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SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

Report on the Baseline Survey of Small Pelagic Fishing Households along the Ghana Coast

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THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY
CRC COASTAL RESOURCES CENTER

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Cover photo: Person being interviewed for the baseline survey. (Credit: SFMP)

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Acronyms

ANOVA	Analysis of Variance
BIRD	Bureau for Integrated Rural Development
CDCS	Country Development and Cooperation Strategy
CLaT	Child Labor and Trafficking
CR	Central Region
DAs	District Assemblies
DF	Degrees of Freedom
DO	Development Objective
FASDP	Fisheries and Aquaculture Sector Development Program
FtF	Feed the Future
GIS	Geographic Information System
GoG	Government of Ghana
GPS	Geographic Positioning System
HHScore	Household Score
ICFGP	Integrated Fisheries and Coastal Governance Project of USAID/Ghana
IR	Intermediate result
IT	Information Technology
IUU	Illegal, Unreported or Unregulated
KAP	Knowledge, Awareness, and Practices
KNUST	Kwame Nkrumah University of Science and Technology
KVIP	Kumasi Ventilated Improved Pit (latrine)
MOFAD	Ministry of Fisheries and Aquaculture Development
M&E	Monitoring and Evaluation
NS	Not significant
PBS	Population Based Survey
SFMP	Sustainable Fisheries Management Project of USAID Ghana
SMS	Smart Messaging System
USAID	United States Agency for International Development
WARFP	West Africa Regional Fisheries Project
ZOI	Zone of Influence

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Executive Summary

Purpose

The USAID/Ghana Sustainable Fisheries Management Project is a five year effort whose goal is to rebuild marine fisheries stocks and catches through adoption of responsible fishing practices. The project contributes to the Government of Ghana's fisheries development objectives and USAID's Feed the Future Initiative. This report provides a baseline of the current context and conditions of coastal fishing households as well as their attitudes and perceptions in a number of areas the project is working to change. The baseline also captures a number of comparable indicators that are being collected in the USAID Feed the Future northern zone of influence (ZOI) and reported in the Population Based Survey Report. These include indicators on the prevalence of hunger and dietary diversity and some other measures in relation to household structure, contents and ownership of durable goods, and a selected set of indicators included in the women's empowerment index. This will allow for some level of comparison of conditions in coastal fishing households versus Northern farming households although this is not a focus of this report.

With respect to fisheries, the baseline captures information on a number of long term trend indicators including perceptions of change in quality of life, status of the fisheries and other factors the project is attempting to influence. These include, awareness and compliance with fishing regulations and perceptions concerning illegal fishing, empowerment of women within the industry, and aspects of child labor and trafficking. As part of the project's monitoring and evaluation framework, these indicators will be tracked during the project's progression at mid-point and at the conclusion of the project to assess the impact of the SFMP.

Methodological Overview

The sample of 10 communities surveyed was randomly drawn from 29 of the largest coastal fishing villages with a high proportion of small pelagic fishing gears in the four coastal regions of Ghana. This sample frame is consistent with the project focus on small pelagic fisheries and that nine of the ten targeted project villages, being large scale, are included in this frame. It should be noted however that this sample frame means the survey is not representative of all coastal fishing villages as small sized villages and those using primarily other gear to target other species groups such as large pelagics or demersals are excluded. From this frame 10 villages were randomly selected and included some targeted project villages in the Western and Central regions as well as non-project villages. This will allow for project versus non-project community comparisons during the mid and final assessments. Target sample size was distributed proportionately among the villages to be sampled. Actual households to be sampled were determined based on assigning a sampling point to a randomly generated geographic point within 200 meters from the shoreline and within the settlement area and finding the closet household to that point that was engaged in one or more types of fishery activities. A paperless tablet-based survey instrument was used to sample a total of 480 households and 716 individuals, 57% being female.

Key findings from the survey include the following:

Socio-economics and Livelihoods

- The Western region has the highest percentages of households with houses in poor or very bad shape (29%), no access to a toilet facility of any kind (60%), no household water supply 95%) and no electrical supply 19%), suggesting that this region may have higher poverty levels among fishing households than the other coastal regions.

- Literacy rates were very low at 23% of respondents and even lower for women at 15 percent. Fifty nine percent of respondents never attended school with lower attendance rates for women. Of those who went to school 42% either completed or did not complete primary level. These findings have implications for designing communications strategies that do not rely on written words in order to reach a majority of people in the fishing communities. Additionally, interventions designed to diversify of livelihoods that require higher educational attainment will not be viable options for most adults in fishing households, making such a strategy to relieve pressure on fish stocks and at a large scale difficult if not impossible.
- Twenty-one percent of fishing households surveyed experienced moderate to severe hunger which is approximately half the rate reported for the Ghana FtF northern zone of influence. Hunger was inversely related to literacy of the respondent. Sixty-two percent of respondents had low dietary diversity compared to 41% in the northern ZOI. While there is less hunger in the costal fishing households compared to norther farming households, dietary diversity is lower and argues for more emphasis on nutritional programs in coastal fishing villages.
- Approximately half of respondents reported ownership of motorized fishing vessels and it is highest in the Greater Accra and Western Regions. Ownership of fish smokers is very high (83%), and is highest in the Volta and Western regions. Almost no one interviewed owns fish ponds or fish cages (<1%), and less than 20 percent own agricultural land.
- Fishing was the most important livelihood reported by respondents and mentioned twice as often as fish processing. The mean number of livelihood activities per household was 2.68 whereas the number of fishery related livelihood activities was 2.16 and the mean for non-fishery activities was 0.52. This suggests very low livelihood diversity or resilience and high dependence on fishing, making these households highly vulnerable to any economic or ecological shocks that may occur in the fishery. The Western and Central regions had the lowest levels of livelihood diversification outside of fishing, making households in these regions even more vulnerable.
- Small pelagic fish was the most frequently reported fish stock exploited (94% of respondents) and was mentioned by 79% as the most economically important stock for the household (over 90% in Greater Accra and Volta regions) followed by large pelagics at 15% and demersals at 6%.

Quality of life and Status of the Fisheries

- Approximately 72 % of respondents said their quality of life was worse off compared to five years ago and only 20% percent said they were better off. This is not surprising as approximately three-quarters of respondents said that their fish catch and the abundance of fish in the sea is less, and that it is harder to catch fish now compared to five years ago. Illegal fishing and an increased number of fishing canoes are the two most frequently mentioned reasons for the declines in catch and quality of life. These results suggest that fishermen understand that the open access fishery and poor compliance with fisheries regulations is affecting them economically.

Illegal Fishing and Regulatory Compliance

- More than half the respondents stated that illegal light fishing (69%) and use of fine mesh nets (52%) have increased in the last five years whereas less than 10% said bomb and carbide fishing have increased. Inshore vessels and canoes were the most frequent responses as to who is conducting illegal activities and also as the most frequent violators. Trawlers in both instances were mentioned less frequently. This suggests that law enforcement efforts need to focus much more on the use of fine mesh nets and light

fishing as the most pernicious illegal methods used at this time and on the illegal activities of the inshore and canoe vessels as the most pernicious violators.

- If the fisheries laws were obeyed 65% of respondents believe it would increase fish catch and only 13 percent say it will not change catch. This suggests a high degree of understanding and legitimacy that the laws are technically well designed to sustain and rebuild fish stocks. More than a quarter believe penalties are severe enough and slightly less than a quarter say they are not severe enough, but more than half said they do not know. They also believe the likelihood of arrests and sanctions being applied is low and the likelihood of seeing enforcement officers patrolling is low, so these deterrence factors are unlikely to weigh heavily on preventing illegal fishing.
- Very few fishermen said they would report violators to the police (2%) but almost two-thirds would either tell them to stop doing it or report them to the chief fishermen. This suggests that moral suasion may be an important influencing factor on fishermen behavior. Inaddition, while chief fishermen have no legal authority, they are mentioned as the most respected official in the villages by 84% of respondents compared to less than 10% for the Fisheries Commission, local government and police combined. Most respondents said chief fishermen consult with them on fishing laws more frequently than the Fisheries Commission or local government. Chief fishermen (80%) and fishermen themselves (56%) were the most frequently mentioned people who should be involved in making fishery rules compared to only 38% who mentioned traditional leaders, Fisheries Commission, Parliament or local government combined.

Child Labor and Trafficking

- Approximately one-quarter of respondents believe it is acceptable to allow children under 15 or 18 years of age to sell or smoke fish at any time of the day and to go fishing, prohibited labor practices under Ghana law; with almost double the level of acceptance of these practices in the Western Region compared to the other regions. In the Volta Region it is approximately one-third the level compared to the other regions. Less than 3% believe it is acceptable to take payment from someone to take your child away with no significant differences between regions, indicating most do not accept the practice of child trafficking.
- The Western Region, followed by the Central Region, had the highest perceived prevalence of child labor and trafficking practices compared to Volta and Greater Accra regions. More than 39% said parents allow children under the age of 15 to go fishing all the time or frequently and slightly less than a third to allow them to smoke or sell fish at any time of the day. On child trafficking, disturbingly, 12 % of respondents in the Central Region said many parents engage in this practice, 42% said that at least a few, compared to an average for all regions of 7 percent. The Western Region, followed by the Central Region, had the lowest scores concerning knowledge of laws on child labor and trafficking with approximately one sixth not knowing that taking payment for a child to be taken away from the home was illegal.
- The project strategy has a focus on anti-child labor and trafficking campaigns in the Central Region as the premise was that this was where the problem was considered greatest. While that seems accurate with respect to child trafficking, it was surprising to note the high scores for the Western Region as well, especially with respect to allowing children to go fishing. This suggests that the anti-child labor and trafficking behavior change communications strategy should be expanded to the Western region as the project design assumed the problem was most prevalent in the Central Region.

Gender and Empowerment

- Concerning who makes decisions regarding household fishing activities, 100% of women said they make inputs into most decisions and only 55.6% of males said they had input into most or all decisions on fishing.
- Concerning boat and gear ownership, 47 % of men said they owned a boat or gear by themselves whereas only 4.9% of women said they own a boat/gear. Women were more likely to claim ownership with a spouse (32%) or other household member (54%) compared to men. On ownership of fish smokers/processors, 68% of women said they own them and only 5% of men said they own them with men more likely to state they are owned with a spouse or household member. This indicates a significant gender difference. Men tend to have more direct ownership of fishing assets, and women of smoking/processing assets, women seem to have more say in how both of these types of assets are used.
- For those with assets other than fishing, men are more likely to report ownership of land and transportation assets by themselves and women more likely to report ownership of livestock.
- With respect to access to credit, 32 % of respondents said the owned a bank account with men reporting more frequent ownership (41%) than women (33%). Men were more likely to state that they owned the account themselves (70%) compared to women (40%), with similar percentages for who made the decisions regarding withdrawals. With respect to borrowing money, most loans were reported from relatives (16%) followed by formal lenders (10%) and then micro-finance institutions (6%). There were no gender differences with respect to who was borrowed from or with respect to who made decisions on how the loan funds were used.
- With respect to comfort of speaking in public about topics of community concern including illegal fishing and proposing fishing rules, 52% of the women said they did not feel comfortable at all or with great difficulty, compared to only 22 % of men.
- On membership in organizations, women were less likely to be members of micro-credit or business associations than men.
- With respect to decisions on various economic activities, men tended to state that decisions on use of fishing inputs or type of fishing conduced were made by the male in the household or husband whereas women were more likely by wider margins to state the female or wife made decisions on fish processing, smoking and marketing. These trends on decision making parallel who is the main actor involved in the activity, men in fishing, women in processing and trading. On household expenditures, men are more likely to say decisions on wages and major household expenditures are made by the male in the household or husband whereas the women are more likely to state that the female or wife makes major decisions on minor household expenditures such as on food for daily consumption.
- These findings tend to suggest that women are less empowered and comfortable about speaking in public and do not have equal ownership on productive assets for fishing and land, or levels of bank account ownership, but they still seem to have significant decision making involvement in fishing activities overall, specifically on fish processing and marketing of food purchases in particular, as well as ownership of fish processing and marketing assets. Improvement in women empowerment levels in public involvement and speaking on issues affecting the community including fisheries management issues, ownership of bank accounts, ownership of land and fishing assets other than processing assets and more involvement in decision making concerning major household expenditures are areas the project should focus on as part of the gender strategy.

The summary findings above represent the baseline on the same set of indicators that will be measured at the mid-term and completion of the project where trends can be analyzed to determine to what extent project interventions may have resulted in changes on these indicators of the project goal or intermediate result areas. These include perceptions, as an indirect measure, of an increase in quality of life (project impact), improved status of the fisheries (project goal), improved awareness and perceptions of compliance with fishing regulations and a resulting perceptions of a reduction in illegal fishing. Empowerment of women within the industry is also expected to create stronger constituencies and support for change. While not related to the project goal, the project does hope to increase awareness of the child labor and trafficking laws, and, using perceptions as an indirect indicator, achieve reductions in the prevalence of child labor and trafficking in the Central Region.

Introduction

The Objectives and Scope of the Baseline Survey

In order to assess the project impact on the overall goal and intermediate results, the project is undertaking two types of baselines and assessments. The first approach is a survey of households engaged in marine fishing activities to assess their perceptions, attitudes and knowledge concerning the key project goal and selected intermediate result areas. This is the main focus of this baseline report as part of the impact assessment to be conducted over life of the project. The second approach is an assessment of the fish stocks, particularly the small pelagic stocks, which is not covered in this report but is being conducted by the project and documented in other reports.

This report is a status report – a baseline that we intend to use when we are gauging project impact after the survey is conducted at mid-term and end of project. This baseline report has two primary intentions. The first is to capture the current baseline state of small pelagic fishing households within Ghana, including the prevalence of poverty and hunger, awareness and compliance with fishing regulations, empowerment of women within the industry, and aspects of child labor and trafficking. The second is to assess the impact of the SFMP (also referred to as "the project") with respect to these factors during the project's progression at mid-point and at the conclusion of the project.

The baseline and impact survey was administered to a sampling frame of individuals and households representing the target population of small pelagic fishing-dependent households within coastal communities of Ghana. The household survey was conducted in the four coastal regions adjacent to the marine shoreline. Lake fisheries were not an aim of the project or this survey. Due to cost constraints, the baseline survey and assessment is focusing on the small pelagic fisheries and activities conducted that are national in scope. Impacts of resource management activities carried out in the Western Region Pra and Ankobra estuaries are not part of the scope of this survey. Impacts of value chain improvements are also not captured here due to cost constraints. Targeted project interventions related to Knowledge, Awareness, and Practices (KAP) of child labor and trafficking within the Central Region are covered in this report. The survey will allow for statistically significant comparisons of child labor / trafficking KAP between the Central Region and the whole coastline at the project outset, mid-point, and conclusion.

The survey instruments and sample sizes were designed to allow for statistically significant comparisons between baseline responses and responses drawn at the mid-project and end-of-project timeframes and also for analysis of differences between coastal regions. A subset of *Feed The Future (FtF)* indicators and indices were used to allow limited comparisons of results between the FtF and SFMP baseline surveys, specifically between farming households in the FTF northern Zone of Influence with fishing households along the coast.

Report Layout

This baseline report provides a brief overview of the USAID/Ghana Sustainable Fisheries Management Project along with its results framework and theory of change. This helps provide an understanding and rationale for the indicators chosen for the baseline survey and to be monitored at mid and end points of the project. Some basic information on the marine fisheries sector is also provided as this is the "Zone of Influence" for the project. The methodology used is also described. In a number of cases we have selected indicators and used identical methods (and interview questions) of a subset of indicators used for the Feed the Future (FtF) Ghana Population Based Survey in the Northern Zone of Influence. This

allows for a limited comparison of a number of poverty and food security indicators between the two zones where USAID is investing FtF resources. Findings are provided on the indicators and in some instances some statistical comparisons with either demographic details of individuals or households or comparisons across regions. In some cases a few comparisons are provided with FtF data in the Northern Zone of Influence where we can view differences between farming households and coastal fishing households. A more detailed comparison and analysis between the coastal zone and northern zone is planned for a future publication. Appendices provide additional information including the survey questionnaire used for the baseline.

Project Overview

The USAID /Ghana SFMP will focus efforts on the small pelagics fisheries along the entire coastline as well as the demersal fisheries and essential mangrove fish habitat in the Western Region. Additionally, improvements in the value chain of smoked fish, important to tens of thousands of women fish processors and marketers is being be supported. The project also implements activities aimed at reducing child labor and trafficking in the fisheries sector in the Central Region of Ghana.

Life-of-Project Results expected include the selected highlights below:

- Over-exploitation of small pelagics reduced, overfishing ended, and stocks rebounding with the opportunity to recoup tens of thousands of metric tons of food protein supply lost due to severe overfishing and poor management.
- Yields and profitability returning for 130,000 people including fish monger and fish processors and marketers engaged in marine fisheries.
- 735,241 hectares of natural resources and fish habitat under more effective management.
- Declines in Illegal, Unreported or Unregulated (IUU) fishing due to an increase in arrests and successful prosecutions.
- Improved voluntary compliance and active support of polices and rules by stakeholders.
- Inclusive participation by under-represented groups, women and youth in decision-making.
- Several more climate-resilient fishing communities and strengthened capacity of District Assemblies (DAs) to promote and support resilient community policies and initiatives.
- A decline in child labor and trafficking in fisheries in the Central Region (CR).
- A Fisheries Act that allows co-management and use rights in Ghana's fisheries to be realized.

The USAID SFMP Results Framework

The Results Framework is shown in Figure 1. The SFMP's integrated results framework include four project intermediate result areas to achieve the ambitious project goal:

IR 1: Improved legal enabling conditions for implementing co-management, use rights, capacity and effort reduction strategies;

IR 2: Improved information systems and science-informed decision-making, and

IR 3 Increased constituencies that provides the political will and public support necessary to make the hard choices and changed behavior needed to rebuild Ghana's marine fisheries sector. These components feed into

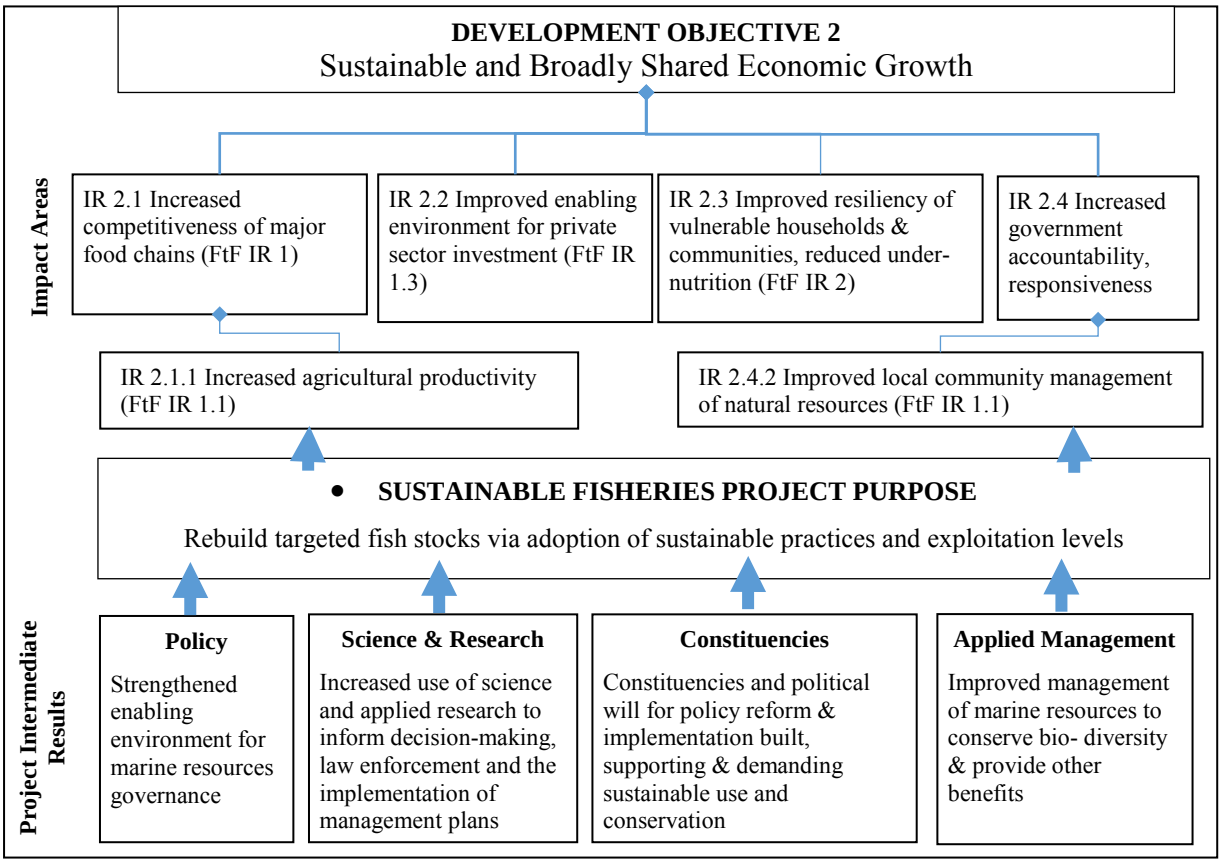
IR 4: Applied management initiatives for several targeted fisheries ecosystems. A set of indicators, described below, will be used to measure progress towards the project goal and intermediate results.

The results framework includes several important cross-cutting themes including capacity development of key government and civil society organizations, social learning, gender mainstreaming and Public-Private-Partnerships.

The results framework and associated indicators conform and contribute to USAID/Ghana's larger Country Development and Cooperation Strategy (CDCS) and its second Development Objective (DO): **sustainable and broadly shared economic growth** and the Feed the Future (FtF) results framework. This is depicted in the figure below. The Project will support all four integrated Intermediate results (IRs) under DO2, with a focus on FtF IR 2.1 and 2.4.

2.1: Increased competitiveness of major food chains (FtF IR 1)
2.2: Improved enabling environment for private sector investment (FtF IR 1.3)
2.3: Improved resiliency of vulnerable households and communities and reduced under-nutrition (FtF IR 2)
2.4: Increased government accountability and responsiveness (FtF IR 1.1)

Figure 1. Graphical Representation of Relationships between SFMP and FtF Results



Theory of Change (Development Hypothesis)

The project purpose is to "Rebuild targeted fish stocks through adoption of sustainable practices and exploitation levels." To achieve sustainable fishing practices and exploitation levels, reduced fishing effort or harvest must occur in order to end overfishing. This, over the longer term, will lead to safeguards of sufficient spawning biomass to produce higher and more sustainable fishing yields. This signals a causal chain and time lag between ending overfishing and improved stock biomass, and ultimately, improved fish yields and profitability (household income). Small pelagics as a short lived and highly fecund species could start to rebound in a few years if proper and sufficient management measures are put in place, so such changes may be possible during life of the project.

IR 3 "constituencies and political will built" is critical to insure that the public is aware of the challenges ahead and becomes supportive of short-term restrictions to reverse the diminishing returns on investment in the fisheries sector.

For targeted stocks, effort control requires a suite of measures such as restrictions on the number of fishing units by limiting the number of licenses issued and restrictions on the amount of fish that units can land. Additional technical measures such as closed seasons, protected areas, fishing gear selectivity, and minimum size must be considered, each with their implications on the biological and socio-economic aspects of the fishery. In the long run, these are designed to ensure exploitation levels are controlled to maximum and sustained yields. However, world experience shows effort controls are a costly and difficult path to sustainability. Determined to be most effective are catch limits —e.g., an annual total allowable catch based on annual stock assessment—coupled with use rights such as collective quotas and transferable licenses. It is unlikely that Ghana will be able to move fully to catch

limits over the SFMP Life-of-Project, but some of the capacity needed to implement such a regime will start to be built. In the short-term, Ghana will have to rely more on effort controls and other technical measures.

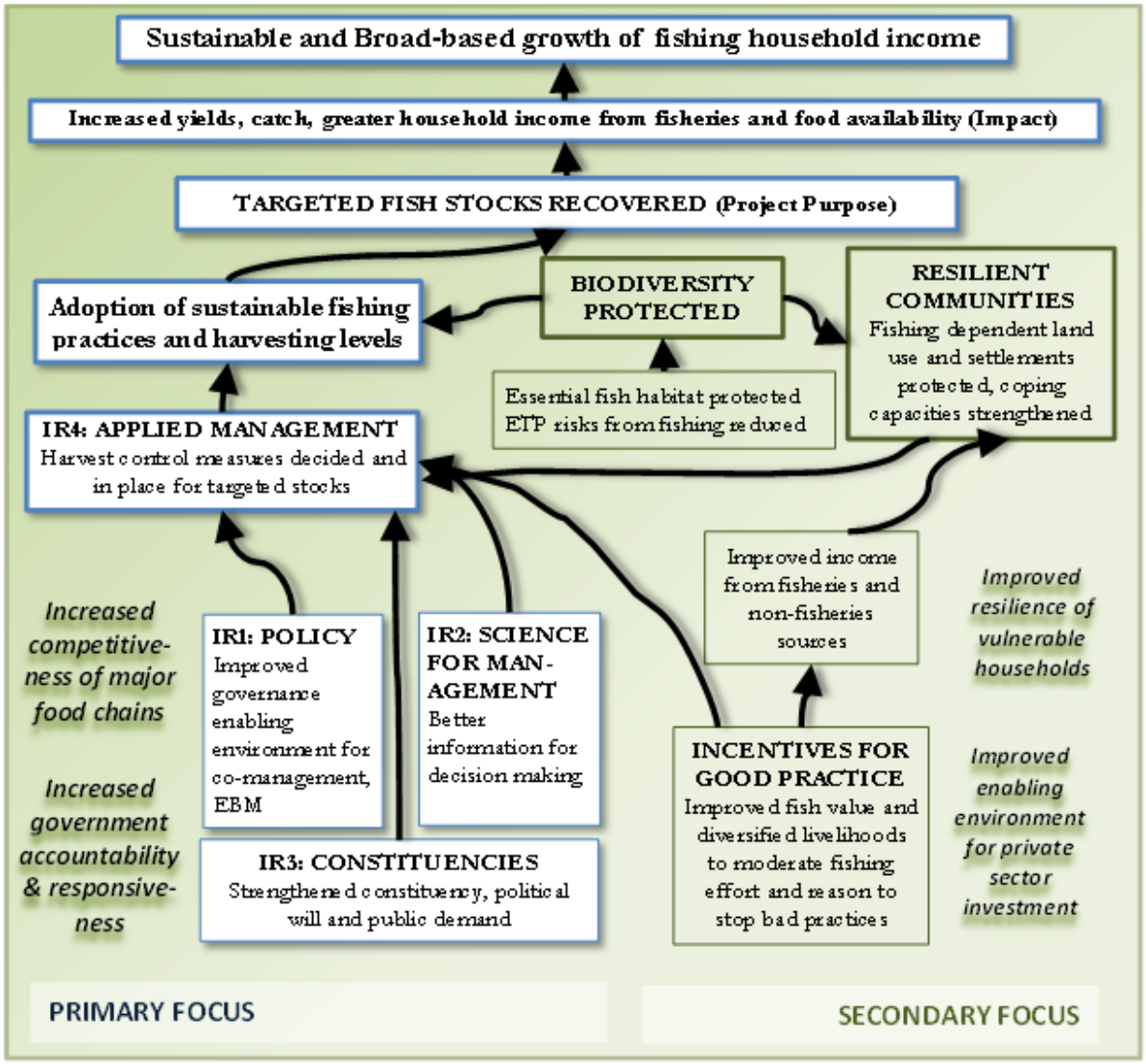
Consistent with the Fisheries and Aquaculture Sector Development Program (FASDP) and West Africa Regional Fisheries Project (WARFP), the project strategy is to support government efforts of both effort-control measures and managed access as first steps towards sustainability. Enabling conditions for effective fisheries management require a legal framework supportive of policy statements made by the Government of Ghana (GoG) on collaborative management and use rights. However, as noted by Martin Tsamenyi, a consultant for the ICFGP, WARFP and MOFAD: *"The existing legal framework in Ghana is not capable of supporting a co-management framework without amendment..."* Interim advisory groups can be established under the existing legislative framework and once a new legislative framework is in place, these groups can transform into true co-management groups with decision-making authority.

