptable - The livelihood option is widely embraced and supported by the community, fostering cooperation and social cohesion.
Are there any cultural or social norms that influence the acceptance of this option?
Yes No
If Yes Describe briefly
Are the perceptions and attitudes of community members towards individuals engaged in this livelihood option? Yes No
If Yes, Describe briefly.
Infrastructure:
What specific infrastructure facilities (e.g., roads, electricity, water supply) are necessary to support this livelihood option? (List)
Are there any existing infrastructure gaps or limitations that hinder engagement in this option? Yes No
If Yes, List the gaps/Limitations
On a scale of 1 to 5, what is the current state of infrastructure availability and quality to support this livelihood option? (1 = poor, 5 = excellent)

Poor (1): Basic facilities necessary to support the livelihood option are either absent or inadequate or state of disrepair
Fair (2): Infrastructure is below average and may be inconsistent in quality.
Average (3): Infrastructure meets basic requirements but may have some limitations
Good (4): Infrastructure is above average and generally supports the livelihood option well
Excellent (5): Infrastructure is of exceptional quality and fully supports the livelihood option

F. Education:

Do you need education to participate in this livelihood option? Yes or No
Do you need training to participate in this livelihood option? Yes or No
What level of education or training is typically required to participate in this livelihood option? (e.g., primary education, vocational training)
On a scale of 1 to 5, how accessible are educational opportunities for community members to acquire necessary skills and knowledge? (1 = not accessible, 5 = highly accessible)
1: Not accessible - Educational opportunities are severely limited or unavailable
2: Somewhat accessible - Educational opportunities exist but may be limited in scope or availability
3: Moderately accessible - Educational opportunities are available to a moderate extent, allowing community members to access some necessary skills and knowledge
4: Accessible - Educational opportunities are readily available and accessible for community members to acquire necessary skills and knowledge
5: Highly accessible - Educational opportunities are widely available and easily accessible to all community members,
How would the education level of individuals influence their ability to engage in and benefit from this livelihood option? (Describe briefly)

G. Implementation and benefit sharing

How do you envision or propose the implementation of the prioritized livelihood option within the community? (Probe for single or group or community level implementation)

What specific steps or strategies do you think should be taken to effectively implement this livelihood option?

What role do you think local community members should play in the implementation process?

Are there any potential challenges or obstacles that you foresee in implementing this livelihood option, and how do you propose addressing them?

How do you think the benefits generated from this livelihood option should be shared among community members?

Are there any specific mechanisms or arrangements that you believe would ensure equitable distribution of benefits?

Do you think there should be any criteria or guidelines established for determining how benefits are allocated? Probe for ideas.

Should there be any provisions in place to support vulnerable or marginalized community members in accessing the benefits of this livelihood option? Probe for ideas/suggestions

How do you envision monitoring and evaluating the implementation of this livelihood option to ensure its success and sustainability?

H. Any comments or suggestion

Appendix 3: Some results from the study

Distribution of livelihoods in the CREMA

	Sota	Galo	Galotse	Korsikorpe	Klonu
Farming	18%	16%	28%	1%	40%
Mangrove cutting/harvesting	0%	24%	22%	40%	20%
Fishing	36%	26%	28%	22%	4%
Fish smoker	0%	18%	6%	0%	0%
Fish frying	0%	18%	0%	0%	0%
Matt weaving	0%	0%	16%	6%	16%
Sorter	0%	0%	0%	19%	4%
Retailer	14%	0%	0%	0%	0%
Trader	14%	0%	0%	8%	10%
Food vendor	18%	0%	0%	4%	6%

Previous participation in capacity building and frequency of interest in future trainings

Community	Previous Participation in Capacity-Building Programs	Training Program Details	Frequency of Interest in Future Trainings
Galotse	Active participation in mangrove conservation programs facilitated by NGO Arocha Ghana	Training focused on farm management techniques; increased skills in sustainable farming practices	Preference for attending trainings 1-2 times/year
Sota	No previous participation in capacity-building programs	Opportunity for intervention; potential for future participation in capacity-building programs	Interest in future trainings not specified
Galo	Engagement in capacity-building initiatives focused on organic farming facilitated by Arocha Ghana	Training on organic farming; adoption of crop rotation techniques; proactive approach to sustainable agriculture	Willingness to attend trainings 3-5 times/year
Klonu	No previous participation in capacity-building programs	None	None
Korsikorpe	Participation in capacity-building initiatives related to soap making	None	None

Land Cultivation Sizes in Dusornu communities

Community	Land Cultivation Size
Klonu	1 to 2 acres
Galotse	2 to 5 acres
Sota	2 to 5 acres
Galo	0.5 to 1 acre
Korsikorpe	0.5 to 1 acre

Time spent to travel to access mangrove and harvest them

Community	Time Spent Harvesting Mangrove Wood (hours per day)	Time spent to travel to access the mangrove (hours)
Galotse	5 to 8	0.5 to 0.45
Sota	6 to 8	0.5 to 1
Galo	6 to 8	0.5 to 2
Klonu	5 to 7	1 to 1.5
Korsikorpe	3 to 5	0.45 to 3

Appendix 4: Photos



Focused group discussion session



Group photo of participants





Ms. Stephanie and Mr. Joel addressing the communities the CREMA



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