When fishing mortality is reduced via effective management measures (i.e. closed season, closed areas, direct catch and effort reduction...etc.), there could be a rapid improvement in biomass and subsequent fish yields, particularly for short-lived species. However, if the fishery remains open access, increased high fishing mortality will occur and short-term gains will dissipate. Fishing effort and fishing capacity must be measured and taken into account in the context of long-term harvest control. Experience shows that simply limiting the number of vessels (fishing capacity) will prompt fishers to focus on increasing the size and power of vessels and length of gear, all increasing rate of exploitation unless additional harvest control measures are also put in place.

Also needed is improved information for decision-making to help both estimate the optimum fleet sizes for Ghana's fisheries and to set adequate harvest controls. To this end, the SFMP is also focusing on improving stock assessment capabilities within the Fisheries Commission/Marine Fisheries Statistical Support Division and local universities, emphasizing inclusion of the traditional knowledge of fishermen. SFMP is also promoting innovative technologies to improve data collection on landings and effort and to aid law enforcement in reducing IUU fishing through Public-Private-Partnerships.

An integrated approach also requires a close look at shore-based components of the fisheries sector. All post-harvest fish handling, supply chain from sea to market and the infrastructure support for the fishing industry and fishing households occurs in a very narrow strip of the coastline. Without safe and secure places for men and women to live and work on the shore-based side of the industry, it is difficult to ask people to change behavior concerning unsustainable harvesting practices at sea. Reduction in fishing effort is likely to result in economic sacrifices in the short-term, so interventions are also needed to reduce impacts. These measures include creating safer, more secure and resilient fishing communities using spatial planning to identify the development needs of fishing communities and the exposure to natural hazards as well as threats to water-dependent fisheries uses. Community development programs are also needed to help fishers diversify their livelihoods, reduce dependence on fishing and reduce or eliminate the pressure to force their children into the illegal child labor trade. Other efforts include working to improve the fishery value chains and economically empower women involved in processing and marketing. Experience has shown that investing in organizational development and improved processing techniques, handling and infrastructure can lead to additional profits and a greater stewardship ethic. The theory of change described above is depicted in the figure below.

Figure 2. Theory of Change showing causal links, sequences of interventions, intermediate outcomes and impacts, including linkage to USAID, FtF and DO2 intermediate result



Profile of the Zone of Influence

The project zone of influence is the four coastal regions where marine capture fishing takes place (see Figure 3). The project places emphasis on management of the small pelagic fishery due to the importance of these sticks to local food security, whereby over 60% of the animal protein in the diet comes from Fish and where the small pelagics make up most of the local fish catch and almost all of this fish is consumed in Ghana. These fish are sold smoked, dried and fresh, and are transported from harvesting sites along the south coast to major population centers and areas in the very Northern areas of the country. These fish represent a high nutritional value but low cost food protein supply for millions of people.

The SFMP has activities focused on resources management coast-wide as well as improvements in the value chain of small pelagics in the Western and Central regions as well as behavior change efforts to reduce child labor and trafficking in the Central Region.

Figure 3. Map of the Zone of Influence of the SFMP – the Four Marine Coastal Regions in Ghana and locations of communities surveyed for the baseline

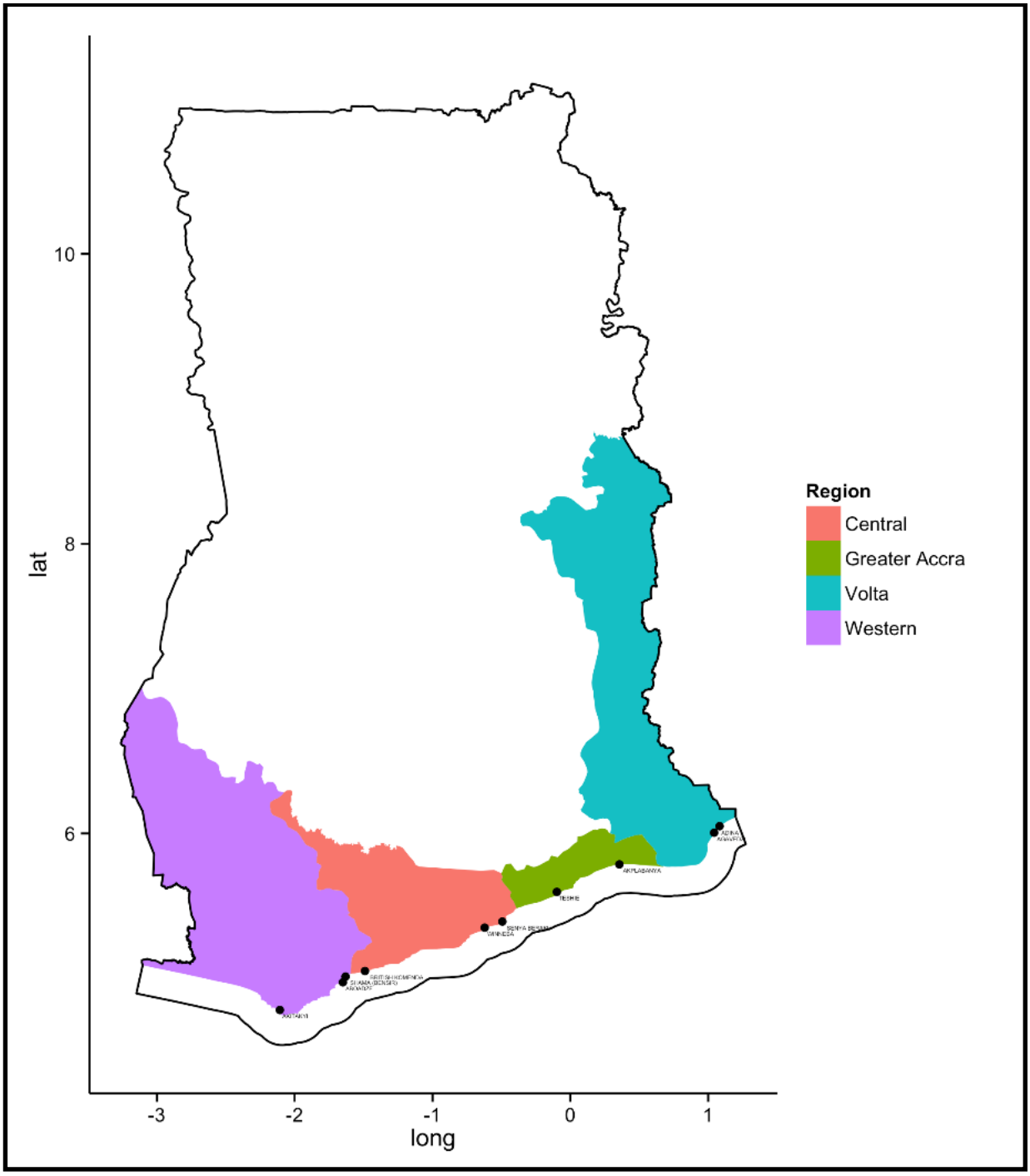
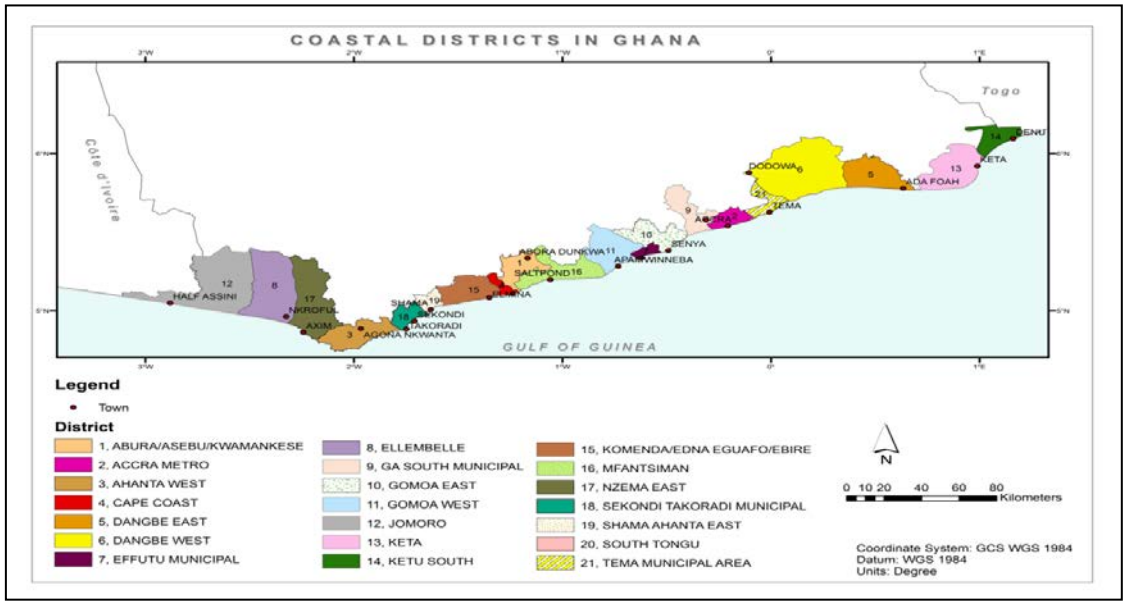


Figure 4 below shows the 21 coastal districts in the four coastal regions. These are the districts where all marine fishing and processing takes place

Figure 4. Map of the Zone of Influence of the SFMP showing the 21 coastal districts



SOURCE: Fishery FRAME Survey, Fisheries Commission, 2013.

The population of each of the four coastal regions and of the coastal and non-coastal districts is provided in Table 1. The coastal districts represent 47.4 % of the total population of the four coastal regions. See Appendix C for information on population per district in coastal regions.

Table 1. Population of coastal and non-coastal districts in the coastal regions

Region	Population
Volta	
Coastal	308,374
Non-Coastal	1,809,878
Total	2,118,252
Greater Accra	
Coastal	2,571,037
Non-Coastal	1,439,017
Total	4,010,054
Central Region	
Coastal	1,117,325
Non Coastal	1,011,820
Total	2,129,145
Western	
Coastal	1,046,165
Non –Coastal	1,329,856
Total	2,376,021
Grand Total all coastal districts	**5,042,901**
Grand Total all non-coastal districts	**5,590,571**
Grand Total all districts	**10,633,472**

SOURCE: Ghana Statistical Services, 2010.

Table 2 shows the number of fishermen per region based on census surveys undertaken by the Fisheries Commission. Comparing this with population census data from the Ghana Statistical Services Division show in Table 1, fishermen make up only 2.76 percent of the coastal district population. However, if using a multiplier of eight persons per fisher dependent on fishing for their livelihood, directly or indirectly, (e.g. processing, marketing,

inputs sales, boatbuilding, etc.) the coastal district population dependent on the marine fisheries sector is 1,113,240 persons or 22.1 percent of the coastal district population. The Volta region has the fewest fishermen and canoes and low levels of motorization. The Greater Accra, Central and Western regions have similar numbers of fishermen, and high levels of motorization, but the Western region has the most canoes and fishermen of any region.

Table 2. Number of Fishermen in the Coastal Regions

Region	No of Fishermen	% of Total Fishermen	No of Canoes	% of Total Canoes	% Motorized
Volta	18,150	13.4	887	7.0	44
Greater Accra	39,737	28.6	2,932	23.0	84
Central	40,563	29.2	3,895	30.6	77
Western	40,705	29.3	5,014	39.4	69
Total	***139,155***	***100.0***	12,728	***100.0***	***73***

SOURCE: Fishery FRAME Survey, Fisheries Commission, 2013.

Table 3 below shows the number of fishing villages, landing beaches and gear types per coastal region. The Western Region has the highest number of fishing villages but a similar number of landing beaches as the Central Region. The Volta Region has the fewest fishing villages and landing beaches followed by Greater Accra with thee second lowest. Pursing nets, beach seines and ali nets are the main gears targeting small pelagic species of fish (anchovies, sardine, herrings, sardinella) which is the primary stock targeted for rebuilding in the SFMP. Summing these net types shows that Greater Accra, Western and Central regions have similar numbers of small pelagic gear (a measure of overall fishing capacity in these regions for these stocks). However, based on percentage of total gears, Volta and Greater Accra have the highest dependence on these gears types.

Table 3. Number of fishing villages, landing sites and gear types per coastal region

Region	No Fishing Villages	No Landing Beaches	Gear Types									
			Pursing Nets	Beach Seines	Ali Net	Total Small Pelagic Gears	Small Pelagic Gears as % of total	Line	Lobster Net	Other Set Nets	Drift Net	TOTAL Gears / Nets
Volta	26	49	123	423	18	564	64	30	0	274	13	881
Greater Accra	44	59	1410	194	244	1848	63	600	42	330	112	2932
Central	42	98	975	221	527	1723	45	349	190	1578	32	3872
Western	74	96	577	236	1084	1740	38	163	1004	679	819	4562
TOTAL	**186**	**302**	**3085**	**1074**	**1873**	**5875**	**48**	**1142**	**1236**	**2861**	**976**	**12247**

SOURCE: Fishery FRAME Survey, Fisheries Commission, 2013.

Methodological Overview

Survey Design

Critical questions of the SFMP baseline survey aim at gathering information to assess the impact of project interventions to the small pelagic fishing communities. The baseline survey gathered quantitative information on key components such as indicators of household wealth,

a hunger and dietary diversity scale (using the FtF indicators), changes in small pelagic fish catch, and women empowerment (using a subset of FtF indicators). Additionally, qualitative information such as perceptions on changes in fish abundance, prevalence of illegal fishing practices and degree of regulatory compliance, degree of control of fisheries resources / participation in decision making, and child labor and trafficking, were collected. Indicators included in the survey questionnaire per result area are shown in the table below. Indicators were then converted into various types of closed and open ended survey questions and scale constructions as the means of their measurement. The survey instrument that was used is provided in Appendix E. For the FtF Program goals noted below, the project has no direct target to impact on these variables but nonetheless they are being tracked so long term trends can be assessed.

Table 4. Result Areas and Related Impact Assessment Indicators

Result and Activity Area	Indicators	Expected Impact (FtF and/or Project)
FtF Program Goals: Reduced Poverty, Hunger and Improved Nutrition	• Changes in material style of life (household assets such as structure, contents and other household wealth indicators comparable with FTF data • Perceptions regarding quality of life • Perceptions of changes in fish catch, abundance and income • Prevalence of households with moderate or severe hunger (FTF ind) • Women's dietary diversity index (FTF ind)	• Reduced poverty and hunger • Inclusive agricultural sector growth • Increased resilience of vulnerable communities and households • Improved access to diverse and quality foods
IR 1 Improved enabling conditions	Knowledge, attitudes and practices (KAP) regarding illegal fishing activities: • Perception on prevalence of illegal fishing practices / degree of compliance with rules • Perceptions on level of law enforcement actions taking place at sea and shore based or in ports/landing sites • Perceptions that if arrested, likelihood you will be punished. Knowledge, attitudes and practices (KAP) regarding child labor and trafficking: • Are people aware of what illegal/dangerous child labor and trafficking practices and of what happens to kids that are trafficked? • Do people think these practices are bad? • Extent to which children are engaged in illegal child labor or trafficked	• Reductions in illegal fishing and improved compliance • Improved attitudes towards law enforcement professionals • Improved efficiency of enforcement and prosecutorial chain • Increased knowledge of laws on CLaT • Increased attitudes that CLaT is bad • Reduced prevalence of CLaT
IR 2 Improved science	Not applicable to this survey	
IR3 Increased constituencies	Empowerment and participation in decision making in fisheries. • Perceptions regarding degree of empowerment and control of fisheries resources and participation in decision making • Women's empowerment in agriculture index – subset of FTF indicators. (FTF ind)	• Improved engagement of stakeholders in decision making • Increased empowerment of women in economic and res mgt decision making

Result and Activity Area	Indicators	Expected Impact (FtF and/or Project)
IR4 Applied fisheries management	Not applicable to this survey	
Independent variables	<u>Non-project related</u> • Degree of dependence on fishing: listing and rank of household livelihoods/income sources • Demographics: Age, gender, years formal education, socioeconomic status, ethnicity, community of residence, district and region of residence, primary livelihood (fisheries and non-fisheries dependent) <u>Project related</u> • Type of participation in project activities (meetings, trainings, grant recipient) • Level of exposure to SFMP communications (radio drama, fliers, billboards, SMS messages, emails)	• Understanding to how responses correlated to demographic variables • Test causality of changes related to project interventions and degree to which project involvement has influenced changes in responses.

Sampling

The coastal baseline and impact survey intends to measure the impact of the SFMP interventions on the small pelagic dependent fisherfolks and households along the coastline of Ghana. As noted in the table above, most of the indicators to be used are at a household or individual level of analysis. In order to select the households and individuals to be sampled along the coastline, a subset of the fishing villages recorded in the Report on the 2013 Ghana Marine Canoe Frame Survey, conducted by the Fisheries Scientific Survey Division of the Fisheries Commission, Ministry of Fisheries and Aquaculture Development, comprise the initial sampling frame. This sampling frame is further refined and described below. These villages (referred to as small pelagic fishing dependent communities) are the primary locations where the project intends to have impact and show results, and within the Zone of Influence (ZOI) of the SFMP – the four coastal regions of the country – previously shown in Figure 3.

Distribution of Small Pelagics Fishermen

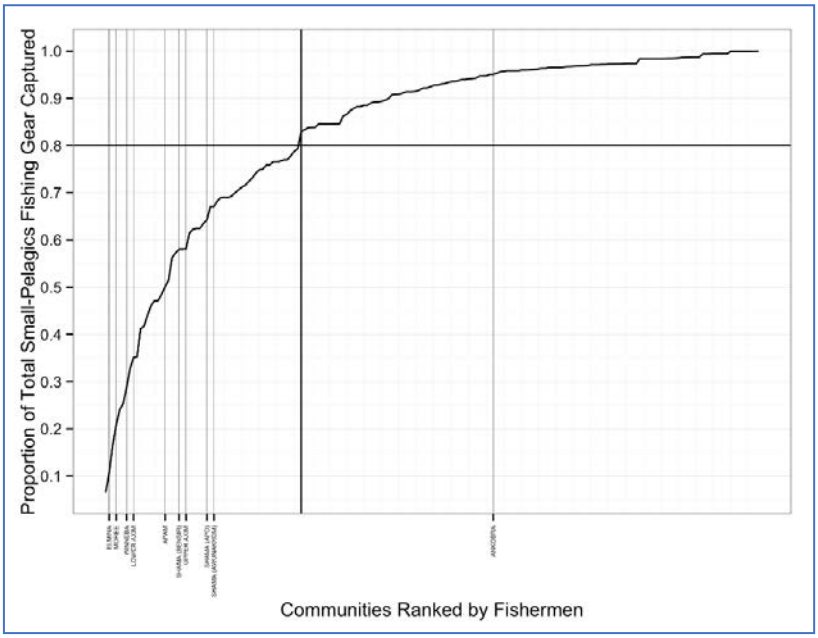
The project specifically targets small pelagic dependent fisherfolk. The Canoe Frame Survey does not distinguish small pelagic fishermen from demersal fishermen or large pelagic fishermen. While fishermen often target different species of fish during the year depending on season, many fishermen often concentrate on one main type of fishery. Communities as a whole typically show similar specializations. For instance, in Dix Cove, almost all of the fishermen in the community exclusively fish for large pelagic species and therefore would not be considered as representing small-pelagic fishermen or a community the project would expect to have an influence on, as large pelagics is not a project focus. Small pelagics fishing-dependent communities are defined as those communities which possess more gear types used for small pelagics, such as purse seines than others. The number of small pelagic gears in a community is assumed to be directly proportional to the number of fishermen in the community. A linear regression model was used to test this assumption using the Frame Survey Data and other data from the FSSD. The number of small pelagic gears relative to the number of fishermen per district. ($y = 18.159x + 1400.5$ $R^2 = 0.64$, N= 26). The association of the variables as indicated by the large R^2 value suggests that the number of small pelagic gears can be used as a proxy for the number of small pelagic fishermen. Using this proxy, the

distribution of small pelagic fishermen across the villages is approximately the ratio of small pelagic fishing gears per fishing village recorded in the Canoe Frame Survey to the overall total of 3088 gears.

Sample Frame Construction

The coastal sampling frame was constructed using reduction steps. The 188 fishing villages recorded in the Canoe Frame Survey were ordered by the number of fishermen in each community. The largest communities were then selected and added to the sampling frame until approximately 80% (2482) of the total small pelagic fishing gears for those villages were captured. The 45 largest communities (in terms of fishermen) comprise this frame and include 80% percent of all small pelagic fishing gears along the coast.

Figure 5. Plot of fishing villages ordered by size relative to the cumulative percent of total small pelagic fishing gears in those villages



The plot above represents the delineation of the sample frame from the overall set of marine communities with a thick vertical line and the 80% of small pelagic gears by the thick horizontal line. Many SFMP activities are targeted towards larger more urban communities with large populations of fishermen. The plot shows these specific communities with thin vertical lines. The majority of communities with targeted project interventions are in the sample frame. The lone exception, Ankobra, is not a small pelagics dependent community. The frame was then further reduced using expert opinion. Experts assessed each of the 45 villages and removed those they felt did not represent the small pelagic fishery in the region. The final sample frame consists of 29 fishing villages.

Sampled Communities

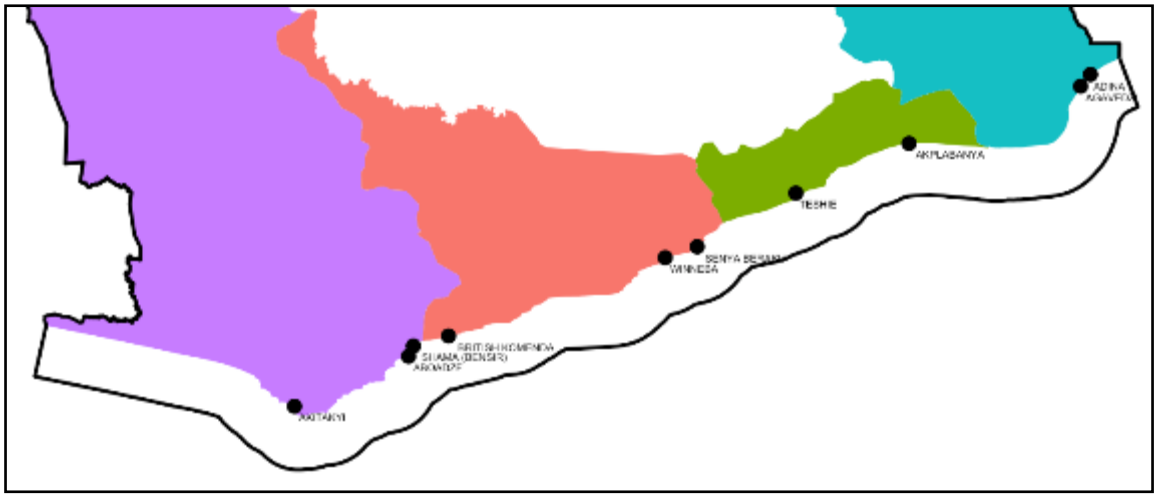
All 29 villages in the sampling frame were not sampled due to finite project resources. Proportionate sampling was used to ensure that each region was represented in the final sample of communities selected. Randomly selecting 3 villages each from Western and Central regions, and randomly selecting 2 villages from the Greater Accra and Volta region generated a representative sample of 10 communities. The random sample was continually generated until it included at least one project community in both the Central and Western

region. This will allow for project and non-project site comparisons during mid and final assessments using a quasi-experimental design. In the case of the Volta region the sample frame had only two communities identified, so both in the list of 29 villages were added to the sample of villages to be surveyed. The number of villages per region in the sample frame is shown in the Table 5 below. Figure 6 below shows the location of the final ten villages selected.

Table 5. Sample Frame for communities sampled

Region:	Volta	Greater Accra	Central	Western	Total
Number of Communities in Sample Frame:	2	7	12	8	29

Figure 6. Location of communities selected for sampling



Sample Size Calculations

The sampling design for the baseline survey calls for random sampling with proportional allocation. Since the response variables (measures used for the result and impact indicators, as well as the project and non-project indicators) include quantitative as well as qualitative (nominal and ordinal) variables, power analysis for several statistical analyses were used to ensure that enough respondents have been included in the survey to guarantee the detection of changes with a probability (power) of 0.80. To detect a medium effect size when comparing three proportions, the needed sample size will range between 166 and 435. That is, a sample size of 450 respondents will guarantee a power of 0.80 (or larger) when comparing three population proportions, irrespective of the percentage of "successes" in the dependent variable (See Appendix D for more information on power analysis calculations).

Allocation of Samples

Table 6 below shows the number of fishermen in the fishing villages surveyed and the target number of households and individuals to be surveyed per village. The number of households and individuals targeted for interviews is roughly proportional to the total number of fishers, canoes and small pelagic gears per region. Sampling methodology is discussed in the methods section below. The 450 household samples were proportionally allocated to the 10 sampled villages. Each village was weighted according to the number of fishermen it contained divided by the overall total number of fishermen within the sampled villages.

Table 6. Number of Fishermen per community sampled

REGION/Community	Project Site	Population of Fishers	Sample target of households (individuals)	% of Total
VOLTA REGION			48 (96)	10.7
Adina	N	1328	28 (56)	
Agaveda	N	967	20 (40)	
GREATER ACCRA			113 (226)	25.1
Teshie	N	1264	26 (52)	
Akplabanya	N	4199	87 (174)	
CENTRAL REGION			137 (274)	30.4
Senya Beraku	N	1731	36 (72)	
Winneba	Y	2941	61 (122)	
British Komenda		1922	40 (80)	
WESTERN REGION			152 (304)	33.8
Shama (Bensir)	Y	1720	36 (72)	
Aboadze	N	4612	96 (192)	
Akitakyi	N	947	20 (40)	
Total			450 (900)	100.0

Household Sampling

For the initial baseline survey, households were selected using Geographic Information System (GIS) spatial sampling within each community. The spatial sampling was accomplished using aerial photographs of the 10 sampled villages and ArcGIS. For each sampled village, a polygon was created by drawing a boundary along the coastline of landing sites belonging to the village extruding it landward by 200m. Latitude, longitude (WGS84) coordinate pairs were randomly generated within the polygon for a total number of coordinates equal to the target number of households to be surveyed. The generation process also produced extra, "backup", coordinates to account for any issues encountered in the field if no fishing household was found near the sample coordinates. See Appendix B for maps with polygons and sample points for villages surveyed.

Within each village, data enumerators administered the survey to the housing structure nearest each set of coordinates. In the case of multiple households per structure, data enumerators arbitrarily ordered the households present in a list and selected the household to be surveyed via a randomly generated number. Within the selected household, the head of household and most senior other adult of the opposite sex were interviewed if there was one in the household unit and if they were available on the day of the interview.

The coordinates, housing structure address, name of respondents, contact phone numbers, and other identifying information for each surveyed household were recorded by data enumerators to aid subsequent impact surveys, where a panel, time series sampling design will be followed (e.g. the same individuals will be surveyed at mid-point and end of project). These impact surveys will be administered to the same households to allow for paired data analysis. An attrition rate of approximately 10 percent over life of project expected when determining the overall sample size.

The survey Instrument

A survey instrument was developed to collect the information on indicators and assess impacts as noted in Table 4. See Appendix E for a copy of survey instrument. A paperless survey system was designed using Samsung Tablets. Kobotoolbox was the form-based application used where completed survey instruments entered into the tablet were sent via cellular or Wifi connections to a cloud storage database. Data quality control and assurance was conducted by a statistical expert reviewing data stored in the cloud. Feedback was provided to the field team in-situ where initial concerns were identified with data entry or sample selection via email, Skype and phone calls. The survey instrument was pretested in a coastal community and minor revisions in questions and procedures made based on the pre-test.

Survey Implementation

Enumerator Recruitment and Training

SFMP M&E team recruited five field enumerators (2 females and 3 males) based on agreed criteria developed by the team and Chief of Party. The recruitment criteria included; a Bachelor degree, computer literacy and ability to speak native languages of the survey area.

Since the main objective of the quantitative fieldwork survey was the collection of baseline information of the impact and outcome indicators for the SFMP, field enumerators were trained prior to the pre-test and field data collection. The SFMP team collaborated with KNUST BIRD to organize a seven day residential training for the enumerators. They were trained in ethics, techniques of household survey, community entry and given hands-on training in proper administration of questionnaires using tablet (android) technology as part of the pre-testing of the questionnaires. Emphasis was placed on the quality assurance procedures that were agreed with the SFMP team. The processes were facilitated by SFMP and the survey coordinator (consultant from BIRD).

Figure 7. Training of field enumerators

It commenced with taking all enumerators through a paper version of the survey instrument and conducting role-plays and tests to determine the competency of enumerators to perform a successful survey. The enumerators were later taken through the electronic (tablet) based version of the questionnaires and trained on its administration. The questionnaire was developed on open Source Software -KoBoToolbox, which is hosted by Harvard Humanitarian Initiative (http://www.kobotoolbox.org/). The software has inbuilt GPS capabilities hence the enumerators were taken through how to generate GPS coordinates on the software with Samsung tablets used for the survey. This allowed them to find the exact location prescribed by the sampling scheme.

Pre-testing the Questionnaire

The pre-testing was conducted in one of the study communities (Teshie) in the Greater Accra Region to test the appropriateness of the draft questionnaire. This was carried out on 25th July, 2015 between the hours of 8:00am and 4:30pm. This helped in determining the appropriateness of the questions, formatting and wording, appropriateness of verbal translation of questions, readiness of trained data enumerators for the task and also allowed for revision of the questionnaire for the main field survey. The Samsung tablets used were also tested for responsiveness and battery life including accuracy of GPS location. The Chief of Party, M&E Specialist and the survey coordinator with a software expert spent the pre-test period with the enumerators. In all, 5 enumerators were involved in the pre-test.

The under listed steps were followed during the pre-test:

- Each field enumerator was paired with a supervisor to help with supervision and make the necessary recommendations on the enumerator
- Itineraries were worked out for each pair and revised when it became necessary (especially on the use of the tablet for locating samples and backups)
- The field supervisors of the enumerators included the Chief of Party for SFMP, the M&E Specialist, the IT expert for the survey and the survey coordinator for the pre-test

On the fourth day of the training, trainees pre tested the survey instrument with the electronic tablet system in Teshie where challenges were identified and recommendations made. On the firth day the enumerators were taken through the revised (tablet) based version of the survey taking into consideration the recommendations from the field pre-test.

Field Work

Before any household survey was conducted in any community, the M&E Specialist and the survey coordinator embarked on a predetermined community entry protocol where the project was introduced to the District Assembly, the Traditional Authorities (including the Chief Fishermen) and the Assemblymen. A quick reconnaissance visit was always undertaken with the enumerators within the communities to check mobile internet network availability and how the GPS system of the device responded to the allocated coordinates on the ground. For communities like Akplabanya and Adina where mobile internet connectivity was a problem, an offline capable GPS map (designed by the IT expert to use the internal GPS of the tablet) was used for these sample locations.

The questionnaires including GPS coordinates for the selected sample locations and their backups were coded into the tablets given to the enumerators for the survey. Responses to the questionnaires were entered directly into the tablet with the aid of the KoboToolbox data collection online software (though it can still work perfectly offline in areas with internet connectivity issues). At the end of each data entry process, where internet was available,

saved data was uploaded onto the cloud server for analysis. Initially uploaded data was analyzed by a statistics experts to help the field team understand a few clerical errors and wrongly entered coordinate numbers and also to serve as quality assurance measures for enumerators entering the data wrongly or using very long or short times per questionnaire.

In order to minimize clerical errors and enhance accuracy, the experts who had access to the data on daily and continuous basis did data review and feedback that was given to the field coordinator and the M&E Specialist via email and telephone calls. Before data collection was done in any new district or community, field enumerators who are not familiar with the local language were given translators. The selected translators were trained for a full day on the questionnaires and how to avoid bias by influencing answers. Enumerators were not changed from one district to the other due to the complex nature in the handling of the tablet used and since it takes almost a week to train a new set of enumerators on the questionnaires, community entry and techniques of household surveys.

Figure 8. Enumerator interviewing a respondent in the field with the Samsung tablet where responses were recorded and then uploaded to the cloud database.

Survey Limitations

There were a number of challenges and limitations encountered during the administration of the questionnaire. These are elaborated below.

- More time was spent administering questionnaires than anticipated as respondents will typically be answering questions while working on their fish or net. There was the need to break from time to time.
- Some difficulty occurred in locating sample households with the tablet GPS due to either over clustering of settlements or the presence of a non-dwelling temporary structure.
- Due to funerals, festivals and other community engagements, respondents were sometimes not at home for interviews. This often led to postponement of the survey to the next day.
- Sometimes there were interruptions by other household members during the interview

- In some communities, the fishermen were at shores mending their nets, so it was not easy to get them at their selected sample locations (dwelling places).
- Finding sample household locations in some communities were not easy due to nature of the settlement and network problems.
- Most selected sample households were not in fact dwelling structures but sheds for smoking fish and some for raring animals requiring use of back-up sample coordinates.
- Though sensitizations were done through the Assemblymen and Chief Fishermen, some community members still thought the team were in their community to investigate illegal fishing activities and so avoided the enumerators, whiles others were reluctant to give information when questions on illegal activities were asked.
- Much time was spent following fishmongers to their sheds after taking coordinate numbers at the sample locations.
- In some communities where the chief fishermen failed to inform the chief of the community about our mission, some community members complained and some refused to grant audience until the chiefs were informed of our mission in the community
- In communities where illegal fishing is common, like light fishing, the fishermen did not want it to be categorized as an illegal activity.
- On rare occasions, the tablet froze and refused to respond, requiring a reboot and loss of some data and requiring the survey to be repeated.
- Some communities visited were far from where the available hotel used as a base of operations was located, making travel time to and from the selected sample sites longer than planned.

Findings

The purpose of this survey is to provide the basis for measuring changes in the general areas where the activities of the SFMP will be occurring. These effects are by definition general and diffuse, since the survey is done independently of decisions by the project to carry out specific activities that will benefit the communities studied. A great deal of general information about coastal households in 10 communities is presented in the following pages as context and background on the nature of the households and communities surveyed. In some cases comparisons are made with Ghana-wide data, with northern Ghana and among the coastal regions or districts.

This section of the report provides the summary results from the survey of households and individual respondents. Table 7 below provides a summary of target versus actual households and individuals sampled per region and community. The actual number of households sampled differed slightly from the target with Greater Accra slightly oversampled and the Central and Western Regions slightly under sampled. The number of households sampled was higher than target but the number of individuals sampled was below target as many households did not have another adult of the opposite sex available for interview at the time the interviews took place. Many males were away fishing and that accounts for the greater percentage of women interviewed (57.4 %) compared to men. These differences are statistically significant. If Greater Accra is removed, there is no statistically significant difference between actual and sampled numbers. These differences do not affect any of the analysis presented in this baseline report.

Table 7. Number of fishermen per community, target sampling frame and actual numbers sampled

REGION/Community	Population of Fishers	Sample target of households (individuals)	% of Total Target	Actual Number of households (individuals) Surveyed	% of Total Sampled households (individuals)
VOLTA		48 (96)	10.7	53 (77)	11.0 (10.8)
Adina	1328	28 (56)	6.2	31 (42)	6.5 (5.9)
Agaveda	967	20 (40)	4.4	22 (36)	4.5 (5.0)
GREATER ACCRA		113 (226)	25.1	138 (223)	28.8 (31.2)
Teshie	1264	26 (52)	5.8	28 (46)	5.8 (6.4)
Akplabanya	4199	87 (174)	19.3	110 (176)	22.9 (24.6)
CENTRAL		137 (274)	30.4	138 (202)	28.8 (28.2)
Senya Beraku	1731	36 (72)	8.0	38 (56)	7.9 (7.8)
Winneba	2941	61 (122)	13.6	61 (91)	12.7 (12.7)
British Komenda	1922	40 (80)	8.9	39 (55)	8.1 (7.7)
WESTERN		152 (304)	33.8	151 (214)	31.5 (29.9)
Shama (Bensir)	1720	36 (72)	8.0	34 (47)	7.1 (6.6)
Aboadze	4612	96 (192)	21.3	99 (140)	20.6 (19.6)
Akitakyi	947	20 (40)	4.4	18 (27)	3.8 (3.8)
Total		450 (900)	100.0	480 (716)	(100)

Table 8 shows the breakdown of respondents by gender with women respondents more represented in the sampled households. While the survey aimed for equal proportion of men and women, many households had men that were away from home and out fishing and no other adult male was present for interviews. In addition, many households were single female headed households with no adult men residing in the household.

Table 8. Gender of respondents

Gender	Frequency	Percent
Male	305	42.60
Female	411	57.40

Demographic and Socio-Economic Characteristics of Respondents and their Households

This section of the report provides details on the demographic and socio-economic characteristics of the individuals and households surveyed.

Household Wealth Indicators

The following summary of household wealth indicators are the same variables used in the Feed the Future baseline survey (Zereyesus et al. 2014) of farmers conducted in Northern Ghana. This allows for direct comparisons between fisher and farmer households. The only exception is the table detailing household fisheries assets.

House Structure

Table 9 shows the frequency distribution of respondent household roof structure. The Volta region has the highest (49.06%) existence of corrugated metal sheets on their structure, followed by Greater Accra (27.34%) while Central and Western regions have the lowest with 26.81% and 17.22% respectively. In terms of palm leaves /raffia/thatch, Greater Accra recorded the highest (20.14%) usage while the other three regions recorded low frequencies. Looking at regional differences from roof characteristics with high frequency responses, comparing; palm leaves/raffia/thatch, corrugated metal sheets and asbestos/slate, there is statistically significant difference in these roof characteristics (Chi-Square 52.066, DF=6, P<0.001, N=481).

Table 9. Frequency distribution of respondent household structure - roof

Roof Type	Region				
	Central	Greater Accra	Volta	Western	All Regions
Asbestos / slate	70.29	49.64	43.40	64.90	59.67
Corrugated metal sheets	26.81	27.34	49.06	17.22	26.40
Palm leaves / raffia / thatch	1.45	20.14	7.55	5.30	8.73
Bamboo	0.00	0.00	0.00	5.96	1.87
Wood	0.00	1.44	0.00	2.65	1.25
Other	0.72	0.72	0.00	2.65	1.25
Roofing tiles	0.72	0.72	0.00	0.66	0.62
Mud bricks / earth	0.00	0.00	0.00	0.66	0.21

Table 10 shows the frequency distribution of respondent household wall structure. The Central region (93.48%) and Volta region (84.91%) accounts for most walls built with cement/sandcrete blocks. In the case of walls built by wood/bamboo, Greater Accra and Western regions have these as most common. There is a regional statistically significant difference in walls built with wood/bamboo and those built with cement/sandcrete. (Chi square 13.020, DF=3, P< 0.005, N=481).

Table 10. Frequency distribution of respondent household structure -walls

Dwelling walls	Region				
	Central	Greater Accra	Volta	Western	All Regions
Cement / Sandcrete Blocks	93.48	77.70	84.91	79.47	83.58
Wood / Bamboo	3.62	15.11	9.43	14.57	11.02
Burnt Bricks	0.72	4.32	0.00	0.66	1.66
Thatch	2.17	0.00	3.77	1.32	1.46
Mud / Mud Bricks	0.00	1.44	0.00	1.99	1.04
Metal Sheets / Slate / Asbestos	0.00	1.44	1.89	0.66	0.83
Cardboard	0.00	0.00	0.00	0.66	0.21
Other	0.00	0.00	0.00	0.66	0.21

Table 11 shows the type of floors in the households surveyed. The Volta region has the greatest percent of houses with mud/earth or wood floors whereas the Western Region has the greatest percent with cement. These differences are statistically significant (Chi-Square=57.477, df=12, p<0.001. N=481).

Table 11. Frequency distribution of respondent household structure - floors

Dwelling floors	Region				
	Central	Greater Accra	Volta	Western	All Regions
Cement / Concrete	71.74	71.94	43.40	80.132	71.31
Earth / Mud / Mud Bricks	23.91	18.71	56.60	19.21	24.53
Wood	1.45	5.04	40.00	0.66	2.08
Stone	2.90	1.439	0.000	0.00	1.25
Other	0.00	2.88	0.00	0.0	0.83

With regards to the state of dwelling condition shown in Table 12, the Volta region accounts for the highest percentage of (32.08%) structures that are in good condition followed by Greater Accra (29.50%) while the Central Region and Western Region accounts for fewer percentages of structures in good shape. In terms of dwelling in a moderate state, the Central Region accounts for the highest (63.04%), while the Western Region accounts for the next highest (54.30%). There exist a statistically significant difference between the state of dwelling across the survey regions (Chi-Square 23.0784, df=6, P<0.001, N=481).

Table 12. Frequency distribution of respondent household structure - condition

Dwelling condition	Region				
	Central	Greater Accra	Volta	Western	All Regions
In excellent repair	1.45	5.04	9.43	0.00	2.91
In good shape	15.94	29.50	32.08	16.56	21.83
In moderate condition	63.04	51.80	49.06	54.30	55.51
In poor shape	19.57	12.95	9.43	27.15	18.92
In very bad shape	0.00	0.72	0.00	1.99	0.83

Table 13 below indicates that more households in Greater Accra (45.32%) and the Volta region (41.51%) rely on public toilets than in the other regions. It is interesting to note that, most households in Western region (60.26%) and Central region (52.17%) do not have a toilet facility, and they often go to the beach or bush to defecate. There is a statistically

significant regional difference for toilet facilities with higher frequency responses; comparing KVIP, public toilet and no toilet facility. (Chi-Square 34.5507, DF=6, P<0.0001, N=481).

Table 13. Distribution of toilet types among respondent households

Dwelling toilet type	Region				
	Central	Greater Accra	Volta	Western	All Regions
Flush Toilet (WC)	2.90	0.00	1.89	1.99	1.66
Pit Latrine	4.35	1.44	9.43	4.64	4.16
KVIP	12.32	19.42	7.55	13.25	14.14
Public toilet	27.54	45.32	41.51	18.54	31.39
Toilet in another house	0.00	0.00	0.00	0.66	0.21
No toilet facility	52.17	33.81	39.62	60.26	48.02
Other	0.72	0.00	0.00	0.66	0.42

Table 14 shows the frequency distribution of water supply for respondent households. The Western region (94.70%) accounts for the highest percentage of households that have no access to potable drinking water in their houses, followed by Greater Accra (93.53%). The Volta region has the highest percentage of households with access to potable water. There is a statistically significant difference among the regions with regards to access to potable water. (Chi-Square 58.6357, DF=3, P<0.0001, N=481).

Table 14. Frequency distribution of household water supply

Water supply in the house	Region				
	Central	Greater Accra	Volta	Western	All Regions
Yes	14.49	6.47	43.40	5.30	12.47
No	85.51	93.53	56.60	94.70	87.53

In terms of access to electricity, there is a high level of electrical supply among all regions averaging 86%. The differences shown in Table 15 below are not statistically different.

Table 15. Frequency distribution of electrical supply among respondent households

Electricity supply in the household	Region				
	Central	Greater Accra	Volta	Western	All Regions
Yes	86.96	86.33	94.34	80.79	85.65
No	13.04	13.67	5.66	19.21	14.35

Charcoal has remained the main source of fuel for cooking among the survey regions, Nevertheless, Greater Accra accounts for most households (89.21%) using charcoal. It also is common among households in Volta and Western regions (Table 16). Fuelwood has a higher frequency of use in the Central region. These differences in fuel use by region are statistically significant (DF=3, Chi-square = 17.7, p=0.0005, N=469).

Table 16. Frequency distribution of household cooking fuel supply

Cooking Fuel	Region				
	Central	Greater Accra	Volta	Western	All Regions
Electricity	0.00	1.44	0.00	0.00	0.42
Piped / biogas	2.17	1.44	0.00	1.32	1.46
Kerosene	0.72	0.00	0.00	0.00	0.21
Charcoal	70.29	89.21	83.02	80.13	80.25
Firewood	26.81	7.91	15.09	17.88	17.26
Other	0.00	0.00	1.89	0.66	0.42

Household ownership of durable goods

Table 17 summarize the percent distribution of the durable goods owned by each the household. These observations were done for each household surveyed and not by individual (N=481). Statistically significant responses between regions are noted in bold for a chi square statistic. The Volta region has higher percentages of gas stove, bicycle and motorbike ownership whereas Greater Accra has the highest percentage of radio, kerosene stove and generator ownership. These results suggest that fishing households in Greater Accra and Volta are economically better off using a durable goods measure.

Table 17. Percent distribution of ownership of durable goods among households surveyed

Type of Durable Good	Region					Chi-square Prob.
	Central	Greater Accra	Volta	Western	All Regions	
Radio	55.80	72.66	67.92	60.93	63.62	**0.0238**
Tape player	36.23	43.17	45.28	37.75	39.71	0.5085
TV	64.49	76.26	66.04	61.59	67.15	0.0500
Sewing machine	26.09	28.78	16.98	17.88	23.28	0.0857
Kerosene stove	0.00	2.88	0.00	0.00	0.83	**0.0192**
Electric stove	1.45	1.44	0.00	0.66	1.04	0.7515
Gas stove	8.70	11.51	26.42	9.27	11.64	**0.0042**
Refrigerator	21.74	32.37	30.19	23.18	26.20	0.1505
Bicycle	13.77	17.27	9.43	5.96	11.85	**0.0213**
Motorbike	2.90	9.35	5.66	0.66	4.37	**0.0027**
Computer	6.52	5.04	11.32	3.97	5.82	0.2463
Generator	17.39	30.94	5.66	11.26	18.09	**<.0001**

Ownership of Productive Assets

Table 18 shows the percent distribution of productive assets per household by region (N-481). Ownership of motorized and non-motorized canoes is greatest in Greater Accra and the Western Region. The frequency of ownership of Trawlers and aquaculture assets is very low, virtually non-existent among fishing households with no statistically significant differences between regions. Ownership of fish smokers was highest in the Volta and Western regions and lowest in Greater Accra. As indicators of wealth, these regional differences vary from the regional differences in durable goods described above. In these wealth measures, Greater Accra still seems to have the most fishing assets (vessels) except in the area of fish processing - smokers. While Volta has higher fish processing assets are higher. It should be

noted that motorized canoes is a rather large investment compared to other items (other than trawler) in either list.

Table 18. Percent distribution of ownership of productive assets among households surveyed

Type of Productive Asset	Region					Prob.
	Central	Greater Accra	Volta	Western	All Regions	
Motorized canoe	38.41	55.40	49.06	52.98	49.06	**0.0241**
Non-motorized canoes	5.07	13.67	3.77	12.58	9.77	**0.0248**
Trawler	0.00	0.72	0.00	0.00	0.21	0.4815
Fish pond	0.00	0.00	1.89	0.00	0.21	**0.0441**
Fish cages	0.00	0.72	1.89	0.00	0.42	0.2322
Fishing nets	44.93	56.83	50.94	57.62	53.01	0.1211
Fish smokers	83.33	73.38	90.57	88.74	82.95	**0.0020**

Individual Characteristics of Respondents

The frequency distribution of the age of respondents is shown in Figure 9. The mean age of the respondents interviewed was almost 44 years of age with a minimum of 18 years (only adults, age 18 years and over were interviewed) and a maximum of 100 years (Table 19).

Figure 9. Frequency distribution of the age of respondents

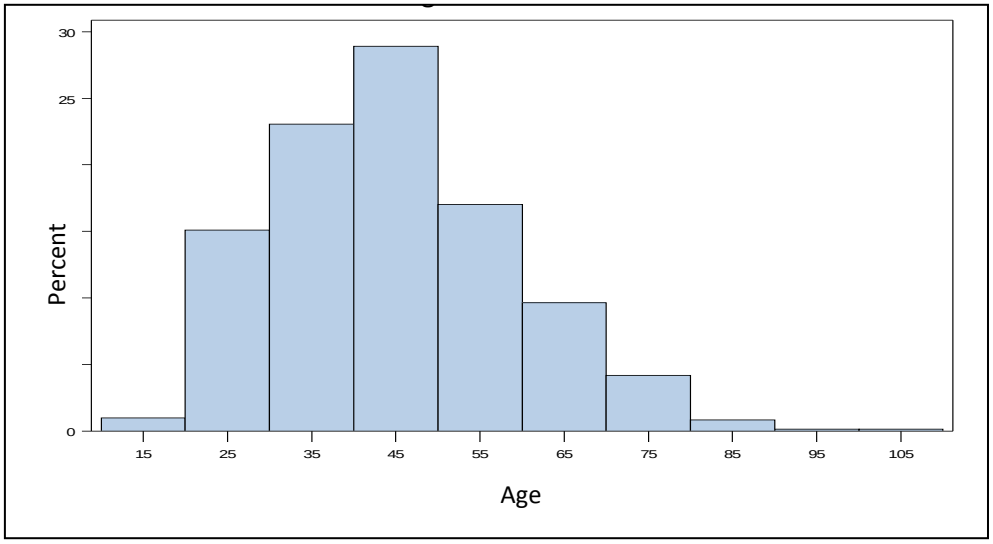


Table 19. Descriptive statistics for age of respondent (N=716)

Mean	Lower Quartile	Median	Upper Quartile	Minimum	Maximum
43.89	34.00	42.50	53.00	18.00	100.00

Table 20 shows the type of respondents in the household. The number of female only head of households (20.1 %) was more than twice the number of male only headed households (8.1%). The overwhelming majority of household types was male and female (71.8 %). There is no statistically significant difference by region among household types.

Table 20. Type of respondents in the household

Household Type	Frequency	Percent
Male and Female	514	71.79
Female	144	20.11
Male	58	8.10

The percent distribution of religion among the 716 respondents is shown in Table 21. Christians made up the majority at 82 percent followed by No religion (8.1%) and Traditionalists (5.2 %). Muslims made up only 3.1 % of the respondents. The Volta region had the highest percentages of respondents declaring no religion or traditionalist whereas the Western region had the highest percentage of Muslims.

Table 21. Distribution of religion of respondents

Type	Region				All Regions
	Central	Greater Accra	Volta	Western	
Christian	81.68	91.93	58.44	81.31	82.26
No Religion	7.92	3.14	20.78	8.88	8.10
Traditionalist	4.95	4.04	19.48	1.40	5.17
Islam	1.49	0.45	0.00	8.41	3.07
Other	3.96	0.45	1.30	0.00	1.40

Table 22 shows the percent distribution of ethnicity of respondents. Fanti made up the largest number of respondents totaling 46.1 percent of the respondents, followed by Ga (23%), other (18%) and Ewe (10.2%). Fanti are concentrated in the Central and Western regions whereas Ga are concentrated in the Greater Accra region and Ewe in the Volta region. These differences are statistically significant.

Table 22. Distribution of Ethnic Group of respondents

Ethnicity	Region				All Regions
	Central	Greater Accra	Volta	Western	
Fanti	65.84	0.45	0.00	91.59	46.09
Ga	0.99	70.85	6.49	0.00	23.04
Ewe	0.00	0.45	92.21	0.47	10.20
Nzema	0.00	0.00	0.00	7.01	2.09
Ahanta	0.00	0.00	0.00	0.93	0.28
Other	33.17	28.25	1.30	0.00	18.30

The majority of respondents were married (75%) with windowed and single (9.4 and 8.4 % respectively) making up the other two primary categories of marital status (Table 23). There were no statistically significant differences in household type by region. Age differences and years schooling between marital status groups was significantly different (ANOVA Marital Status: DF = 5, F value = 58.10, $p < 0.0001$; ANOVA Years Schooling: DF=5, F value = 2.80, $p<0.05$)

Table 23. Marital status of respondents

Marital Status	Percent	Mean Age	Mean Years of Schooling
Married	75.28	43.3	7.3
Widowed	9.36	61.4	6.0
Never married / Single	8.38	26.8	9.9
Separated	3.63	48.7	6.3
Divorced	2.09	51.9	7.6
Living together	1.26	34.3	6.6

Table 24 shows literacy rates. A large majority of the respondents can neither read nor write in any language (77%) with women having a much lower literacy rate (15%) compared to men (34%). Differences in literacy by gender are statistically significant with females more likely to be illiterate. (Chi Square 34.5, DF = 1, $p<0.0001$). Older persons are more likely to be illiterate (Least Square Means: DF = 1, F value = 51.1, $P<0.0001$) with the mean age of literates being 37.3 years, whereas mean age of illiterates was 45.9 years.

Table 24. Literacy: Can read and write in either English or a local language (N=716)

Literate	Male	Female	Total
Yes	33.77	15.09	23.04
No	66.23	84.91	76.96

Individuals who are either separated, divorced or widowed have much lower literacy rates compared to those that are single or living together that have the highest rates (Table 25). Literacy between different marital status categories is statistically significant (Chi-square = 63.3, DF=5, $p<0.0001$).

Table 25. Can read and write in either English or the local language compared by marital status

Literate	Marital Status (N=716)						
	Never married / Single	Living together	Married	Separated	Divorced	Widowed	Total
Yes	61.67	44.44	20.78	7.69	13.33	11.94	23.04
No	38.33	55.56	79.22	92.31	86.67	88.06	76.96
Total	8.38	1.26	75.28	3.63	2.09	9.36	100.0

Similar to the literacy results, a majority of respondents (59%) have never been to school (Table 26) with women having much lower rates of attendance (34%) than men (49%). These differences are statistically significant (DF=1, chi square = 16.1, $p<0.0001$).

Table 26. School attendance by gender

Attended school	Gender (N=716)		Total
	Male	Female	
Yes	49.18	34.31	40.64
No	50.82	65.69	59.36
Total	42.60	57.40	100.00

Of those respondents that have been to school, approximately 42 percent have completed no more than primary level education (see Table 27 below) and of these, 15 percent had not completed primary school.

Table 27. Highest qualification completed by respondent

Highest school level completed	Frequency	Percent
None	43	14.78
Primary	80	27.49
MLSC	24	8.25
BECE	52	17.87
Voc/Comm	1	0.34
Teacher Tra. A	3	1.03
Teacher Post Sec	1	0.34
GCE O Level	8	2.75
SSCE/WASSCE	27	9.28
GCE A Level	6	2.06
Bachelors	4	1.37
Other	42	14.43
N	291	100

Food Security Indicators

The two food security indicators used to measure progress towards the Feed the Future goals of Reduced Poverty, Hunger and Improved Nutrition were also used in this study. These were the household hunger scale (Table 19) and the women's dietary diversity index. In the case of our survey, the women's dietary diversity index was calculated for women aged 18 to 49 whereas for the Population Based Survey (PBS), women aged 15 to 49 (women of child bearing years) was used. The same methodology for calculating the scale and index and exact same interview questions were used in this study as was used for the Population Based Survey of the USAID Ghana northern Zone of Influence (see Zereyesus et al. 2014 for a description of the methodology and detailed results). While the women's dietary diversity index is not fully or statistically comparable due to differences in the age ranges used, the results of both studies nonetheless are shown below to provide a rough comparison between northern farming and coastal fishing households.

Fishing households experiencing moderate to severe hunger during the interview period was 21 percent (Table 28), which is considerably lower compared to the PBS results (39%). While older women tended to have higher hunger scores or more moderate to severe hunger rank, these differences were not statistically significant (ANOVA: HHScore: df=2, F=0.763, p>0.1; HHRank: df=2, F=1.402, p>0.1). However, Household Hunger Rank was statistically significantly related to literacy (Chi-square=6.842, df=2, P<0.03, N=716) with those unable to read or write more likely to experience moderate to severe hunger (Table 29).

Table 28. Household hunger scale

Level	SFMP	PBS
No Hunger	78.7%	60.6%
Moderate to Severe Hunger	21.3%	39.4%

PBS (Population Based Survey) SOURCE: Zereyesus et al. 2014

Table 29. Comparing literacy and hunger

Literacy	% Moderate to Severe Hunger	% No Hunger
Able to read and write	15.2	84.8
Not able to read and write	22.7	77.3
N	150	565

However, comparing the women's dietary diversity index, a strikingly low number of women in fishing households having a high dietary diversity of only 1.6 percent compared to women in farming households of 17 percent (Table 30). Fishing respondents had a much higher percentage with a low dietary diversity (62%) compared to farming household respondents (41%). There is no statistically significant relationship between age and the individual women's dietary diversity score (ANOVA: df=8, F=0.776, p> 0.1) or rank (ANOVA: df=2, F=0.386, p>0.1, N=253).

Table 30. Women's dietary diversity index

Index Rank	SFMP (N=253)	PBS
High Dietary Diversity	1.6%	17.4%
Medium Dietary Diversity	36.4%	42.1%
Low Dietary Diversity	62.0%	40.5%

PBS (Population Based Survey) SOURCE: Zereyesus et al. 2014

The mean of women's dietary diversity score in the SFMP baseline compared with the northern FTF baseline is shown in Table 31 below. SFMP respondents show a much lower mean score than the PBS surveyed respondents in the North. This suggests a need for nutritional programs targeted in coastal fishing households emphasizing dietary diversity.

Table 31.Women's Dietary Diversity Score

Statistic	SFMP (N=253)	PBS
Arithmetic Mean	3.1	4.0
Standard Deviation	1.3	1.6

PBS (Population Based Survey) SOURCE: Zereyesus et al. 2014

Examining the percent of each food group consumed (Table 32), meat and seafood was the most frequently mentioned food group eaten (67.2%) followed by other fruits and cereals. Egg products, green vegetables and organ meat was the least frequently consumed food group. Teasing out differences between the meat and seafood group (Table 33), it reveals that fish was consumed by over 84% whereas meat was consumed by approximately 23 percent, demonstrating the high dependence on fish in the daily diet of coastal fishing households. Fish is the most frequently consumed food by far of any other group.

Table 32. Percent of SFMP respondents consuming the Women's Dietary Diversity Score food groups in a 24hr period

Food Category	Percent
Meat and seafood	67.2
Other fruits	59.7
Cereals	54.6
Other Vitamin A rich fruits and vegetables	52.6
Milk and milk products	31.6
Legumes	18.2

Eggs and egg products	12.6
Green vegetables	9.1
Organ meat	2.0

Table 33. Percent of SFMP respondents consuming meat and seafood in a 24hr period

Food Group	Percent
Meat	22.9
Seafood	84.2

Fishing Household Livelihoods

Table 34 below indicates the distribution of livelihood activities of the households surveyed. Totals sum to more than 100% as households have one or more livelihood activities. Also, it should be noted that the sample of households surveyed were households that were involved in fisheries activities of any type, that is, engaged in one or more types of fisheries activities such as fish processing, trading or capture fishing. Only fish processing and fish trading and other livelihoods showed significant differences between regions. Central, Volta and Western regions are highly dependent on fish processing. Overall, in the fishing dependent households surveyed, fish processing is the most frequent fisheries livelihood among those surveyed followed by fishing as the second most frequent livelihood activity, and then fish trading. Non-fisheries livelihoods were less frequently mentioned. This suggests high dependence on fishing among these fisheries households. Farming is the least frequently cited and is practiced by less than 10 percent of fisheries households (both for cash or food crops).

Table 34: Frequency distribution of livelihood activities per household interviewed

	Regions					Chi Square P-value
Livelihoods	Central	Greater Accra	Volta	Western	All Regions	
Fishing	73.91	84.17	84.91	76.82	79.00	0.1145
Fish Processing	91.30	79.14	90.57	92.05	87.94	0.0024
Fish Trading	52.17	54.68	56.60	39.07	49.27	0.0232
Other	21.74	26.62	32.08	17.88	23.08	<.0001
Livestock rearing	15.22	30.22	33.96	9.93	19.96	0.1199
Farming food crops	10.87	5.04	3.77	7.28	7.28	0.2003
Cash crops	1.45	0.00	0.00	2.65	1.25	0.1809

N=481

Table 35 below shows the responses to the most important livelihood activity in the household. There is statistically significant differences across the regions. In terms of fishing, it is the most important livelihood activity overall and highest in in Greater Accra (67%) and Volta (62%) regions. Fish processing is second most important overall and highest in the Western and Central regions. Non-fishing livelihoods was ranked as most important by less than 10% of households overall, indicating very high importance and dependence on fisheries livelihoods for the households surveyed.

Table 35. Most important livelihood activity of household's surveyed

Most Important Livelihood Activity	Region				
	Western	Greater Accra	Central	Volta	All Regions
Fishing	59.60	66.91	44.93	62.26	57.80
Fish Processing	33.11	20.86	39.86	24.53	30.56
Fish Trading	3.31	7.91	9.42	5.66	6.65
Other	1.32	3.60	3.62	0.55	3.33
Farming Food Crops	1.32	0.00	2.17	0.00	1.04
Farming Cash Crops	1.32	0.00	0.00	0.00	0.42
Livestock	0.00	0.72	0.00	0.00	0.21

(Chi Square =35.2613, DF 18, p<0.01, N=481)

The results below show responses to what is the second most important livelihood in the household (Table 36). There are statistically significant differences across the regions. In contrast to the table above, fish processing is ranked overall as the second most important livelihood activity followed by fish trading and fishing. As in the table above, non-fishing related livelihoods make up a small percentage (14%) in the second most important livelihood activities reported across the coastal regions. For fish processing across the survey regions, Western region (52.38%) had this ranked as highest in secondary importance. In terms of fish trading, the results show that the Central region has this activity as the second most important livelihood activity whereas all other regions had fish processing as highest.

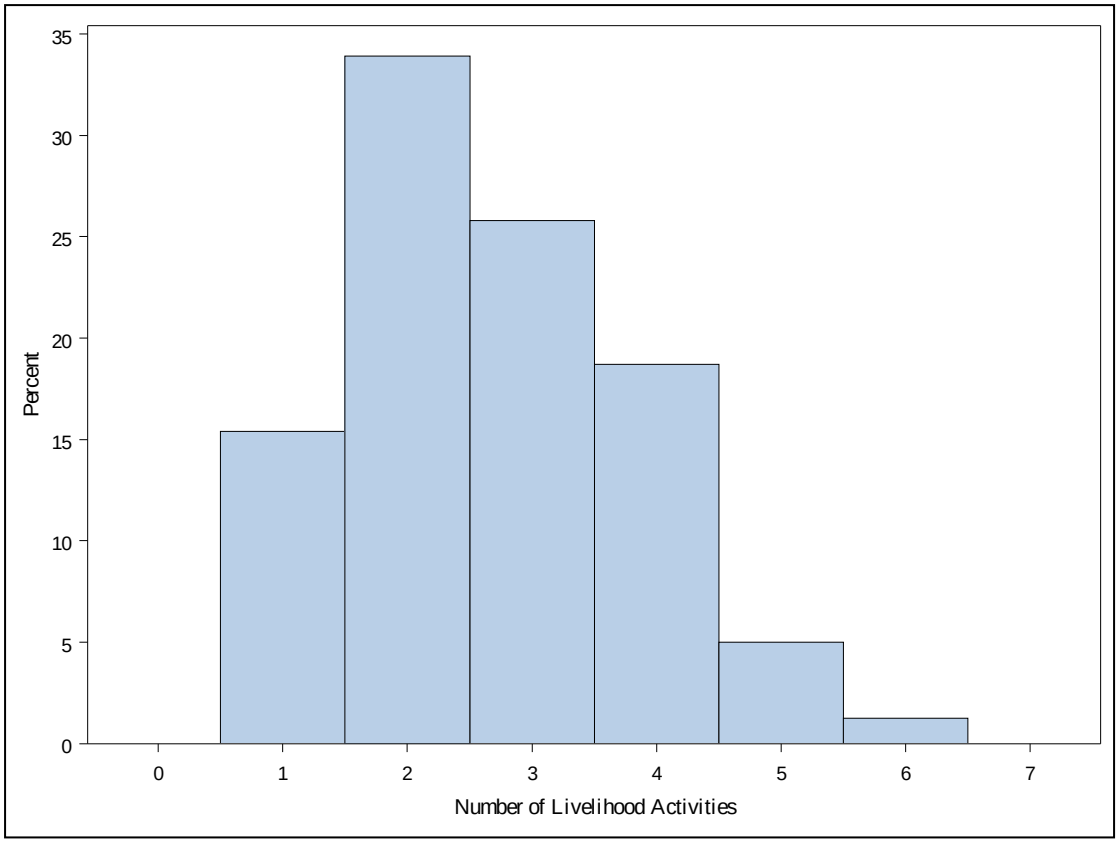
Table 36. Second most important livelihood per household

Second Most Important Livelihood Activity	Region				
	Western	Greater Accra	Central	Volta	All Regions
Fish Processing	52.38	40.34	34.82	42.00	42.75
Fish Trading	21.43	21.85	36.61	28.00	26.54
Fishing	16.67	13.45	20.54	14.00	16.46
Other	7.94	18.49	4.46	14.00	10.81
Farming Food Crops	1.59	0.84	3.57	0.00	1.72
Livestock	0.00	5.04	0.00	2.00	1.72

(Chi –Square 40.5545, DF 15, P=0.0004, N=407)

Figure 10 below shows the distribution of the number of livelihood activities per household with a majority having between two or three livelihood activities and approximately one-quarter with more than four. Figure 11 shows the distribution of fisheries livelihoods in the households with more than a two-thirds having either two or three fisheries livelihoods.

Figure 10. Number of total livelihood activities per household



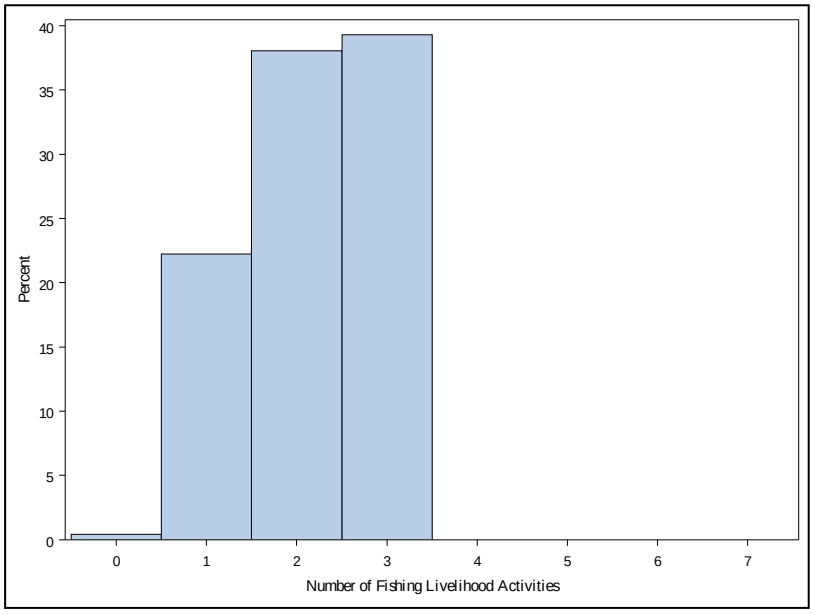


Figure 11. Number of fisheries livelihood activities per household

In Figure 12 below, most households are fully dependent on fisheries as more than half have no other occupation other than fisheries, showing again and high degree of specialization in fisheries. The lack of non-fisheries livelihoods suggests low household economic resilience

or ability to switch to alternative means of support based on shocks or declines in the fisheries sector. The lack of other non-fishing livelihoods, and lack of agricultural land ownership (see section on access to productive capital – agricultural land ownership is less than 20%) and high illiteracy rates may make promotion of alternative livelihoods outside of the fishing sector difficult.

Figure 12. Number of non-fisheries livelihoods per household

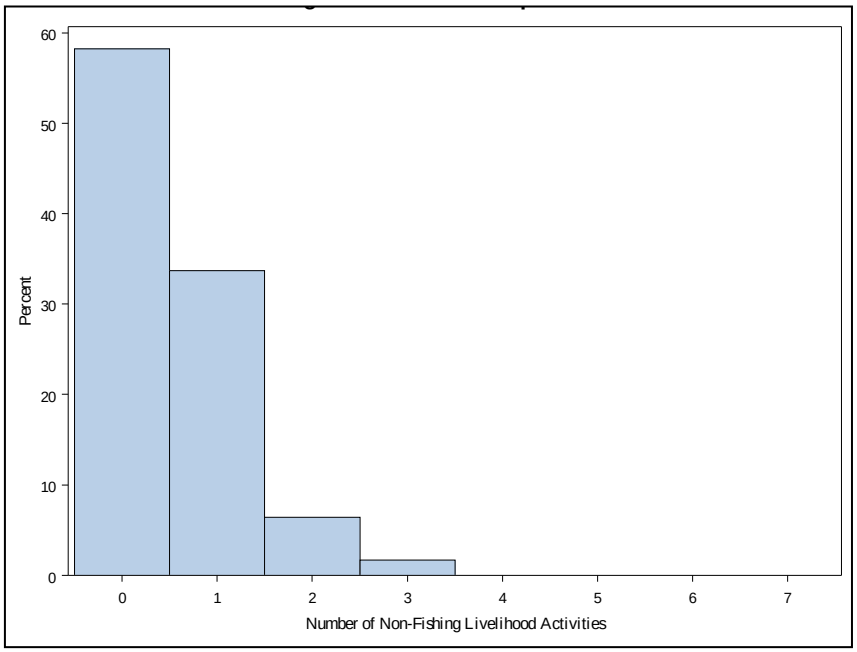


Table 37 below shows the mean number of livelihood activities grouped overall and disaggregated by fishing and non-fishing related. This again illustrates the low level of livelihood diversification outside of the fishing industry.

Table 37. Mean values for number of livelihood types per household

Label	Mean
Number of Livelihood Activities	2.68
Number of Fishing Livelihood Activities	2.16
Number of Non-Fishing Livelihood Activities	0.52

Table 38 shows the breakdown of livelihood types by region. There is no difference by region among percentages engaged in fisheries livelihoods. However, but–fishing and overall number of livelihoods shows statistically significant differences. Western and Central Regions have the lowest level s of diversification outside of fishing. The Volta region followed by Greater Accra have the highest overall number of livelihoods. These results suggest that the Central and Western regions are most dependent on fisheries and will be impacted most due to shocks in the fisheries such as declining catches, and the most in need of diversified livelihoods to improve household economic resilience.

Table 38. Comparison by region of livelihood activities per household

Region	Livelihood Activity Types	Mean
Central	Number of Livelihood Activities	2.67
	Number of Fishing Livelihood Activities	2.17
	Number of Non-Fishing Livelihood Activities	0.49
Greater Accra	Number of Livelihood Activities	2.80
	Number of Fishing Livelihood Activities	2.18
	Number of Non-Fishing Livelihood Activities	0.62
Volta	Number of Livelihood Activities	3.02
	Number of Fishing Livelihood Activities	2.32
	Number of Non-Fishing Livelihood Activities	0.70
Western	Number of Livelihood Activities	2.46
	Number of Fishing Livelihood Activities	2.08
	Number of Non-Fishing Livelihood Activities	0.38

(Regional differences in overall livelihoods F value =3.91, df=3, p < 0.01, N=481)
(Regional differences in non-fishing livelihoods F value =4.40, df=3, p < 0.01, N=481)
(Regional differences in fishing livelihoods – NS: F value =1.34, df=3, p > 0.05, N=481)

Table 39 below shows the various types of fish exploited by the fisheries households surveyed. The analysis indicates that there are statistically significant differences among the regions in terms of household dependency on small pelagic and demersal species. The Volta region and Greater Accra region have the highest dependence on small pelagics but all regions have this as the most frequently mentioned type of fish exploited (94% of households surveyed). The Central and Western region are most dependent on the demersal species.

Table 39. Percent of households exploiting different types of fish

Fish Types	Region					Chi Square P-value	N
	Central	Greater Accra	Volta	Western	All Regions		
Small Pelagic	92.63	98.28	100.00	86.54	93.59	0.0011	359
Large Pelagic	73.68	70.69	68.18	71.15	71.31	0.9199	359
Demersal	66.32	28.45	43.18	53.85	47.63	<.0001	359
Other	3.16	0.86	9.09	3.85	3.34	0.0785	359

Table 40 below shows responses as to which types of fish exploited were most important to the household in terms of livelihood. Small pelagics is overwhelmingly mentioned as the most important by 79% of households, followed by 15% for large pelagics and only 6% for demersals. There are statistically significant differences by region with Greater Accra and Volta regions most dependent on the small pelagics. Western and Central regions had high percentages reported for large pelagics (24 and 21% respectively) and the Central region ranking demersals as highest among all regions although only reported as second importance by 19 percent of respondents.

Table 40. Most important type of fish exploited per regions

Most Important Fish Type	Regions				
	Western	Greater Accra	Central	Volta	All Regions
Small pelagic	73.28	94.02	58.82	97.78	78.68
Large pelagic	24.14	5.13	20.59	2.22	14.74
Bottom Demersal	1.72	0.85	18.63	0.00	5.79
Shellfish	0.86	0.00	0.98	0.00	0.53
Other	0.00	0.00	0.98	0.00	0.26

(Chi-Square 76.66 =, DF=12, p<0.0001, N=380)

Perceptions on Quality of Life, Fishing Abundance, Catch and Effort

An overwhelming majority of respondents feel that their quality of life is worse off compared to five years ago (Table 41 below). This is not surprising since these are fishing dependent households and as most of these respondents also report that catch and abundance of fish in the sea is less compared to 5 years ago (Table 42). Greater Accra had the largest percentage reporting they are better off (41%) followed by Volta (27%). Central and Western regions had the fewest reporting they were better off.

Table 41. Perception on Quality of Life: Compared to 5 years ago

Quality of Life	Region				
	Central	Greater Accra	Volta	Western	All Regions
Better	7.43	40.81	27.27	7.01	19.83
About the same	5.45	13.90	10.39	4.21	8.24
Worse	86.63	45.29	62.34	88.79	71.79
Do not know	0.50	0.00	0.00	0.00	0.14

(Chi-Square=140.4, DF=9, p<0.001, N=716)

Table 42. Perceptions of change in fish abundance and catch compared to 5 years ago (n=716)

Change	number of small pelagic fish in the sea	number of other fish in the sea	amount of small pelagic fish you catch	amount of other fish you catch
More	14.94	7.54	12.57	7.12
About the same	7.96	10.06	6.98	9.36
Less	72.21	80.45	75.42	77.79
Do not know	4.89	1.96	5.03	5.73

Respondents also reported that fishing effort is increasing and it is increasingly difficult to catch fish (Tables 43-47). The majority of the respondents said the number of small pelagics in the sea now is less compared to five years ago. Central and Western region have the highest respondents saying it is less (90.10% and 89.25% respectively).

Table 43. Perceptions on fish abundance – small pelagic

Perceptions on Fishing Abundance, Catch and Effort	Region				
	Central	Greater Accra	Volta	Western	All Regions
More	0.00	40.36	11.69	3.74	14.94
About the same	3.47	12.56	14.29	5.14	7.96
Less	90.10	40.36	70.13	89.25	72.21
Do not know	6.44	6.73	3.90	1.87	4.89
Total	28.21	31.15	10.75	29.89	100.00

(Chi-Square 217.7634, DF 9, P<0.0001, N=716)

Most of the respondents indicated that compared to 5 years ago the quantity of other fish in the sea is less. The Central and Western regions account for the highest percentages (92.57% and 91.59%) reporting declines.

Table 44. Perception of fish abundance, other than small pelagic

Perception of fish abundance, other than small pelagic	Region				
	Central	Greater Accra	Volta	Western	All Regions
More	1.49	17.04	5.19	4.21	7.54
About the same	5.45	17.49	18.18	3.74	10.06
Less	92.57	60.09	76.62	91.59	80.45
Do not know	0.50	5.38	0.00	0.47	1.96

(Chi-Square 108.4342, DF9, P<0.0001, N=716)

The results in the table below indicate that the perceptions concerning the amount of small pelagic fish caught in the sea compared to 5 years ago has dwindled, this perception is highest in Central and Western regions (93.56% and 90.65% respectively).

Table 45. Perceptions of changes in small pelagic fish catch by region

Perceptions of changes in fish catch	Region				
	Central	Greater Accra	Volta	Western	All Regions
More	0.00	33.18	11.69	3.27	12.57
About the same	2.48	11.21	11.69	5.14	6.98
Less	93.56	47.98	64.94	90.65	75.42
Do not know	3.96	7.62	11.69	0.93	5.03

(Chi-Square 186.7710, DF 9, P<0.0001, N=716)

Looking at the table below, it is clear that over three quarters of the respondents perceive the amount of other fish caught compared to 5 years ago is also less, this perception is highest in the Western and Central regions (90.19% and 89.11%).

Table 46. Perceptions of changes in catch of fish other than small pelagics

Perceptions of changes in fish catch of fish other than small pelagics	Region				
	Central	Greater Accra	Volta	Western	All Regions
More	0.99	16.14	6.49	3.74	7.12
About the same	4.46	14.80	18.18	5.14	9.36
Less	89.11	60.54	63.64	90.19	77.79
Do not know	5.45	8.52	11.69	0.93	5.73
Total	28.21	31.15	10.75	29.89	100.00

(Chi-Square =96.8397, df=9, p<0.0001, N=716)

The table below shows that compared to 5 years ago perceptions concerning ease of catching fish near to the shore has become harder, with such cases very common in Central and Western region (94.06% and 87.85%).

Table 47. Ease of catching fish near to shore compared to 5 years ago

Compared to 5 years ago, catching fish near to shore	Region			
	Central	Greater Accra	Volta	Western
Easier	3.96	44.39	14.29	4.21
No change	1.49	2.69	6.49	5.61
Harder	94.06	43.95	72.73	87.85
Do not know	0.50	8.97	6.49	2.34

(df = 3, p<0.0001, N=716)

The table 48 below shows overall that fishermen perceive they spend more time to catch the same amount of fish compared to 5 years ago. There are statistically significant differences among the coastal regions. The Western and Central regions account for the highest frequency of responses (80.84% and 77.72%) indicating more time is needed to catch the same amount of fish, an indicator of increased fishing effort.

Table 48. Time to catch same amount of fish compared to 5 years ago,

Compared to 5 years ago, time to catch same amount of fish	Region				
	Central	Greater Accra	Volta	Western	All Regions
less time	2.97	36.32	20.78	3.74	15.50
same time	4.46	7.17	10.39	5.14	6.15
more time	77.72	42.15	55.84	80.84	65.22
Do not know	14.85	14.35	12.99	10.28	13.13

(Chi Square 141.35*, DF=9, p<0.0001, N=716)*

There is statistically significance differences across the surveyed regions in terms of perceptions of the amount of fish caught compared to 5 years ago. The largest responses where the need to use bigger nets to catch the same amount of fish (e.g. more fishing effort needed to catch same amount of fish).

Table 49. Amount of fish caught compared to 5 years ago

Compared to 5 years ago, the amount of fish caught	Region				
	Central	Greater Accra	Volta	Western	All Regions
more fish, same size net	1.49	24.22	9.09	2.80	9.78
same fish, same size net	22.28	4.35	22.08	24.30	20.39
bigger nets, same fish	40.59	31.39	35.06	47.66	39.25
Do not know	35.64	30.04	33.77	25.23	30.59

(Chi Square 90.2672, *df =9, p*<.0001, N = 716)

The results below (Table 50) show the responses to perceived causes of the changes in fish abundance, catch and effort reported above. Illegal fishing is the most frequent response overall followed by an increasing number of canoes, inshore and trawlers taking the fish and primarily the actions of fishermen. Illegal fishing was most frequently mentioned in the Western region (81.05%) followed by the Central Region (57.01%) and least in Volta Region (12.70%). Oil development had a very low frequency of response but was reported more frequently in the Western Region (5.26%) and very low everywhere else.

Table 50. Main reasons for the changes mentioned

Main reasons for the changes	Region					Chi-square P-Value
	Central	Greater Accra	Volta	Western	All Regions	
Illegal fishing	57.06	43.50	12.70	81.05	56.01	<.0001
Increased Number of Canoes	25.99	30.51	33.33	21.58	26.69	0.1497
China China & Trawlers taking the fish	15.82	20.34	6.35	13.16	15.32	0.0447
Primarily actions of Fishermen	10.73	14.69	11.11	17.89	14.17	0.2205
God Will	18.08	9.60	9.52	13.68	13.34	0.0942
Increased No. of China China & Trawlers	14.12	15.25	4.76	10.00	12.19	0.0992
Other	9.04	22.03	17.46	2.63	11.70	<.0001
Sea Conditions have Changed	7.91	15.25	34.92	1.58	10.87	<.0001
Oil and Gas Development	0.00	0.56	0.00	5.26	1.81	0.0003
Sea Spirits	1.13	1.13	0.00	0.53	0.82	0.7686
Algal blooms	0.00	0.00	0.00	0.00	0.00	

Law Enforcement and Regulatory Compliance

The following indicators are designed to try to identify which illegal fishing practices are most serious, who are perceived to be the primary actors in illegal fishing and assess a baseline of a number of factors that influence decisions of fishers to engage in illegal fishing or not. The identification of who is conducting illegal fishing and what types of illegal fishing can help inform law enforcement authorities on developing smart targeted enforcement strategies. The latter factors influencing illegal behavior can help in designing interventions targeting those factors which are weakest and therefore most likely to result in improved compliance. The factors influencing illegal behavior are based on the socio-economic theory of regulatory deterrence (Sutinen and Kuperan, 1999). These include probability of detection, severity of the penalty, degree of legitimacy and fairness in rule making and in the administration of justice as well as social norms, peer influence.

Perceptions on Illegal Fishing Practices

The following tables present respondent perceptions of illegal fishing practices. Respondents in the Volta region overwhelmingly perceive light fishing has decreased a lot (85%). Respondents in Greater Accra perceive it has increased a lot (79%). In the Central and Western regions, a majority perceive light fishing to have increased somewhat or a lot. Overall, the majority of respondents perceive the problem is increasing. The differences on perceptions of illegal fishing between regions are statistically significant in all the tables shown below.

Table 51. Level of illegal light fishing among fishermen compared to 5 years ago

Changes in light fishing	Region				
	Central	Greater Accra	Volta	Western	All Regions
Decreased a lot	14.36	4.93	84.42	10.28	17.74
Decreased somewhat	6.93	4.48	0.00	6.07	5.17
Stayed about the same	3.96	2.24	0.00	3.27	2.79
Increased somewhat	27.23	6.28	1.30	24.30	17.04
Increased a lot	40.59	78.92	1.30	51.87	51.68
Do not know	6.93	3.14	12.99	4.21	5.59
N	202	223	77	214	716

(Chi-Square Statistic: DF=15 Value=362.1766 Probe <0.0001)

The increase in the use of fine mesh nets does not as dramatic a change as light fishing. However, a majority of respondents overall say it has increased a lot or somewhat (52%). Comparing responses between regions, Greater Accra has the highest responses of increased a lot whereas Volta has the highest responses of decreased a lot.

Table 52. Level of illegal use of fine mesh nets among fishermen compared to 5 years ago

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Decreased a lot	17.33	13.45	23.38	18.22	17.04
Decreased somewhat	13.37	4.48	1.30	11.68	8.80
Stayed about the same	17.33	7.17	6.49	15.89	12.57
Increased somewhat	13.86	16.59	22.08	14.95	15.92
Increased a lot	28.22	47.98	31.17	33.18	36.17
Do not know	9.90	10.31	15.58	6.07	9.50
N	202	223	77	214	716

(Chi-Square Statistic: DF=15 Value=54.6 Probe <0.0001)

The perceptions concerning the changes in bomb fishing show that most respondents perceived it has decreased a lot with the greatest perceived change in p decreases in the Volta region. The results are similar with respect to carbide fishing.

Table 53. Level of illegal bomb fishing among fishermen compared to 5 years ago

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Decreased a lot	79.21	40.81	79.22	43.46	56.56
Decreased somewhat	1.49	1.35	0.00	5.14	2.37
Stayed about the same	0.99	0.45	1.30	11.68	4.05
Increased somewhat	0.99	1.35	1.30	5.14	2.37
Increased a lot	0.50	1.79	0.00	11.21	4.05
Do not know	16.83	54.26	18.18	23.36	30.59
N	202	223	77	214	716

(Chi-square: df=15, Value==206.2, p<0.01)

As with bomb fishing, perceptions of carbide fishing are that it has decreased a lot, with the Central and Volta regions reporting the greatest frequency of responses in this category.

Table 54. Level of illegal carbide fishing among fishermen compared to 5 years ago

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Decreased a lot	78.22	40.81	74.03	42.06	55.31
Decreased somewhat	3.96	0.90	0.00	4.67	2.79
Stayed about the same	0.99	0.90	2.60	13.08	4.75
Increased somewhat	1.98	0.90	2.60	5.14	2.65
Increased a lot	0.50	2.69	0.00	10.75	4.19
Do not know	14.36	53.81	20.78	24.30	30.31
N	202	223	77	214	716

(Chi-square: df=15, Value = 196.4, p<0.01)

Overall, it would seem that the major issues perceived by respondents are increases in light fishing and use of fine mesh nets, with much less concerns expressed about bomb and carbide fishing. In addition, the Volta region seems to be a region where illegal fishing is perceived to be on the decline. This suggests that enforcement efforts should be concentrated in regions where perceptions in illegal fishing are higher – Central, Western and Greater Accra regions, and on those illegal activities perceived to be on the increase- light fishing and use of fine mesh nets.

Knowledge of Fishing Laws

Respondents were asked about their general knowledge of fishing laws. The responses are noted in the table below. Approximately two-thirds of respondents said they were barely or not at all aware of the fishing laws. Regional differences are statistically significant with the Central Region showing the least knowledge and Volta Region with the highest knowledge.

Table 55. Awareness of fishing regulations

Response (% of respondents)	Region				
	Central	Greater Accra	Volta	Western	All Regions
Very	2.48	4.04	9.09	3.27	3.91
Somewhat	19.31	37.22	35.06	38.32	32.26
Barely/Not At All	78.22	58.74	55.84	58.41	63.83

(Chi square = 30.61, df=6, p<0.001, N=716)

Respondents were tested on knowledge of fishing laws by stating a number of fishing practices and asking respondents to note for each, which were illegal. The list of practices is shown below:

1. Set gill nets
2. Monofilament nets (i.e. Rubber Nets, Sika Ye Abrantie)
3. Nets with mesh sizes smaller than 2.5cm
4. Beach seines
5. Fishing with lights
6. Nets with mesh sizes greater than 10cm
7. Catching of sword fish
8. Fish transferred from trawlers to canoes and then brought to shore (i.e. Saiko)
9. Catching of sea turtles
10. "Ali Poli Watcha" nets
11. Use of dynamite
12. Drift gill nets

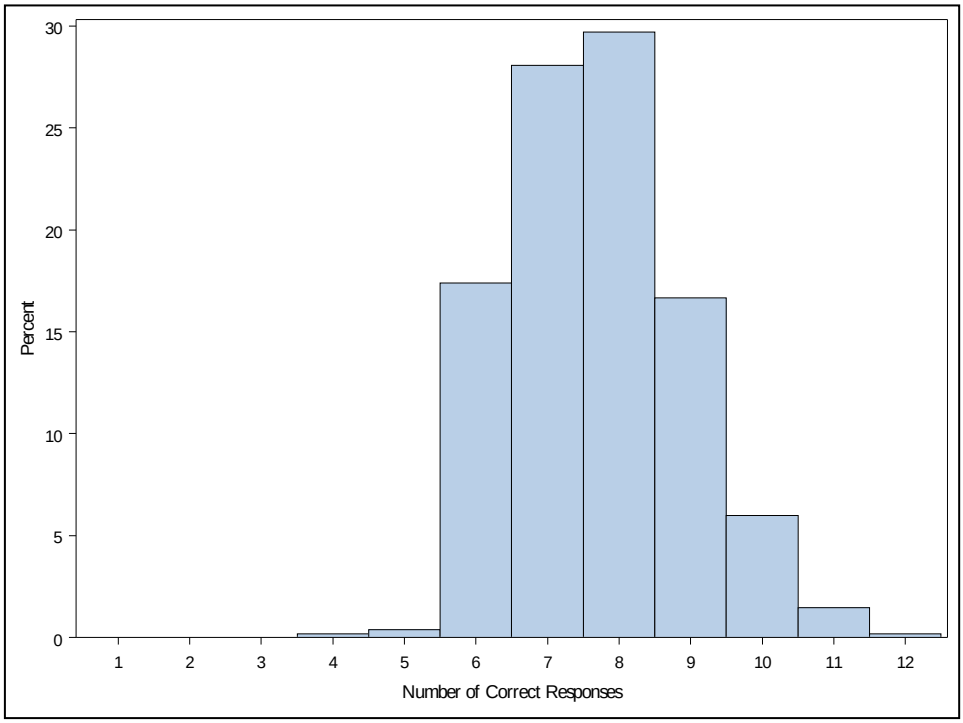
Some of these are illegal and others are legal activities. The number of correct responses was summed for a total score on fishing knowledge from 0 to 12, with 12 representing a perfect score and 0 representing no correct responses at all. The summary statistics on the scores are noted in the table below.

Table 56. Scoring on actual knowledge of fisheries laws

Statistics					
Mean	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
7.69	4.00	7.00	8.00	8.00	12.00

The frequency distribution of all responses is shown in the figure below with the median being 8 correct responses and a mean of 7.69, or a “grade” of 64%. This would tend to suggest a higher knowledge on at least some specific fishing laws than the previous question infers where 64% said they barely knew or did not know at all the laws.

Figure 13. Frequency distribution of number of correct responses on fisheries laws



Regional differences in scores are shown in the table below and are statistically significant. Greater Accra had the highest mean followed by Volta and the Western region, whereas the Central region had the lowest score.

Table 57. Frequency distribution of correct responses by region

Region	Mean of Correct Responses
Central	7.30
Greater Accra	8.02
Volta	7.71
Western	7.66

(Least Square Means F value = 9.07, df=3, p<0.0001, N=552)

Perceptions concerning who is conducting illegal fishing practices are presented in the table below. Results between each region for each fleet type are statistically significant except for the Ghanaian trawler responses. The inshore (china-china) boats are perceived as the most likely to be illegally fishing followed by canoes. Ghanaian trawlers and foreign trawlers were least frequently mentioned. The inshore fleet is most frequently mentioned in Greater Accra and Volta, whereas the canoes are most frequently mentioned in the Central and Western Regions. Foreigners are mentioned more frequently in Greater Accra and Volta than in the Central and Western Region. While perceptions may not be fully correlated with who is actually doing illegal fishing, the perceptions are based on local knowledge of individuals that are engaged in fishing and on the water quite frequently. Hence, these can be used as an indirect indicator of illegal fishing by whom. It can provide some insights for law enforcement for targeting monitoring and surveillance activities in specific areas and on specific fleets.

Table 58. Perception of who is conducting illegal fishing practices (N=474)

Fleet Type	Region					Chi-square p value
	Central	Greater Accra	Volta	Western	All Regions	
China china / inshore	56.52	75.00	65.38	47.75	58.86	<0.0001
Canoe	54.35	41.67	26.92	57.87	50.63	0.0022
Ghanaian trawler	29.71	21.97	26.92	39.33	31.01	0.0112
Foreign trawler	5.80	30.30	42.31	6.74	14.98	<0.0001

The results of perceptions of respondents of who is the most frequent violator of fishing laws is shown in the table below is similar to the table above. The inshore and canoe fleets are seen as the most frequent violators of the law. The inshore fleet is seen as the most frequent violator in Greater Accra and Volta whereas canoes are seen as the most frequent violator in the Central and Western regions.

Table 59. Perception of who is the most frequent illegal actor

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
China china / inshore	44.20	62.12	53.85	35.96	46.62
Canoe	44.20	27.27	11.54	45.51	38.19
Ghanaian trawler	9.42	6.06	15.38	16.85	11.60
Foreign trawler	2.17	4.55	19.23	1.69	3.59

(Chi square = 53.6, df=9, p<0.0001, N=474)

Perceptions on Deterrence

Respondents were asked the frequency they see law enforcement officers patrolling or talking to the public. Responses are shown in the tables below. Responses between regions is statistically significant in all three tables below. Over two thirds of respondents said they rarely or never saw law enforcement patrols on the beach. Volta had the highest response in the never category (73%) followed by the Central region (46%).

Table 60. Frequency distribution of observing law enforcement officers on the beaches

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	45.54	23.32	72.73	15.89	32.68
Rarely	27.72	52.47	16.88	38.32	37.43
Frequently	17.33	16.59	5.19	38.32	22.07
All the time	0.00	0.45	0.00	1.40	0.56
Do not know	9.41	7.17	5.19	6.07	7.26

(Chi square=146.9, df=12, p<0.0001, N=716)

Law enforcement was seen more often at sea with fewer frequency of responses overall in never and rarely categories and more responses in the frequently category.

Table 61. Frequency distribution of observing marine patrols at sea

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	30.20	17.04	46.75	14.02	23.04
Rarely	32.18	43.50	23.38	31.78	34.64
Frequently	19.31	27.80	9.09	41.59	27.51
All the time	0.50	0.45	0.00	0.93	0.56
Do not know	17.82	11.21	20.78	11.68	14.25

(Chi square = 80.5, df=12, p<0.001, N=716)

On interactions with enforcement personnel, more than half said they never interact with law enforcement officers and one-quarter said only rarely. Less than 10 % said they frequently interact with law enforcement officers.

Table 62. Frequency of interaction with fisheries enforcement officers

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	60.40	40.81	66.23	56.54	53.77
Rarely	20.79	34.08	16.88	25.23	25.84
Frequently	2.97	14.35	5.19	9.35	8.66
Do not know	15.84	10.76	11.69	8.88	11.73

(Chi square=43.07, df=9, p<0.0001, N=716)

The above findings on interactions and visibility law enforcement officers suggest that probability of detection if conducting illegal activities is quite low, indicating this is a weak factor influencing deterrence.

Perceptions of Legitimacy of the Legal Process

Approximately two thirds of the respondents believe that if laws were obeyed, catches will increase. Only 13 percent said it would not change catch. This is a positive trend as it indicates a belief that the laws have technical legitimacy. The Volta and Greater Accra regions had the highest responses that it would not increase catch (21 and 29% respectively).

Table 63. Frequency distribution of beliefs concerning changes in fish catch if laws obeyed

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Will increase catches	69.31	46.19	58.44	83.18	65.08
Will not change catch	5.45	28.70	20.78	1.40	13.13
Do not know	25.25	25.11	20.78	15.42	21.79

(Chi Square = 106.4467, df=6, p <.0001, N= 716)

Respondents were asked the likelihood a person would be arrested if fishing with illegal methods. The most frequent response overall was rarely although Greater Accra had frequently as the most frequent response and Volta regions most frequent response was not at all. As approximately half the respondents responded never or rarely, it suggests probability of detection and apprehension is low, not acting as much of a deterrence against illegal fishing.

Table 64. Likelihood of arrest of a fishermen

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	17.82	9.87	35.06	12.62	15.64
Rarely	34.16	37.22	23.38	41.59	36.17
Frequently	29.21	38.57	22.08	35.98	33.38
All the time	1.49	0.45	5.19	0.93	1.40
Do not know	17.33	13.90	14.29	8.88	13.41
Total	28.21	31.15	10.75	29.89	100.00

(Chi-Square =52.337, df=12, p < .0001)

The table below shows the perceptions of respondents regarding the likelihood that if arrested, a person would be fined or go to jail or have gear confiscated. Slightly less than half responded never or rarely and slightly more than one third responded frequently. Volta region had the least frequency of responses in the frequently category.

Table 65. Likelihood if arrested the person will get fined, have gear confiscated or go to jail

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	13.86	7.17	6.36	14.02	14.25
Rarely	34.65	39.91	28.57	23.36	32.26
Frequently	32.67	40.81	15.58	44.86	37.01
All the time	0.99	2.69	3.90	1.87	2.09
Do not know	17.82	9.42	15.58	15.89	14.39

(Chi Square =52.337, df =12, P value <.0001, N =716)

The table below shows the likelihood if arrested, the person will not go to jail to interventions of politicians or high level officials. Overall the most frequent response (36%) was never followed by rarely (21%). Frequently was the highest frequency of response in Greater Accra (36%).

Table 66. Likelihood if arrested will not go to jail due to interventions of politicians

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	33.17	26.91	49.35	42.99	35.89
Rarely	27.23	18.83	23.38	16.36	20.95
Frequently	11.39	36.32	3.90	7.01	17.04
All the time	0.00	2.24	0.00	0.47	0.84
Do not know	28.22	15.70	23.38	33.18	25.28

(Chi Square 113.9907, df=12, p <.0001, N= 716)

The table below shows the frequency of responses concerning the adequacy of the severity of penalties. The majority of respondents did not know. More respondents stated they are severe and prevent illegal fishing than said they are too small. The large number of I do not know responses may indicate poor knowledge of the penalties for illegal fishing (e.g. level of fine or jail time).

Table 67. Frequency that penalties applied for illegal fishing are adequate to serve as a deterrence

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
penalties are so small, it does not stop anyone from illegal fishing	13.86	30.49	27.27	10.28	19.41
penalties are very severe and prevent fishermen from illegal fishing	19.80	30.49	10.39	32.71	25.98
Do not know	66.34	39.01	62.34	57.01	54.61

(Chi Square 60.694, df=6, p<.0001 N =716)

The following table shows responses to the question as to what a person would do if they see someone illegally fishing. The most frequent response was they would do nothing (36%). This suggests that very little peer pressure on those illegally fishing. The second most frequent response was report them to the chief fishermen (33%) which indicates chief fishermen have a significant amount of moral authority among respondents. Only two percent said they would report illegal fishers to the police.

Table 68. Legitimacy of legal process Moral suasion: what would you do?

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Report them to police	1.49	3.14	6.49	0.47	2.23
Report them to chief fisherman	40.59	29.15	49.35	23.36	32.82
Stop socializing with them	0.00	0.45	0.00	0.00	0.14
Tell them to stop fishing those methods	25.25	35.87	22.08	27.57	28.91
Nothing, ignore it	32.67	31.39	22.08	48.60	35.89

(Chi Square 51.2678, df=12, P-value <.0001, N=716)

Perceptions of Opinion Leaders in Fisheries

The following table (Table 69) shows responses to the question of who respondents respect most to advise them on good and bad fishing practices. An overwhelming majority stated the Chief Fishermen (84%). All other choices had frequencies below 10%, although Fisheries Commission personnel was second most frequent response at 6 percent of respondents. Chief fishermen as trusted and respected individuals may be able to serve therefore as strong figures for moral authority on good fishing practices.

Table 69. Who do your respect most?

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Fisheries Commission Official	5.45	3.59	9.09	6.54	5.59
Chief Fisherman	86.63	85.20	81.82	79.91	83.66
Local Government Official	1.49	4.48	2.60	3.27	3.07
Chief Fishmonger	0.99	3.59	1.30	7.01	3.63
Police	1.49	0.45	3.90	0.93	1.26
Traditional Leader	3.96	2.69	1.30	2.34	2.79

(Chi Square 26.7169, df =15, P-value 0.0311, N = 716)

The following table shows responses concerning respondent opinions of whether law enforcement officers ever accepted a bribe to not arrest someone for illegal fishing. Most responded they did not know. Those that responded never or rarely was 46 percent combined. Only 19% said frequently or all the time.

Table 70. Perceptions as to whether law enforcement officers ever accept payment to not arrest a person for illegal fishing

Perception that law enforcement officers accept payments to not arrest	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	19.80	31.39	46.75	21.50	26.82
Rarely	18.81	15.70	11.69	23.83	18.58
Frequently	12.38	18.39	7.79	13.55	14.11
All the time	1.49	10.31	0.00	3.74	4.75
Do not know	47.52	24.22	33.77	37.38	35.75

(Chi Square 70.384, df=12, p <.0001, N= 716)

The following tables shows responses on an indicator of participation in regulatory decision making. Regarding the Fisheries Commission asking for input, ten percent said frequently but an overwhelming majority (83%) said never or rarely with never the most frequent response (59%).

Table 71. If ever asked for input on fisheries laws by fisheries commission

Input on fisheries laws by fisheries commission	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	74.75	53.81	61.04	48.60	58.94
Rarely	13.86	24.66	16.88	29.91	22.35
Frequently	5.94	12.11	10.39	11.21	9.92
Do not know	5.45	9.42	11.69	10.28	8.80

(Chi Square 35.6752, df=9, p <.0001, N =716)

Regarding whether local government officials ever ask for input on fishing laws, the results were similar with the Fisheries Commission. Most said never (62%) or rarely (22%).

Table 72. If ever asked for Input on fishery laws by local government

Perception on Local Government	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	76.73	58.30	50.65	55.61	61.87
Rarely	14.85	21.97	23.38	26.64	21.51
Frequently	3.96	11.66	15.58	5.61	8.10
Do not know	4.46	8.07	10.39	12.15	8.52

(Chi Square 79.0954, DF 12, P value <.0001, N =716)

The following table shows responses regarding if respondents were ever asked about fishing laws by chief fishermen or traditional leaders. In contracts to the above tables regarding the Fisheries Commission and Local Government, a much larger number of respondents said frequently (29%), although the most frequent response was never (37%). The third most frequent response was rarely (28%).

Table 73. If ever asked for Input on fishery laws by chief fishermen or traditional leaders

Response	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	56.44	36.77	24.68	22.90	36.87
Rarely	23.27	25.11	18.18	37.38	27.51
Frequently	16.34	31.84	49.35	29.44	28.63
All the time	0.50	0.00	1.30	0.47	0.42
Do not know	3.47	6.28	6.49	9.81	6.56

(Chi square = 79.1, df=12, p<0.0001, N=716)

Regarding responses of who should be involved in making fisheries rules, The overwhelming majority said the Chief Fishermen (80%) followed by fishermen themselves (56%). Responses here can sum to more than 100% as respondents could choose more than one response.

Table 74. Who should be involved in making fishery rules

Response	Region					Chi square P-value
	Central	Greater Accra	Volta	Western	All Regions	
Chief Fisherman	81.59	75.34	74.03	85.05	79.89	0.0389
Fishermen	56.72	57.08	48.05	57.94	56.26	0.487
Traditional Leaders	9.45	15.98	15.58	9.35	12.10	0.0774
Fisheries Commission	13.93	5.02	16.88	7.01	9.42	0.0010
Parliament	11.94	7.76	0.00	9.81	8.72	0.014
Fish processors	4.48	11.42	7.79	8.88	8.30	0.0795
Local Government	2.49	9.13	10.39	9.35	7.45	0.0173
Environmental groups	0.00	0.00	0.00	0.47	0.14	0.5076

N=711

From the above findings it is very clear that chief fishermen play a significant influence in the opinions of people regarding fisheries management, and much more than other traditional leaders or government officials. These findings suggest that chief fishermen should play a string role in promoting good and sustainable fishing practices and be involved in making rules concerning how to manage the fishery sustainably.

Perceptions of Child Labor and Trafficking

The following questions describe the knowledge, attitudes and perceptions of prevalence of child labor and trafficking in the fisheries sector. Knowledge and attitudes responses will provide insights into messages for the communications campaign against child labor and trafficking. Perceptions is used as an indirect measure of actual prevalence of these practices

Attitudes

Table 75 shows respondents attitudes various forms of child labor practices. It should be noted that only a small percentage of people responded that it is acceptable for a parent to take payment from a person who promises to take care of the child at a location outside the community regardless of age. Western region has the highest percentage of respondents indicating it is acceptable to have a child of under 15 or from 15- 18 years working on a fishing vessel, flowed by Greater Accra, with Central and Volta regions having the lowest frequency responses in this category. The high percentages in the Western region are

alarming given that fishing on a vessel below age of 18 is illegal. Concerning shore based labor at any time of the day, the Western region also has the highest percentages followed by the Central region.

Table 75. Perceptions concerning acceptable labor practices acceptable to allow

Labor Practice	Region					Chi-square P-value
	Central	Greater Accra	Volta	Western	All Regions	
Child funder 15 can work on a fishing vessel	11.17	16.22	6.35	43.84	22.70	**<0.0001**
Child under 15 can sell or smoke fish afterschool	96.65	95.68	100.0	98.52	97.30	0.168
Child under 15 can sell or smoke fish any time of day	17.32	9.73	6.35	39.90	21.27	**<0.0001**
Parent can take payment for child under 15 to be trafficked	0.56	3.78	1.59	4.43	2.86	0.104
Children between ages 15 – 18 can work on a fishing vessel	14.53	25.40	11.11	46.08	27.56	**<0.0001**
Child between 15-18 can sell or smoke fish after school	94.97	94.71	100.00	96.08	95.75	0.3057
Child between 15-18 can sell or smoke fish any time of day	20.11	10.58	7.94	39.71	22.36	**<0.0001**
Parent can take payment for child between 15-18 to be trafficked	0.56	3.70	1.59	4.90	2.99	0.0727

Prevalence

The tables below shows respondents perceptions of prevalence of child labor and trafficking practices. Table 76 shows that perceptions of prevalence of children fishing on fishing vessels is highest in the Central and Western regions and lower frequencies in Greater Accra and the Volta regions. Table 77 and 78 show similar results that perception of prevalence of shore based child labor is highest in the Western region followed by the Central region and lowest in Greater Accra and the Volta regions.

Table 76. Perceptions of respondents of prevalence of parents allowing children < 15 to go fishing

Prevalence	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	12.38	17.04	23.38	4.67	12.71
Rarely	45.54	50.22	18.18	28.50	38.97
Frequently	39.60	28.25	51.95	44.39	38.83
All the time	0.00	2.24	5.19	20.09	7.26
Do not know	2.48	2.24	1.30	2.34	2.23
N	202	223	77	214	716

(Chi-Square 0= 128.4356, DF=12, p<0.0001)

Table 77. Perceptions of respondents of prevalence of parents allowing children < 15 to work during school hours to smoke fish

Prevalence	Region				
	Central	Greater Accra	Volta	Western	All Regions
Not at all / Never	20.79	24.22	35.06	19.16	22.91
Rarely	42.08	49.33	40.26	37.85	42.88
Frequently	33.17	23.32	22.08	36.45	29.89
All the time	0.00	1.35	0.00	4.67	1.82
Do not know	3.96	1.79	2.60	1.87	2.51
N	202	223	77	214	716

(Chi-square: df = 12, Value = 36.5, p<0.01)

Table 78. Perceptions of respondents of prevalence of parents allowing children < 15 to work during school to sell fish

Prevalence	Region				All Regions
	Central	Greater Accra	Volta	Western	
Not at all / Never	23.27	28.25	37.66	22.90	26.26
Rarely	38.61	46.64	36.36	33.18	39.25
Frequently	34.65	22.42	22.08	35.98	29.89
All the time	0.00	1.35	0.00	6.07	2.23
Do not know	3.47	1.35	3.90	1.87	2.37
N	202	223	77	214	716

(Chi-square: df = 12, Value = 45.11, p<0.001)

Table 79 below shows the perception of prevalence of child trafficking as highest in the Central region with the most "Many" responses and Greater Accra and Volta have the highest percentages of "No one ever" responses.

Table 79. Perceptions of respondents of prevalence of parents taking payments from a person to take care of child at location outside the community

Prevalence	Region				All Regions
	Central	Greater Accra	Volta	Western	
No one ever	45.5	78.92	68.83	41.59	57.26
Only a few	42.08	15.70	28.57	54.67	36.17
Many	12.38	5.38	2.60	3.74	6.56
N	202	223	77	214	716

(Chi-square: df = 6, Value = 98.40, p<0.001)

While the Chi-square analysis indicates statistically different differences across regions concerning prevalence of child labor practices, it does not provide an overall score on level of prevalence. Therefore, prevalence responses were converted to into a Likert scale from 1 to 3 (1= no one ever, 2=only a few, 3=many), with a higher score representing a higher perceived prevalence. These scores were then analyzed using a general linear model to determine if these differences in means are statistically significantly different. The scores on all four indicators were then summed to derive an overall child labor and trafficking score for each region. These results are reported in the Table 80 below. All differences between regions per

the four indicator are statistically significant. Comparing the sum of the scores, the Western region has an overall higher prevalence score followed by the Central Region, with Greater Accra and the Volta regions having similar and lowers overall scores. The higher score for the Western Region is attributed to the high scores on allowing children to under 15 to go fishing and work during schools hours. The Central and Western regions have similar trafficking scores with

Table 80. Differences between regions in the perceived prevalence of child labor and trafficking practices

		Mean score				
		Child labor			Trafficking	CLaT Score
		parents allowing children < 15 to go fishing	parents allowing children < 15 to work during school hours smoking fish	parents allowing children < 15 to work during school hours selling fish	practice of parents taking payments from a person to take care of child at location outside your community	Sum of all mean scores
Region	Central	2.28	2.13	2.12	1.67	8.2
	Greater Accra	2.16	2.02	1.97	1.26	7.41
	Volta	2.39	1.87	1.84	1.34	7.44
	Western	2.82	2.27	2.26	1.62	8.97
Statistics	N	700	698	699	716	
	F value	29.70	6.67	7.23	22.08	
	P	<0.0001	0.0002	<.0001	<.0001	

Knowledge

Respondents were asked about their knowledge of what practices are illegal under Ghana laws with respect to child labor and trafficking in the fisheries sector, which practices did they believe were illegal. Not all of the practices listed in the table below are illegal (e.g. selling fish after school for children between the ages of 15-18 years) and these are noted in the table as well. All child labor under the age of 15 is considered illegal and fishing is considered a dangerous labor practice and prohibited for children under 18 years of age. Child trafficking here is defined as someone paying money to take a child away and say they will care for them. Working after school even between the ages of 15-18 years of age is defined as illegal for the analysis here as this means they could be working during school hours which is prohibited.

For each practice, respondents were asked whether they thought the practice was illegal or not. The responses in the table below are the percent of correct responses that the stated practice is illegal or not. A summary score per region was calculated by summing the percentage of correct responses. For those practices that were legal, the percentage believing the practice to be illegal was subtracted from 100 to get the percentage that believed the practice is legal and number of correct responses. Scores were summed for all indicators as

well as disaggregated by illegal labor and trafficking working under the age of 15 and between 15-18 years of age. In these cases a higher score represents a more accurate knowledge of the laws on illegal child labor and trafficking.

The results are shown in table 81. The Western Region had the lowest scores on both child labor and trafficking summary scores, followed by the Central Region. The Volta Region had the highest scores on all the summary measures. The individual and summary child trafficking knowledge indicators show that least knowledge in the Central and Western Regions. There were particularly low summary scores on children working under the age of 15 where that is illegal under Ghana's laws. There were also low average scores for indicators of children working at any time of the day between the ages of 15-18 years which is also not legal if during school hours. These results point to areas where greater awareness of the existing laws is needed.

Table 81. Knowledge on illegal child labor and trafficking practices

Practice (% respondents with correct responses as to whether the practice is illegal)	Region					Chi-square P value	N
	Central	Greater Accra	Volta	Western	All Regions		
Children < 15 years Working on a fishing vessel (Illegal)	83.76	77.29	82.89	65.71	76.23	0.0001	690
Children < 15 years selling fish or smoking fish after school (Illegal)	14.21	16.91	15.79	10.48	14.06	0.2822	690
Children < 15 years selling fish or smoking fish any time of day (Illegal)	57.36	65.22	76.32	45.71	58.26	<.0001	690
Children < 15 years: parent taking payment from a person at a location outside of the community (Illegal)	80.71	92.27	94.74	74.76	83.91	<.0001	690
Summary Score working <15 years of age	***236.04***	***251.69***	***269.74***	***196.66***	***232.46***		
Children between 15-18 years working on a fishing vessel (Illegal)	75.63	73.43	72.37	60.39	70.01	0.0038	687
Children between 15-18 years selling fish or smoking fish after school (Legal)	88.32	84.54	82.89	89.86	87.05	0.2564	687
children between 15-18 years selling fish or smoking fish any time of day (Illegal)	57.36	62.80	75.00	30.43	52.84	<.0001	687
Children between 15-18 years: Parent taking payment from a person at a location outside of the community (Illegal)	82.74	91.79	94.74	78.74	85.59	0.0001	687
Summary Score working 15-18 years of age	***304.05***	***312.56***	***325.00***	***259.42***	***295.49***		
Summary illegal labor Score	***376.64***	***380.19***	***405.26***	***302.58***	***358.45***		
Summary trafficking Score	***163.45***	***184.06***	***189.48***	***153.5***	***169.5***		
Summary knowledge Score	***540.09***	***564.25***	***594.74***	***456.08***	***527.95***		

Empowerment Index

The following indicators look at empowerment of men and women with respect to ownership of household assets and role in decision making. These questions are the same subset of an extended list of questions used in the FtF baseline survey to create a women's empowerment index, except for those related specifically to fishing activities. These same questions are asked of men and women as it is expected their answers will vary, revealing certain gender biases and roles, even when talking about ownership of assets and decision making within the

same household. An index is not created here in this report but the responses per question are reported below. These indicators provide insights into the level of empowerment of women versus men in various dimensions and can be used to help tailor SFMP's gender strategy.

Role in Household Decision making

Table 82 below shows that fishing and aquaculture was carried out 79 percent of the males interviewed and by less than one percent of females. Fishing and aquaculture are clearly male dominated activities. However, Table 83 shows who makes decisions about fishing activities among those that said they fish or conduct aquaculture. All women said they make inputs into most decisions whereas 55.6 % of men said they had input into most or all decisions. Of men, 44.1% said they had no, very few or only some inputs into decisions on fishing where no women mentioned any of those categories. This suggests that women play a powerful role in decision making concerning fishing and aquaculture activities even though they do not engage in these activities. These are statistically significant differences.

Table 82. Individual participation in fishing or aquaculture in the last 12 months by gender

Response	Male	Female
Yes	79.0	0.2
No	21.0	99.8

(N=716, Chi-Square=485.531, df=1.000,p< 0.001)

Table 83. Who makes decisions on fishing in the last 12 months

Category	Male	Female
No input	7.1	0.0
Input into very few decisions	10.0	0.0
Input into some decisions	27.0	0.0
Input into most decisions	27.0	100.0
Input into all decisions	28.6	0.0
No decision made	0.4	0.0

(Goodman –Kruskal Lambda = 0.211, 0.040, Z=5.341, p<0.001, N=242)

Access to Productive Capital

Table 84 shows the responses as to household ownership of fishing vessels/gear. Men tend to say yes more frequently than women. Table 85 shows responses concerning who owns the fishing boat or gear, whereas men tend to say that the gear is owned by them. Women report higher frequencies as jointly owned with them or by another person in the household.

Table 84. Household ownership fishing boats or gear

Ownership	Male	Female
Yes	63.3	49.9
No	36.7	50.1

(Pearson Chi-Square=12.734, df=1.000, p<0.001, N=716)

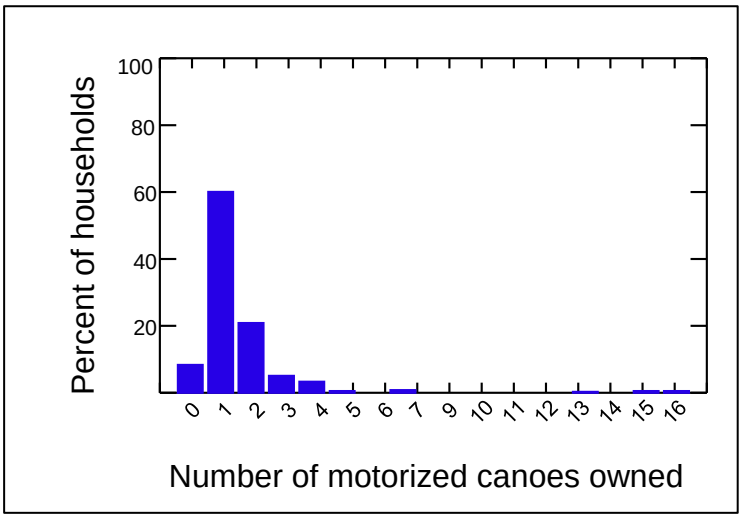
Table 85. Who owns the fishing boats/gear

Response	Male	Female
Self	47.150	4.878
Partner / Spouse	1.036	32.683
Other household member(s)	33.161	54.146
Self and other household member(s)	13.472	2.439
Partner/Spouse and other household member(s)	0.518	4.390
Someone (or group of people) outside the household	3.627	0.976
Self and other outside people	1.036	0.488

(Chi-Square, 162.338, df=6.000, p<0.01, N= 398)

Figure 14 shows the number of motorized canoes owned by those that reported vessel ownership. Approximately 8% of respondents reported no motorized canoe ownership, 60% reported owning one motorized canoe and 21 % reported owning two. Approximately 11% own more than two motorized canoes. Eighty two percent of respondents reported no ownership on non-motorized canoes and 14% reported owning one and approximately 4% reported owning more than one. None of these differences in number of canoes owned varied significantly between responses of men and women. No respondents reported owning any semi-industrial vessels and one reported owning a trawl vessel.

Figure 14. Number of motorized canoes owned by those owning fishing boats



On household ownership of fishing gear, there were no significant differences between responses by gender. Approximately 2% reported no gear ownership, 42% reported owning one gear, 25% two gears, 9% three gears, and 12% reported owning 4 or more fishing gears.

Percentage of respondents reporting household ownership of fish smokers (Table 86) varied by gender with 90% of women reporting ownership and 77% of men reporting ownership.

Table 86. Ownership of fish smokers

Response (%)	Male	Female	Total
Yes	77.4	90.3	84.8
No	22.6	9.7	15.2

(Pearson Chi-Square= 22.542, df=1.000, p< 0.001, N=716)

Table 87 shows the responses to ownership of the smokers which differed significantly. 68% of women reported owning the smokers themselves compared to only 5% of men. 53% of men reported another household member owning the smokers and 36% reported joint ownership. This result contrasts sharply with boat and gear ownership which is more in the hands of men. Fish smoking clearly not only a women's activity but they also control the assets for this activity as well.

Table 87. Ownership of fish smokers

Response (%)	Male	Female	Total
Self	4.7	67.9	43.3
Partner / Spouse	36.0	0.5	14.3
Self and Partner/Spouse jointly	0.4	0.3	0.3
Other household member(s)	53.4	11.6	27.8
Self and other household member(s)	0.8	18.3	11.5
Partner/Spouse and other household member(s)	4.2	0.0	1.6
Someone (or group of people) outside the household	0.4	0.5	0.5
Self and other outside people	0.0	0.5	0.3
Self, partner/spouse, and other outside people	0.0	0.3	0.2

(Pearson Chi-Square= 406.428, df=8.000, p<0.001, N=607)

Of those respondents reporting household ownership of smokers (Figure 15), 11% owned one, 22 % two, 15% three, 14% four and fully 83% of respondents reported owning between one and six smokers. Only 2% reported owning more than 20 smokers. There was no difference by gender in responses on the number of smokers owned.

Less than 1% (two) of respondents reported household ownership of aquaculture assets indicating that it is not a common livelihood activity among fishing households surveyed.

Concerning household ownership of a house (Table 88), there was no difference in responses by gender and 48% of all respondents reported owning a house. However, who owned the house varied by gender significantly. Men (32%) were more likely to report they owned the house compared to women (13%). Women were more likely to report it was owned with a spouse or partner (24%). A large percentage of both men and women reported ownership by another household member (38%) or by themselves and another household member (17%).

Figure 15. Distribution of number of smokers owned

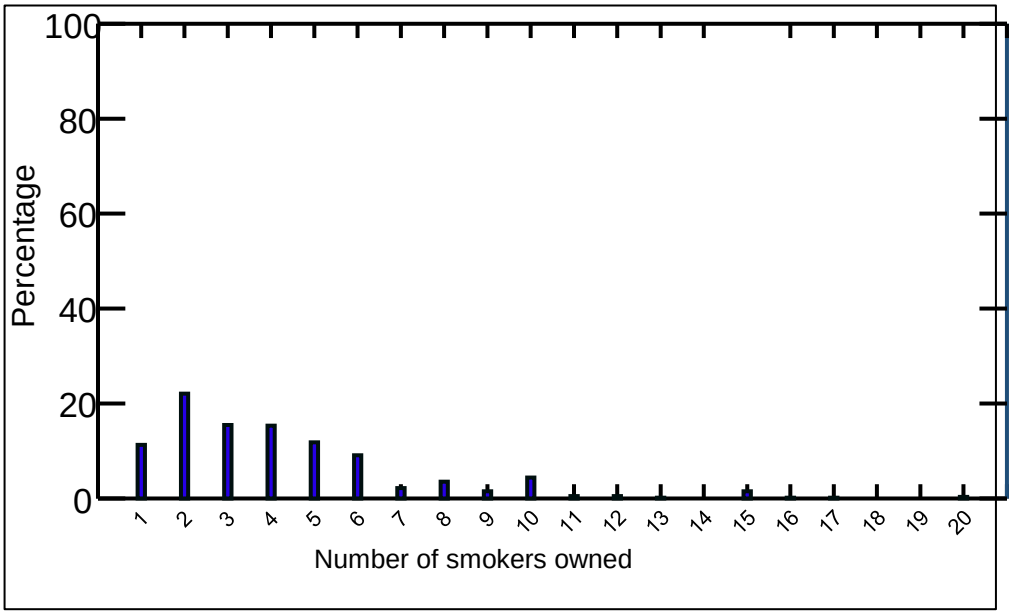


Table 88. Ownership of a house reported by gender

Response (%)	Male	Female	Total
Self	32.0	12.6	21.3
Partner / Spouse	6.5	23.7	16.0
Self and Partner/Spouse jointly	3.9	5.3	4.7
Other household member(s)	40.5	35.3	37.6
Self and other household member(s)	16.3	17.4	16.9
Partner/Spouse and other household member(s)	0.0	4.2	2.3
Someone (or group of people) outside the household	0.7	0.5	0.6
Self and other outside people	0.0	0.5	0.3
Partner/Spouse and other outside people	0.0	0.5	0.3

(Pearson Chi-Square= 39.601, df=8.000,p< 0.001, N=343)

Household ownership of cellphones were reported by 94% of the respondents with no significant difference in responses by gender. Concerning cellphone type, 89% of households owned a basic phone and only 11% owned a smart phone. Again there were no gender differences in reporting type of phone owned. Ownership of the phone is reported in Table 89 below with men more likely to report they own the phone than women, whereas women were more likely to report the phone was owned by the spouse or other household member. The most frequent cellphone service carrier was MTN followed by Tigo, then Vodafone (Table 90).

Table 89. Cellphone ownership by gender

Cell Phone Ownership(% respondents)	Male	Female	Total
Self	25.43	18.37	21.43
Partner / Spouse	2.75	9.19	6.40
Self and Partner/Spouse jointly	11.68	8.14	9.67
Other household member(s)	12.37	20.47	16.96
Self and other household member(s)	43.64	40.16	41.67
Partner/Spouse and other household member(s)	2.06	2.36	2.23
Someone outside the household	0.00	0.26	0.15
Self and other outside people	0.69	0.26	0.45
Self, partner/spouse, and other outside people	1.37	0.79	1.04

(Pearson Chi-Square= 25.572, df=8.000, p<0.001, N= 672)

Table 90. Type of cellphone service carrier reported

Service Carrier	Total
MTN	85.6
Tigo	28.3
Vodafone	13.8
Airtel	8.3
Glo	4.2
Other	0.3

(N = 665, Note – percentages sum to more than 100% as some people use more than one SIM card)

Concerning reportage of household assets (Table 91), approximately 20% of households had agricultural land and 30% also reported having non-farm land. 56% reported owning livestock and 17% reported ownership of transportation assets.

Table 91. Household ownership of assets

Response	Agricultural Land			Livestock			Other Non-Agricultural Land			Transportation (bicycle, motorbike, car)		
	M	F	Tot	M	F	Tot	M	F	Tot	M	F	Tot
Yes	22.0	17.9	19.7	55.7	57.7	56.9	33.8	27.5	30.2	20.3	14.6	17.0
No	78.0	82.1	80.3	44.3	42.3	43.1	66.2	72.5	69.8	79.7	85.4	83.0
N	304	408	712	298	409	707	305	411	716	305	411	716

(Chi square M-F: Agric. land NS, Non-agric. land NS, Livestock NS, Transportation p<0.05 >0.01)

Concerning ownership of other household assets shown in Table 92, men more likely to report ownership of agricultural land by themselves or by another household member where women are more likely to report ownership is by a spouse or partner, or jointly with a spouse. Women are more likely to report ownership of livestock than men, and men are more likely to report ownership of other non-agricultural lands than women. Men are also more likely to report more ownership of means of transportation compared to women.

	Agricultural land			Livestock			Other non-agricultural land			Transportation (bicycle, motorbike, car)		
Ownership Category	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**
Self	32.8	27.4	30.0	20.6	43.8	34.3	39.8	24.8	31.9	32.3	3.3	18.0
Partner / Spouse	1.5	20.5	11.4	10.3	6.4	8.0	1.9	17.7	10.2	0.0	20.0	9.8
Self and Partner/Spouse jointly	3.0	8.2	5.7	9.1	6.8	7.8	6.8	8.0	7.4	1.6	1.7	1.6
Other household member(s)	55.2	30.1	42.1	50.3	30.2	38.5	33.0	31.9	32.4	62.9	75.0	68.9
Self and other household member(s)	7.5	8.2	7.9	7.9	12.3	10.5	15.5	15.0	15.3	3.2	0.0	1.6
Partner/Spouse and other house member(s)	0.0	1.4	0.7	0.6	0.4	0.5						
Someone outside the household	0.0	2.7	1.4	1.2	0.0	0.5	1.9	0.0	0.9			
Self and other outside people	0.0	1.4	0.7				1.0	1.8	1.4			
Partner/Spouse and other outside people							0.0	0.9	0.5			
Self, partner/spouse, and other outside people												
N	67	73	140	165	235	400	103	113	216	62	60	122

Table 92. Household ownership of assets

(All differences per ownership category are significantly different, $p<0.05$)

Access to Credit

Table 93 shows borrowing and banking practices of households surveyed. On average 33% of households have bank accounts with men significantly more likely to report household bank account than women. Relatives were most likely to be the source of borrowing for a household (16%) followed by formal lending institutions such as banks and the by microfinance institutions. There were not gender differences in reporting household borrowing responses. Household savings accounts were reported by 86% of respondents while the remainder had either current accounts or both. Almost all borrowing is for cash (92%-100%) and virtually no in-kind borrowing except from informal lenders (8%).

Of those that had bank accounts, Table 94 shows that more than half (57%) of respondents reported making regular deposits and there were no significant differences by gender.

Table 93. Do you regularly deposit saving into your bank account

Response (%)	Male	Female	Total
Yes	60.8	53.2	57.3
No	39.2	46.8	42.7

(Pearson Chi-Square =1.370, df=1.000, 0P> 0.05, N= 234)

Table 95 shows ownership, borrowing and decision making patterns concerning use of loans and bank accounts of household respondents. Men were more likely to report the household having a bank account and more likely to report that they owned the account. Women were more likely to report the account is owned by a spouse or partner or by another member in the household. None of the other responses showed statistically significant gender differences.

Table 94. Borrowing money and banking practices of household respondents

Response/ Type (% respondents)	Bank account			Non-governmental Organization			Informal lender			Formal lender			Relative			Micro-finance/Susu		
	M	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**
Taken loan or Ownership of an account																		
Yes	***41.0***	***26.5***	***32.7***	2.3	1.5	1.8	3.6	3.2	3.4	8.2	11.7	10.2	18.7	13.7	15.8	4.9	6.8	6.0
No	***55.1***	***67.4***	***62.2***	90.8	94.2	92.7	89.8	92.5	91.3	84.9	83.9	84.4	75.1	79.8	77.8	88.2	86.7	87.4
Don't know	***3.9***	***6.1***	***5.2***	6.9	4.4	5.4	6.6	4.4	5.3	6.9	4.4	5.4	6.2	6.6	6.4	6.9	6.3	6.6
N	***305***	***411***	***716***	305	411.	716	305	411.0	716	305	411	716	305	411	716	305	411	716
T***ype of account or type of borrowing***																		
Current/Cash	8.0	3.7	6.0	100.0	100.0	100.0	90.9	92.3	91.7	***100.0***	***100.0***	***100.0***	98.3	100.0	99.2	100.0	100.0	100.0
Savings/ In-kind	84.0	87.2	85.5	0.0	0.0	0.0	9.1	7.7	8.3	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0
Both/Both	8.0	9.2	8.5	0.0	0.0	0.0	0.0	0.0	0.0	***0.0***	***0.0***	***0.0***	1.8	0.0	0.9	0.0	0.0	0.0
N	125	109	234	6	7	13	11	13	24	***25***	***48***	***73***	57	56	113	15	28	43

(Bold Italics are statistically significant differences: Chi square $p<0.05$)

Response (% respondents)	Bank Account			Non-Governmental Organization			Informal Lender			Formal Lender			Relative			Micro-Finance / *Susu*		
	M	**F**	**Tot**	**M**	**F**	**Tot**	**Tot**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**	**M**	**F**	**Tot**
Borrow decision/ owner																		
Self	***69.6***	***39.5***	***55.6***	0.0	66.7	30.8	18.2	46.2	33.3	40.0	43.8	42.5	56.1	57.1	56.7	33.3	57.1	48.8
Partner / Spouse	***3.2***	***24.8***	***13.2***	14.3	0.0	7.7	18.2	0.0	8.3	12.0	4.2	6.8	8.8	3.6	6.2	13.3	0.0	4.7
Self and Partner/Spouse jointly	***3.2***	***6.5***	***4.7***	0.0	0.0	0.0	9.1	7.7	8.3	4.0	6.3	5.5	3.5	10.7	7.1	6.7	3.6	4.7
Other household member(s)	***17.6***	***24.8***	***20.9***	71.4	33.3	53.8	45.5	23.1	33.3	36.0	18.8	24.7	17.5	10.7	14.2	40.0	21.4	27.9
Self and other household member(s)	***6.4***	***4.6***	***5.6***	0.0	0.0	0.0	9.1	23.1	16.7	8.0	20.8	16.4	12.3	16.1	14.2	6.7	7.1	67.0
Partner/Spouse and other house member(s)	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.9	0.0	3.6	2.3
Someone outside the household	***0.0***	***0.0***	***0.0***	14.3	0.0	7.7	0.0	0.0	0.0	0.0	2.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Self and other outside people	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	2.7	0.0	0.0	0.0	0.0	7.1	4.7
Partner/Spouse and other outside people	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	0.0	0.0	0.0
N	***125***	***109***	***234***	7	6	13	11	13	24	25	48	73	57	56	113	15	28	43
Use / withdrawal decision																		
Self	***68.0***	***43.1***	***56.4***	0.0	33.3	15.4	27.3	46.2	37.5	44.0	56.3	52.1	54.4	42.9	48.7	33.3	57.1	48.8
Partner / Spouse	***3.2***	***23.9***	***12.8***	28.6	0.0	15.4	27.3	0.0	12.5	10	4.2	8.2	7.0	3.6	5.3	13.3	0.0	4.7
Self and Partner/Spouse jointly	***4.8***	***4.6***	***4.7***				0.0	7.7	4.2	4.0	4.2	4.1	8.8	17.9	13.3	6.7	3.6	4.7
Other household member(s)	***18.4***	***23.9***	***20.9***	42.9	33.3	38.5	36.4	123.1	29.2	28.0	18.8	21.9	14.0	10.7	12.4	33.3	17.9	23.3
Self and other household member(s)	***5.6***	***4.6***	***5.1***	28.6	33.3	30.8	9.1	23.1	16.7	8.0	14.6	12.3	14.0	23.2	18.6	13.3	14.3	14.0
Partner/Spouse and other house member(s)	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.9	0.0	0.0	0.0
Someone outside the household	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Self and other outside people	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	4.7
Partner/Spouse and other outside people	***0.0***	***0.0***	***0.0***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.9	0.0	0.0	0.0
N	***120***	***109***	***234***	7	6	13	11	13	24	25	48	73	57	56	113	15	28	43

Table 95. Ownership, borrowing and decision making patterns on loans and bank account

(Bold Italics are statistically significant differences: Chi square p<0.05)

Leadership and Influence in the Community

Table 96 shows information on responses concerning comfort levels on speaking in public on issues of community concern. All of the responses showed statistically significant gender differences; on decisions on public infrastructure, payment of wages, misbehavior of publically elected officials, protesting illegal fishing and on proposing new fishing rules. Men are more likely to respond they are very comfortable on discussing these issues in public. Women are more likely to respond to these questions as not at all comfortable or comfortable but with a great deal of difficulty. While not tested for statistical differences, men had higher percentages responding that they are very comfortable discussing the fisheries issues compared to the others.

Group Membership

Table 97 shows responses concerning knowledge, membership and participation in fish producer or processor associations. The canoe council is the best known of the organizations mentioned along with "other" associations. NFPTA (National Fish Processors and Traders Association) was least know. CEWWEFIA and DAA as regional processor associations were better known than the national processors association. The highest number of active members were of other associations and the canoe council. The women processor associations had fewer responding positively as active members with DAA having the most active users and CEWEFIA the fewest. In general, where there were statistically significant differences, men reported higher percentages of knowledge and active membership in the inshore fishers association and canoe council where women were more active members of NFPTA and other associations. Women were more likely to say they had not input into decisions in the inshore association or canoe council, as well as in among the DAA and NFPTA and other producer and processor associations. Men were more likely to report input into most decisions for these same organizations. This suggests that women are more disempowered in decision making regardless of whether the organization is male dominated (producer groups) or female dominated (processor groups).

Table 96. Comfort level about speaking in public on topics of community concern

Response (% respondents)	Decisions on Public Infrastructure			Proper Payment of Wages			Misbehavior of Authorities or Elected Officials			Protest Illegal Fishing			Propose New Fishing Rules		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
No, not at all comfortable	21.0	43.6	33.9	18.7	41.8	32.0	23.0	49.6	38.3	17.0	46.5	33.9	16.1	43.3	31.7
Yes, but with a great deal of difficulty	5.2	9.5	7.7	5.2	8.5	7.1	4.3	6.8	5.7	4.6	5.4	5.0	3.9	6.8	5.6
Yes, but with a little difficulty	5.9	5.6	5.7	7.9	7.3	7.5	11.1	7.8	9.2	5.6	3.2	4.2	3.6	2.2	2.8
Yes, fairly comfortable	15.7	14.8	15.2	16.4	13.1	14.5	10.2	11.4	10.9	13.4	15.8	14.8	13.4	17.8	15.9
Yes, very comfortable	52.1	26.5	37.4	51.8	29.2	38.8	51.5	24.3	35.9	59.3	29.2	42.0	63.0	29.9	44.0
N	305	411	716	305	411	716	305	411	716	305	411	716	305	411	716

(Gender differences are all statistically significant Chi square $p<0.001$)

Table 97. Knowledge, membership and participation in fish producer or processor organizations

Response (% respondents)	Inshore Fishermen's Association			Canoe Fishermen's Council			CEWEFIA			Development Action Assn. (DAA)			NFPTA			Other Producer/ Processor Assn.		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
Knowledge of group																		
Yes	33.8	24.3	28.4	51.8	39.4	44.7	6.9	6.6	6.7	25.9	23.8	24.7	***12.1***	***10.2***	***11.0***	45.6	44.8	45.1
No	51.5	31.4	39.9	38.0	23.8	29.9	69.2	53.8	60.3	54.1	42.3	47.3	***60.3***	***55.0***	***57.3***	35.7	43.8	40.4
Don't know	14.8	44.3	31.7	10.2	36.7	25.4	23.9	39.7	33.0	20.0	33.8	27.9	***27.5***	***34.8***	***31.7***	18.7	11.4	14.6
N	305	411	716	305	411	716	305	411	716	305	411	716	***305***	***411***	***716***	305	411	716
Active Member																		
Yes	36.9	8.0	22.7	38.0	3.1	20.3	***4.8***	***18.5***	***12.5***	***26.6***	***23.5***	***24.9***	8.1	35.7	22.8	5.0	33.7	21.4
No	63.1	92.0	77.3	62.0	96.9	79.7	***95.2***	***81.5***	***87.5***	***73.4***	***76.5***	***75.1***	91.9	64.3	77.2	95.0	66.3	78.4
N	103	100	203	158	162	320	***21***	***27***	***48***	***79***	***98***	***177***	37	42	79	139	184	323
Input into group decisions																		
No input	2.6	50.0	10.9	1.7	20.0	3.1	***0.0***	***0.0***	***0.0***	4.8	30.4	18.2	0.0	13.3	11.1	0.0	9.7	8.7
Input into very few decisions	7.9	12.5	8.7	15.0	20.0	15.4	***100.0***	***20.0***	***33.3***	9.5	21.7	15.9	0.0	26.7	22.2	0.0	14.5	13.0
Input into some decisions	23.7	25.0	23.9	21.7	40.0	23.1	***0.0***	***60.0***	***50.0***	28.6	13.0	20.5	0.0	46.7	38.9	14.3	48.4	44.9
Input into most decisions	57.9	12.5	50.0	50.0	20.0	47.7	***0.0***	***20.0***	***16.7***	52.4	30.4	40.9	100.0	13.3	27.8	57.1	19.4	23.2
Input into all decisions	7.9	0.0	6.5	11.7	0.0	10.8	***0.0***	***0.0***	***0.0***	4.8	4.3	4.6	0.0	0.0	0.0	28.6	8.1	10.1
N	38	8	46	60	5	65	***1***	***5***	***6***	21	23	44	3	15	18	7	62	69

(Gender differences are all statistically significant: Chi square p<0.01 *except italics: p>0.05*)

Table 98 below shows high knowledge of microfinance associations (79%) and very little knowledge of other trade or business associations (10%). There were no significant gender differences in these responses. Women were more likely to be active members of microfinance associations. Women were more likely to say they had input into all, most or some decisions (53%) of microfinance associations compared to men that tended to say they had no or very few (57%) inputs into decisions.

Table 98. Knowledge, membership and participation in other community associations

Response	Credit Microfinance Assn			Trade or Business Assn		
	Male	Female	Total	Male	Female	Total
K***nowledge of group***						
Yes	***82.6***	***76.9***	***79.3***	***12.5***	***7.5***	***9.6***
No	***12.1***	***16.1***	***14.4***	***53.1***	***52.8***	***52.9***
Don't know	***5.2***	***7.1***	***6.3***	***34.4***	***39.7***	***37.4***
N	***305***	***411***	***716***	***305***	***411***	***716***
Active Member						
Yes	14.7	30.4	23.4	***7.9***	***12.9***	***10.5***
No	85.3	69.6	76.6	***92.1***	***87.1***	***89.9***
N	252	316	568	***38***	***31***	***69***
Input into group decisions						
No input	32.4	32.3	32.3	***0.0***	***25.0***	***14.3***
Input into very few decisions	24.3	14.6	17.3	***66.7***	***50.0***	***57.1***
Input into some decisions	18.9	27.1	24.8	***0.0***	***25.0***	***14.3***
Input into most decisions	24.3	10.4	14.3	***0.0***	***0.0***	***0.0***
Input into all decisions	0.0	15.6	11.3	***33.3***	***0.0***	***14.3***
N	37	96	133	***3***	***4***	***7***

(Gender differences are all statistically significant Chi square $p<0.01$ unless in *italics* $p>0.05$)

Decision Making

Table 99 below shows responses on who makes decisions on various productive economic activities. Men were more likely to say the male or husband made decisions on fishing input and type of fishing conducted, although both men and women had men as the highest frequency of responses of any choice (42% and 39% respectively). Women were more likely to say the female or wife made decisions on fish processing, smoking and marketing. Both men and women had very high frequency responses on women being the decision maker in these economic activities (72% and 75% respectively), higher than men in fishing activities.

Table 99. Person in the household who makes decisions on various productive economic activities

Response (% of respondents)	Fishing Inputs			Type of Fishing			Fish Processing and Smoking			Fish to Market		
	M	F	Tot	M	F	Tot	M	F	Tot	M	F	Tot
Main male or husband	46.6	39.1	42.3	42.3	36.7	39.1	3.6	2.7	3.1	3.6	2.2	2.8
Main female or wife	2.3	4.1	3.34	1.3	3.7	2.7	68.5	74.5	71.9	70.5	77.9	74.7
Husband and wife jointly	1.6	2.9	2.4	1.3	1.7	1.5	2.0	1.2	1.5	2.0	1.2	1.5
Someone else in the household	4.3	15.1	10.5	3.6	16.1	10.8	13.8	6.1	9.4	13.8	5.4	8.9
Jointly with someone else inside the household	14.1	1.9	7.1	15.1	2.0	7.5	1.6	9.7	6.3	2.6	9.2	6.4
Jointly with someone else outside the household	14.1	1.7	7.0	15.7	2.4	8.1	1.3	0.7	1.0	0.3	0.7	0.6
Someone outside the household / other	11.1	14.4	13.0	9.8	14.4	12.4	2.6	1.5	2.0	3.0	1.2	2.0
Household does not engage in activity / Decision not made	5.9	20.7	14.4	10.8	23.1	17.9	6.56	3.7	4.9	4.3	2.2	3.1
N	305	411	716	305	411	716	305	411	716	305	411	716

(all differences between genders are statistically significant Chi square p<0.001)

Decision making on economic activities other than fishing related activities are shown in Table 100 below. In all cases of type of economic activity, men were more likely to say they were the decision maker and the highest frequency of all responses overall for wages and major expenditures. Women were more likely to say they were the decision makers on minor expenditures and the highest frequency of male and female responses in this category. From a nutritional standpoint, this is important as women are mainly making decisions on food purchases. As dietary diversity already noted previously is quite low, this suggest that nutrition educational programs should focus on women.

Table 100. Person in the household who makes decisions on various economic activities and expenditures

Response (% of respondents)	Wages and Salaries			Major Household Expenditures (purchase large appliances)			Minor Household Expenditures (food for daily consumption)		
	M	F	Tot	M	F	Tot	M	F	Tot
Main male or husband	49.5	11.7	27.8	57.4	28.2	40.6	19.7	4.4	10.89
Main female or wife	0.7	39.2	22.8	4.3	27.0	17.3	45.0	67.2	57.7
Husband and wife jointly	9.5	17.5	14.1	29.5	29.9	29.7	30.8	20.2	24.7
Someone else in the household	3.0	2.4	2.7	3.3	4.6	4.1	3.0	1.0	1.8
Jointly with someone else inside the household	10.8	6.6	8.4	4.3	8.5	6.7	1.3	7.1	4.6
Jointly with someone else outside the household	8.6	01.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0
Someone outside the household / other	3.9	2.13	2.9	0.3	0.2	0.3	0.3	0.0	0.1
Household does not engage in activity / Decision not made	14.1	19.5	17.2	1.0	1.5	1.257	0.0	0.2	0.1
N	305	411	716	305	411	716	305	411	716

(all differences between genders are statistically significant Chi square p<0.001)

SUMMARY

The above summary information serves as a baseline of indicators on a number of factors the project hopes to influence over the life of the project as well as provides basic information on the living situation of small pelagic fishermen along the coastline of Ghana. It provides a wealth of information that could be further analyzed by researchers interested in the topics covered in the report. The results also provide a number of insights and some suggestions as to how the SFMP could tailor interventions and communications strategies based on these results. However, this report is not intended to go in depth into such recommendations but rather primarily to just present the data in summarized form of how respondents answered the baseline questions. Readers and users of this document can make decisions and draw conclusions related to project interventions or for other planning or policy purposes. Highlights of the findings are also summarized in the Executive Summary found at the beginning of this document and are not repeated here.

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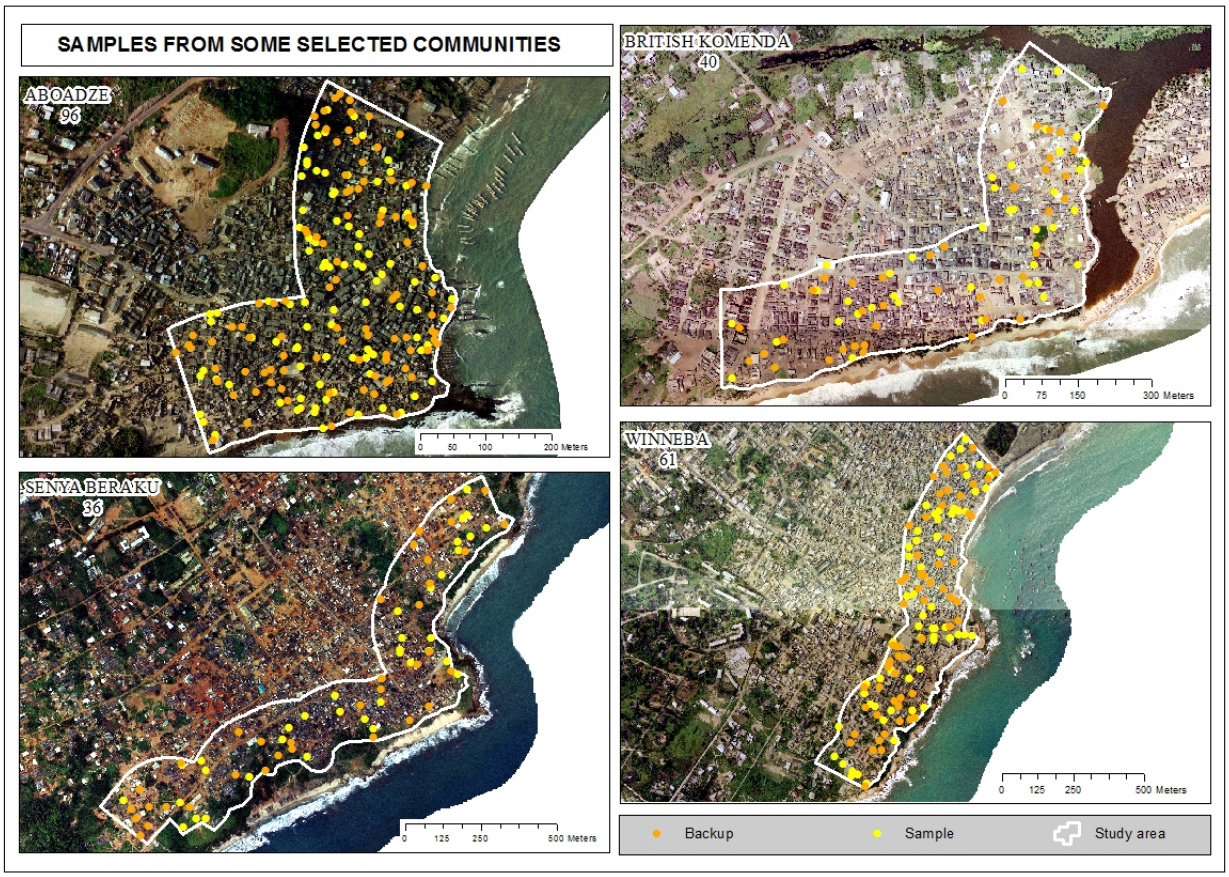
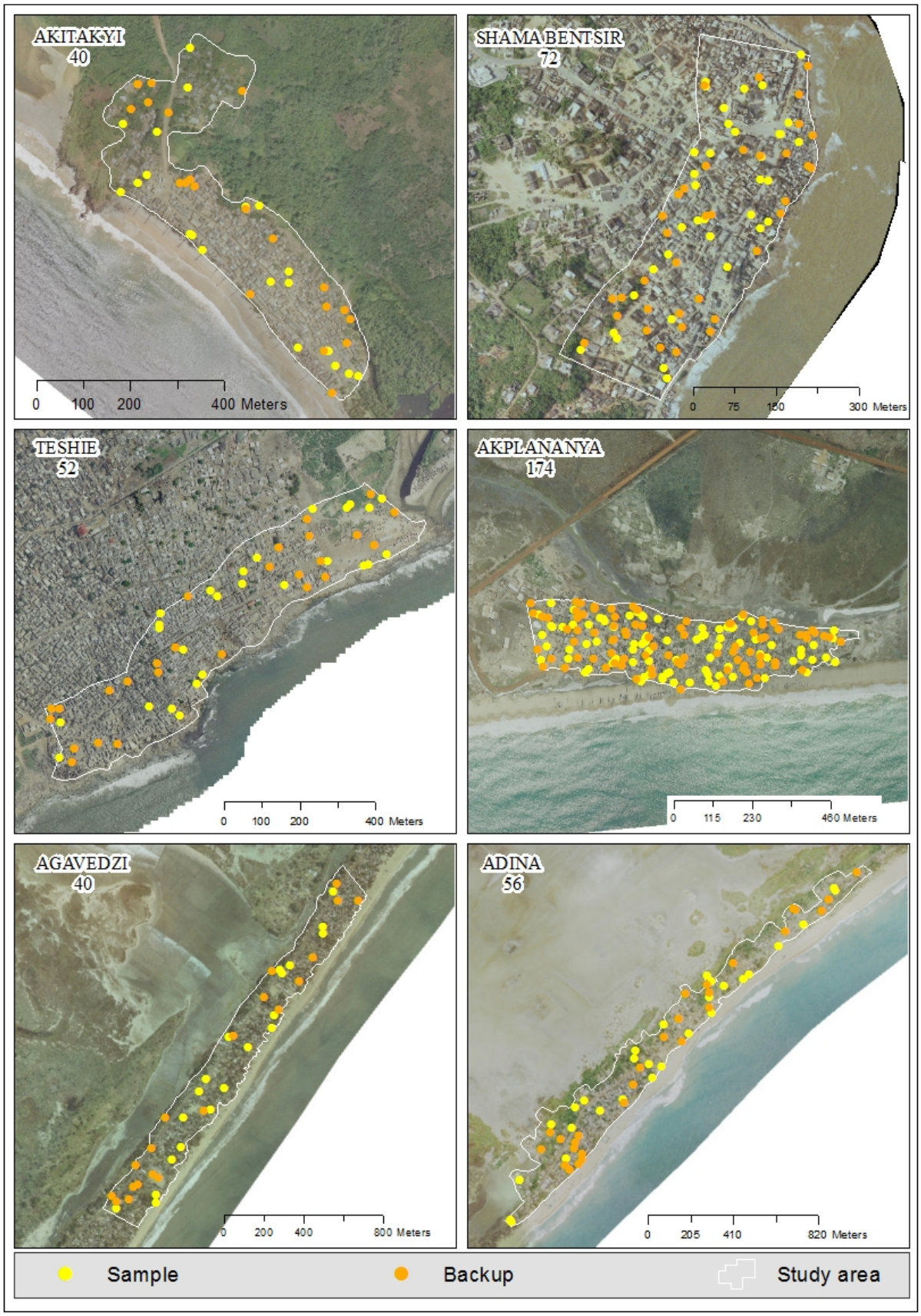
Appendix A: Sample Frame

Central	Abura-Asebu-Kwamankese	MOREE	4297	Y	Y
Central	Effutu Municipal	WINNEBA	2941	Y	Y
Central	Gomoa East	NYANYANO	2165	N	N
Central	Mfantseman	ANOMABO	1986	N	N
Central	Mfantseman	BIRIWA	1986	N	N
Central	Komenda-Edina Eguafo-Abrem	BRITISH KOMENDA	1922	N	N
Central	Gomoa West	APAM	1846	Y	Y
Central	Mfantseman	ANKAFUL	1840	N	N
Central	Awutu Senya	SENYA BERAKU	1731	N	N
Central	Cape Coast	CAPE COAST	1326	N	N
Central	Mfantseman	KROMANTSE	1288	N	N
Central	Cape Coast	EKON	1007	N	N
Greater Accra	Ada West	AKPLABANYA	4199	N	N
Greater Accra	Ada West	ANYAMAM	3678	N	N
Greater Accra	Accra	CHORKOR	2483	N	N
Greater Accra	Kpone-Katamanso	KPONE	2296	N	N
Greater Accra	Ledzokuku-Krowor	TESHIE	1264	N	N
Greater Accra	Dangme East	AZIZANYA	1007	N	N
Greater Accra	Shai Osudoku (Dangme West)	LEKPONGUNOR	885	N	N
Volta	Ketu South	ADINA	1328	N	N
Volta	Ketu South	AGAVEDZI	967	N	N
Western	Shama	ABOADZE	4612	N	N
Western	Shama	ABUESI	2868	N	N
Western	Nzema East	LOWER AXIM	2665	N	Y
Western	Sekondi-Takoradi	SEKONDI	1737	N	N
Western	Shama	SHAMA (BENSIR)	1720	N	Y
Western	Shama	SHAMA (APO)	1287	N	Y
Western	Jomoro	NEW TOWN	1175	N	N
Western	Ahanta West	AKITAKYI	947	N	N

Appendix B: Map of communities with randomized GPS points selected for sampling

The maps below show polygons drawn around settlement areas and within 200 meters of the shoreline where the majority of fishing household are assumed to be concentrated. Random GPS points for household selection were generated within these polygons with a number of sample sites (one household per site) equal to the targeted number of households to be sampled within the community, and an equal number of random back-up sites in case no fishing households could be found in close proximity to the original sample point.




AKITAKYI
40
0 100 200 400 Meters
SHAMA BENTSIR
72
0 75 150 300 Meters
TESHIE
52
0 100 200 400 Meters
AKPLANANYA
174
0 115 230 460 Meters
AGAVEDZI
40
0 200 400 800 Meters
ADINA
56
0 205 410 820 Meters
Sample
Backup
Study area

Appendix C: Population of districts in the coastal regions

Volta			
Volta	Ketu South	Coastal	160,756
Volta	Ketu Municipal	Coastal	147,618
Volta	South Tongu	Non Coastal	87,950
Volta	Ketu North	Non Coastal	99,913
Volta	Akatsi	Non Coastal	128,461
Volta	North Tongu	Non Coastal	149,188
Volta	Adaklu Anyigbe	Non Coastal	64,404
Volta	Ho Municipal	Non Coastal	271,881
Volta	South Dayi	Non Coastal	46,661
Volta	Kpando	Non Coastal	93,649
Volta	Hohoe	Non Coastal	262,046
Volta	Biakoye	Non Coastal	65,901
Volta	Jasikan	Non Coastal	59,181
Volta	Kadjebi	Non Coastal	59,303
Volta	Krachi East	Non Coastal	116,804
Volta	Krachi West	Non Coastal	122,105
Volta	Nkwanta South	Non Coastal	117,878
Volta	Nkwanta North	Non Coastal	64,553
Coastal			**308,374**
Non-Coastal			**1,809,878**
Total			**2,118,252**
Greater Accra			
Greater Accra	Ada West	Coastal	59,124
Greater Accra	Ada East	Coastal	71,671
Greater Accra	Ningo Prampram	Coastal	70,923
Greater Accra	Tema Metropolis	Coastal	292,773
Greater Accra	Ledzokuku /krowor	Coastal	227,932
Greater Accra	La Dede Kotonpon	Coastal	183,528
Greater Accra	Accra Metro	Coastal	1,665,086
Greater Accra	Ga South Municipal	Non Coastal	411,377
Greater Accra	Ga West Municipal	Non Coastal	219,788
Greater Accra	Ga East Municipal	Non Coastal	147,742
Greater Accra	Accra Metropopolis	Non Coastal	1,665,086
Greater Accra	Adenta Municipal	Non Coastal	78,215
Greater Accra	Ashaiman Municipal	Non Coastal	190,972
Greater Accra	Shai Osudoku	Non Coastal	51,913
Greater Accra	Ga Central Municipal	Non Coastal	117,220
Greater Accra	La Nkwantanang Madina	Non Coastal	111,926
Greater Accra	Kpone Katamanso	Non Coastal	109,864
Coastal			**2,571,037**
Non-Coastal			**1,439,017**
Total			**4,010,054**
Central			

Central Region	Komenda Edna Eguafo/Abirem	Coastal	144,705
Central Region	Cape Coast metropolis	Coastal	169,894
Central Region	Mfantsiman municipal	Coastal	196,563
Central Region	Ekumfi	Coastal	
Central Region	Gomoa West	Coastal	135,189
Central Region	Gomoa East	Coastal	207,071
Central Region	Efutu	Coastal	68,597
Central Region	Ewutu Senya	Coastal	195,306
Central Region	Ajumako /Enyam/Essiam	Non- Coastal	138,046
Central Region	Agona East	Non- Coastal	85,920
Central Region	Agona West	Non- Coastal	115,358
Central Region	Asikuma /odoben/Brakwa	Non- Coastal	112,706
Central Region	Assin South	Non- Coastal	104,244
Central Region	Assin North	Non- Coastal	161,341
Central Region	Twifo /Heman/lower Denkyira	Non- Coastal	161,341
Central Region	Upper Denkyiri East	Non- Coastal	72,810
Central Region	Upper Denkyiri West	Non- Coastal	60,054
Coastal			**1,117,325**
Non Coastal			**1,011,820**
Total			**2,129,145**
	Western		
Western Region	Jomoro	Coastal	150.107
Western Region	Ellembelle	Coastal	87,501
Western Region	Nzema East	Coastal	60,828
Western Region	Ahanta West	Coastal	106,215
Western Region	Sekondi/Takoradi	Coastal	559,548
Western Region	Shama	Coastal	81,966
Western Region	Mpohor –Wassa East	Non- Coastal	123,996
Western Region	Tarkwa Nsuaem	Non- Coastal	90,477
Western Region	Prestea /Huni Valley	Non- Coastal	159,304
Western Region	Wassa Anenfi East	Non- Coastal	83,478
Western Region	Wassa Amenfi West	Non- Coastal	161,166
Western Region	Aowin/Suaman	Non- Coastal	138,415
Western Region	Sefwi Akontombra	Non- Coastal	82,467
Western Region	Sefwi Wiawso	Non- Coastal	139,200
Western Region	Sefwi Bibiani –Ahwiaso Bwkwai	Non- Coastal	123,272
Western Region	Juabeso	Non- Coastal	111,749
Western Region	Bia	Non- Coastal	116,332
Coastal			**1,046,165**
Non –Coastal			**1,329,856**
Total			**2,376,021**
Grand Total all coastal districts			**5,042,901**
Grand Total all non-coastal districts			**5,590,571**
Grand Total all districts			**10,633,472**

Appendix D: Background on Power Analysis

Determinations of minimum sample sizes are generally performed via precision or power analysis. Precision deals with confidence intervals and power with hypothesis testing. Power is defined as:

$$P(\text{Rejecting } H_0 \mid H_1 \text{ is true})$$

or equivalently as:

$$P(\text{Accepting } H_1 \mid H_1 \text{ is true})$$

That is, power can be interpreted as the probability of detecting a change of a particular magnitude in a parameter of interest.

It is important to point out that an analysis of confidence interval precision is analogous to a traditional power analysis, with the margin of error taking the place of effect size and the probability of achieving the specified precision taking the place of power. The sample size determination presented below assumes a desired power of 0.80.

Power Analysis of Quantitative Responses

Comparison of Two Populations

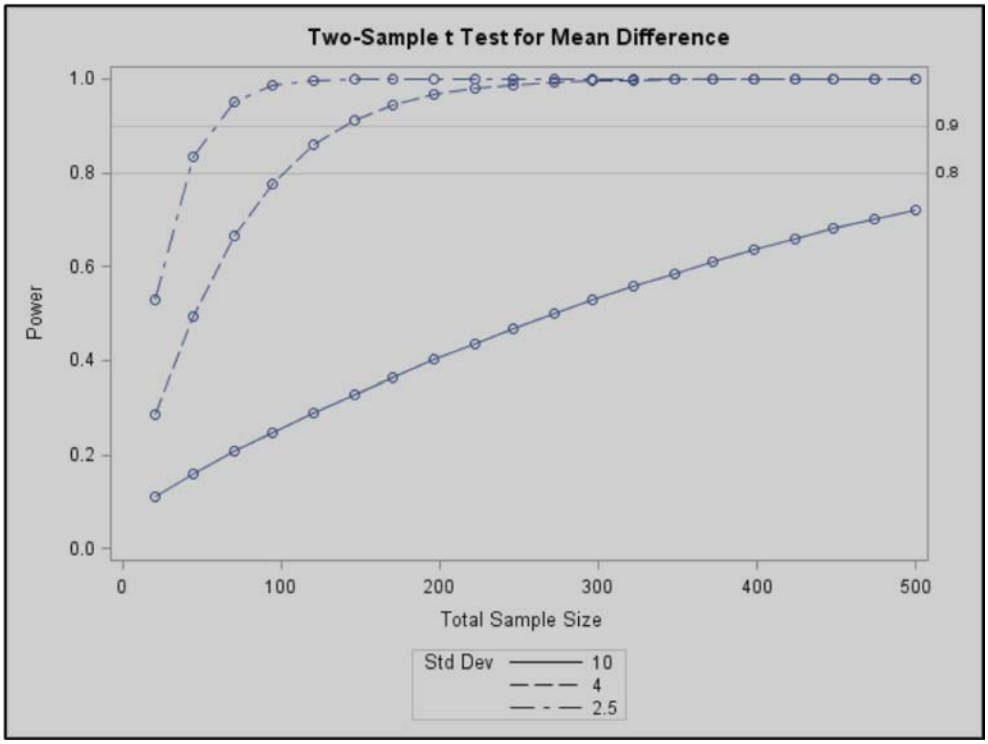
Comparisons of quantitative variables at two different times call for comparison of means. Since the same sampling units will be considered for the different time points the data will be dependent (referred to as panel data or repeated measures). A very conservative approach for calculation of sample size is to consider the two time points as independent populations. The power analysis is based on effect sizes since no *a priori* information is available.

The effect size in a comparison of two population means for independent data, assuming equal variability at both time points, is given by (Cohen, 1988):

$$D = \frac{\bar{x}_1 - \bar{x}_2}{s_p}$$

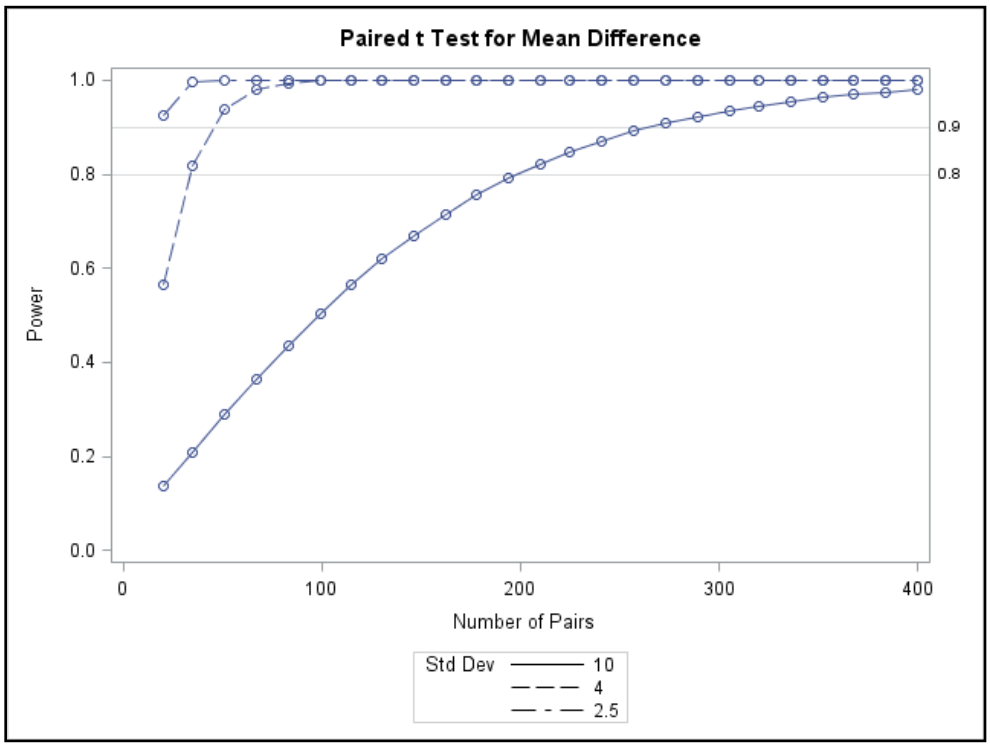
Three effect sizes are considered in the calculation of sample sizes: 0.2 (small), 0.5 (medium) and 0.8 (large). For all effect size calculations, the difference in means (numerator) is fixed at 2. Small, medium, and large effect sizes are obtained using pooled standard deviations of 10 (D=0.2), 4 (D=0.5), and 2.5 (D=0.8) respectively (Figure 1). Effect size is not dependent on the scale or units of the data. That is, for a difference in means equal to 5 (2.5 times the difference used above) the pooled standard deviations must be multiplied by 2.5 to achieve small, medium, and large effect sizes (a pooled standard deviation of 25 yields a small effect size, 10 yields a medium effect size, etc.)

Figure 16. Power curves for comparison of two population means assuming independence and equality of variances. Ten, 4, and 2.5 standard deviations represent effect sizes of 0.2, 0.5 and 0.8 respectively.



The plot above displays power on the vertical axis and sample size per time period on the horizontal axis. To achieve a medium effect size with a power of 0.8, the sample size required is of 102. A large effect size with a power of 0.8 requires a sample size of 42 per time period. Power computations assumed a unidirectional (one-tailed) test.

Figure 17. Power curves for unidirectional comparisons of two dependent population means, assuming a correlation between populations of 0.5. Ten, 4, and 2.5 standard deviations represent effect sizes of 0.2, 0.5 and 0.8 respectively.



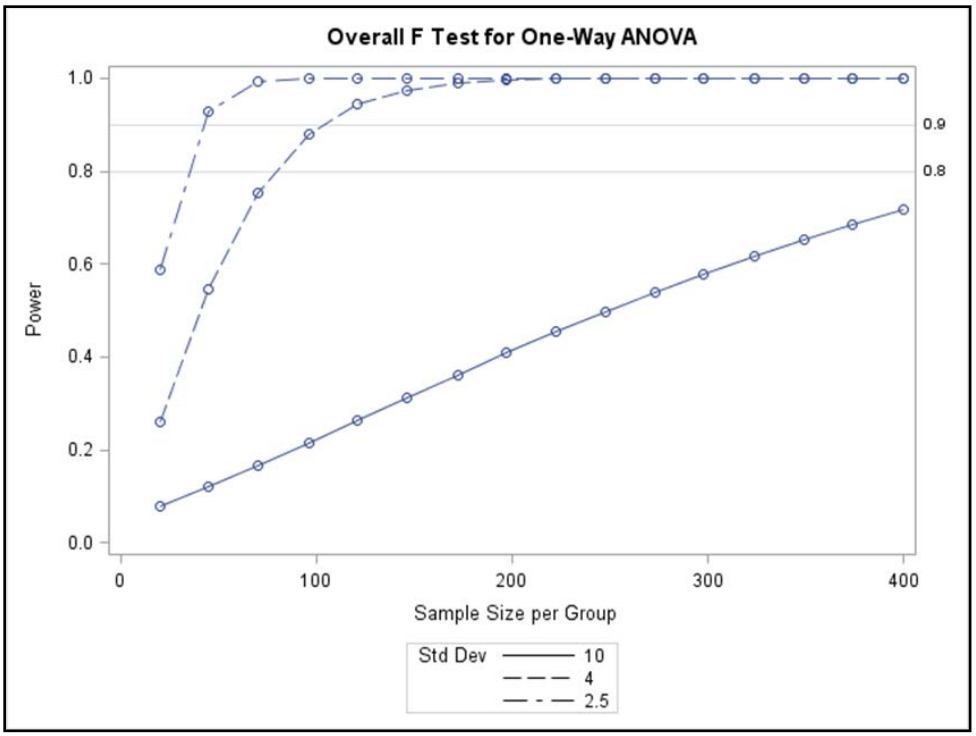
Comparison of Three Populations

When differences between mean levels of three independent populations with equal variances are assessed, the experimental design is a factorial analysis of variance (ANOVA) with one factor. For the survey the factor relates to "time" and has three levels (baseline, midterm, end of project). Sample size calculations assuming independence in data are conservative compared to sample sizes needed for panel designs (repeated measures). Effect sizes for ANOVA are defined as (Cohen, 1988):

$$D = \frac{Max\,\bar{x}_i - Min\,\bar{x}i}{RMSE} \qquad i=1,2,\ldots,k$$

Power curves were produced to achieve small, medium and large effect sizes as defined above, for a one-way analysis of variance with three different levels.

Figure 18. Power curves for comparison of three population means assuming independence. Ten, 4, and 2.5 standard deviations (RMSE) represent effect sizes of 0.2, 0.5 and 0.8 respectively.



A one-way ANOVA with three levels, a medium effect size (0.5), a significance level of 0.05, and 79 observations per level, results in a power of 0.80. If the effect size is increased from medium (0.5) to large (0.8) the sample size decreases to 32 per level to achieve the same power (under the conditions stated above).

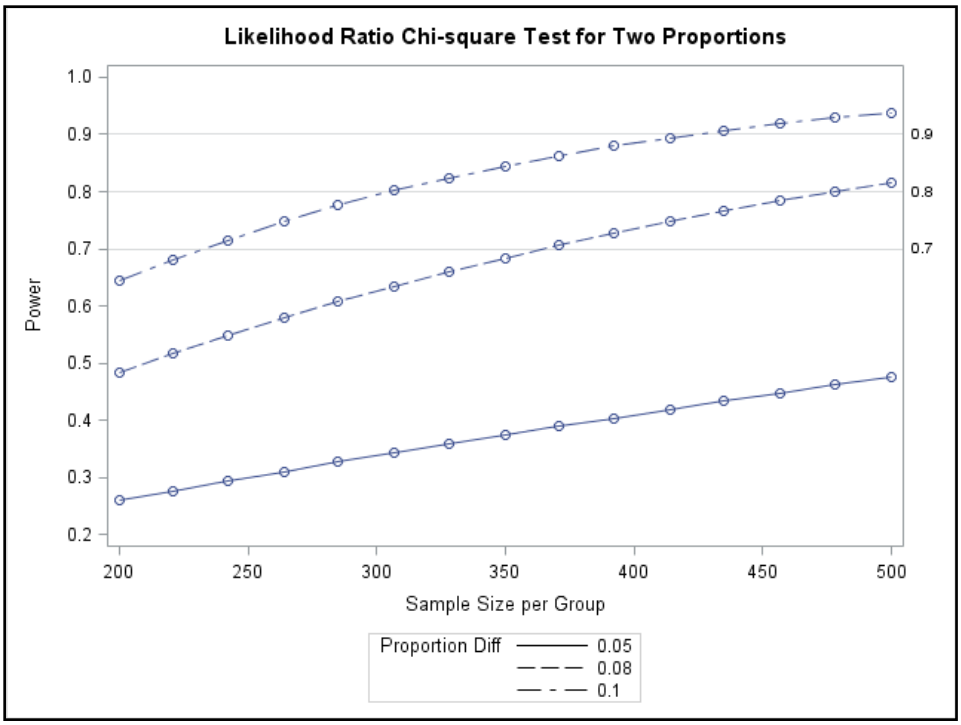
Power Analysis of Qualitative Responses

The majority of responses to be collected will be qualitative and the analysis will compare proportions at two or three time points. In order to calculate sample sizes for analysis of proportions, knowledge of the baseline proportion and expected change in proportion must be known. Since no information about the required parameters is available, a conservative estimate of sample size can be achieved assuming the worst-case baseline proportion of 50% (p=0.5, which gives the largest sample size necessary to achieve the desired power or precision).

Comparison of Two Population Proportions

Power curves to detect a unidirectional change in proportions (percentages) of 5%, 8% and 10% at two different time points (assuming a worst-case baseline proportion of 0.5) are given below (Figure 4).

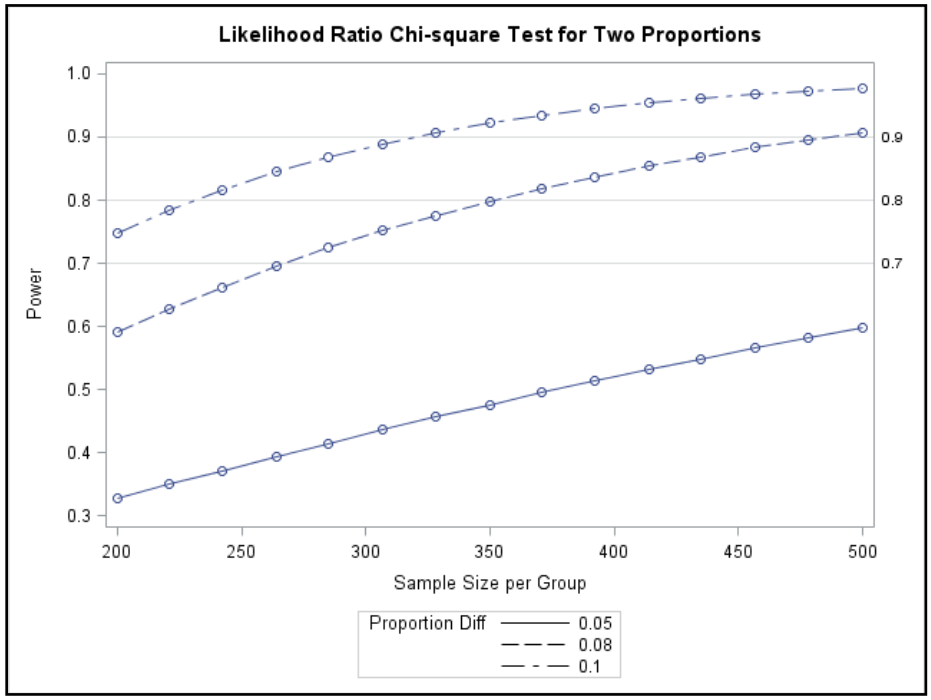
Figure 19. Power curves for unidirectional comparisons of two population proportions with a baseline proportion of 50% (p=0.5).



In the worst-case scenario, detecting a change of 5% (using a Wald test) with a power of 0.80 can only be achieved using a sample size larger than 500. However, a difference of 8% or 10% can be detected with a sample size of about 480 or 306 respondents per time point respectively.

Using the information on the prevalence of poverty of about 20% (p=0.2) as reported by the FtF survey in Northern Ghana, the results for sample size calculations to detect the same differences reduce considerably (Figure 5).

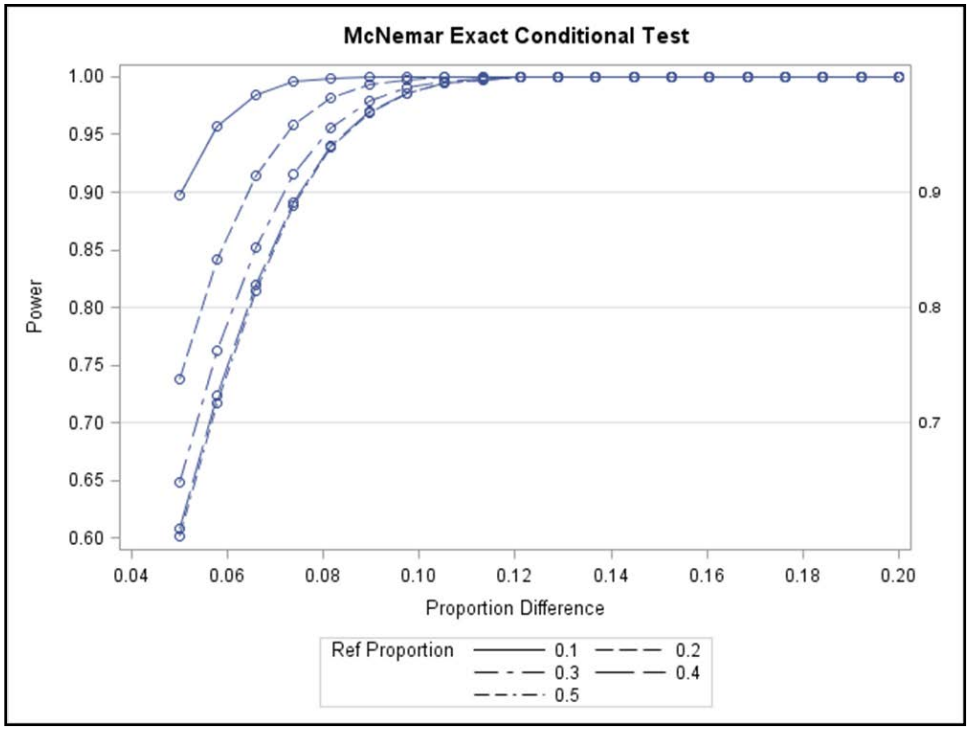
Figure 20. Power curves for unidirectional comparisons of two population proportions with a baseline proportion of 20% (p=0.2).



That is, to achieve a power of 0.8 to detect a unidirectional change of 8% the sample size required will be of about 352 respondents. Detecting a change of 10% with the same power reduces the sample size to about 231. In order to detect a 5% change in one direction, the required sample sizes increases to 862.

The same comments regarding calculations and comparisons of means between dependent and independent populations apply to proportions. When the comparisons are performed on correlated proportions, assuming a correlation of 0.5, power analysis indicates that the sample size reduces considerably. The following power curves, fixing the number of respondents at 400, indicate that the changes in percentages discussed above are achieved with a higher power (Figure 6).

Figure 21. Power curves for unidirectional differences between two dependent population proportions (x-axis) and power (y-axis) using a fixed sample size of 400 and population correlation of 0.5, as baseline proportion varies between 10% and 50%.



The plot above shows a change of 7% or higher is detected with power greater than or equal to 0.80 irrespective of the baseline proportion (10% - 50%).

Comparison of Three Population Proportions

Differences in proportions of three independent populations are generally analyzed using Pearson's chi-squared test. The same analysis can be performed using simple logistic regression, where the independent variable is qualitative in nature. Thus, sample size calculations for a one-way contingency table are performed using a power analysis for logistic regression with a categorical variable as the only covariate in the logit model.

As previously, effect sizes can also be defined and used in calculations of sample sizes for proportions. The guidelines established by Lipsey (1990) indicate small, medium, and large effect sizes for logistic regression as being odds ratios (OR) of 1.2, 1.72, and 2.47 respectively. The following table gives the required sample size to achieve a power of 0.80, with a significance level of 0.05.

Table 101. Sample size versus probability response

Response Probability	Effect size		
	Small	Medium	Large
0.1	3890	424	143
0.2	2198	247	88
0.3	1681	193	71
0.4	1475	172	65
0.5	1418	166	63
0.6	1478	173	65
0.7	1688	195	73
0.8	2213	252	90
0.9	3924	435	149

Table 101 shows sample size calculations for comparison of three proportions using small, medium, and large effect sizes. The response probabilities correspond to the percent of "successes" in the dependent variable of the logit model.

Rows in Table 101 indicate the overall percentage of "successes" in the response variable of the logistic regression model. Columns indicate the observed or expected effect size. To detect a medium effect size when comparing three proportions, the needed sample size will range between 166 and 435. That is, a sample size of 450 respondents will guarantee a power of 0.80 (or larger) when comparing three population proportions, irrespective of the percentage of "successes" in the dependent variable.

Appendix E: Survey Questionnaire

Note to enumerator: your team will interview households located closest to your given list of coordinates. Answer the following questions and attempt to locate the house structure nearest to the current set of coordinates. If multiple households exist within that structure, pick one using the appropriate random number list (and note the random number on the question as prompted). If no household structure is near to the current set of coordinates, or if the nearest household structure has already been surveyed, note this set of coordinates as already surveyed (in the specify status text box), inform your supervisor, and proceed to the next set of coordinates.			
A 1.01 ENUMERATOR IDENTIFIER	A 1.02 REGION: ☒Volta ☐Greater Accra ☐Central ☐Western	A 1.03 DISTRICT:	A 1.04 COMMUNITY/ VILLAGE NAME:
A 1.05 CHOOSE COORDINATE NUMBER: *Which number on the list of coordinates are you currently attempting to survey?*	A 1.06 STATUS OF LOCATION: ☐Single Household ☐Multiple Households ☐No Households Present ☐No House Structure nearby ☐Other	A 1.06A NUMBER OF FISH DEPENDENT HOUSEHOLDS WITHIN STRUCTURE:	A 1.06B FISH DEPENDENT HOUSEHOLD NUMBER SELECTED:
A 1.06C PLEASE SPECIFY STATUS OF LOCATION (FOR EXAMPLE, WAS THIS ALREADY SURVEYED? WHICH ENUMERATOR CONDUCTED			
A 1.07 GPS COORDINATES OF FISH DEPENDENT HOUSEHOLD: GPS coordinates can only be collected when outside. latitude (x.y °) longitude (x.y °) altitude (m) accuracy (m)			

Informed Consent

NOTE TO ENUMERATOR: YOU NEED TO OBTAIN VERBAL CONSENT FROM THE RESPONDENT BEFORE YOU CAN ADMINISTER THE SURVEY. CAREFULLY READ ALOUD THE CONSENT FORM AND CLARIFY ANY AMBIGUITIES. ANSWER THE FOLLOWING QUESTION BASED ON THE RESPONSE FROM THE RESPONDENT.		
DO YOU, THE ENUMERATOR, AFFIRM THAT YOU HAVE READ ALOUD THE CONSENT STATEMENT TO THE PARTICIPANT AND THEY HAVE * CONSENTED TO THE INTERVIEW, AS WELL AS PROVIDING INFORMATION THAT WILL BE USED FOR FOLLOW--UP INTERVIEWS IN SUBSEQUENT YEARS? ☐Yes ☐No		
WHAT IS THE NAME OF THE RESPONDENT?		
WHAT IS THE NUMBER (MOBILE) WHERE THE RESPONDENT MAY BE REACHED?		
DESCRIBE THE HOUSE SETTING OR NAME (ANY TIPS TO HELP FUTURE ENUMERATORS FIND THIS HOUSEHOLD AGAIN IN THE FUTURE)		
A 1.08 TYPE OF FISH DEPENDENT HOUSEHOLD: ☐Male and Female Adult ☐Female Adult Only ☐Male Adult Only	A 1.09 MAIN RELIGION OF FISH DEPENDENT HOUSEHOLD: ☐No Religion ☐Christian ☐Islam ☐Traditionalist ☐Other	A 1.10 MAIN ETHNIC GROUP OF FISH DEPENDENT HOUSEHOLD: ☐Akan ☐Ga ☐Ewe ☐Fanti ☐Ahanta ☐Nzema ☐Other

Material Style of Life

ENUMERATOR: ASK THESE QUESTIONS ABOUT ALL HOUSEHOLD MEMBERS. ASK THE PRIMARY OR SECONDARY RESPONDENT, WHOEVER IS MORE KNOWLEDGEABLE ABOUT THE HOUSEHOLD DWELLING CHARACTERISTICS. (THIS SECTION IS ONLY ASKED ONCE PER HOUSEHOLD)
ENUMERATOR: HAVE YOU ANSWERED THE QUESTIONS ABOUT THIS DWELLING'S CONSTRUCTION ALREADY WHEN INTERVIEWING THE PREVIOUS RESPONDENT? ☐Yes ☐No

B 1.01 ENUMERATOR: OBSERVE (DO NOT ASK) ROOF TOP MATERIAL (OUTER COVERING): ☐Palm leaves/raffia/thatch ☐Wood ☐Corrugated metal sheets ☐Asbestos/slate ☐Roofing tiles ☐Mud bricks/earth ☐Bamboo ☐Other	B 1.02 ENUMERATOR: OBSERVE (DO NOT ASK) FLOOR MATERIAL: ☐Earth/Mud/Mud Bricks ☐Wood ☐Stone ☐Cement/Concrete ☐Burnt Bricks ☐Vinyl Tiles ☐Ceramic/Marble Tiles ☐Terrazzo ☐Other
B 1.03 ENUMERATOR: OBSERVE (DO NOT ASK) EXTERIOR WALLS: ☐Mud/Mud Bricks ☐Wood/Bamboo ☐Metal Sheets/Slate/Asbestos ☐Stones ☐Burnt Bricks ☐Cement/Sandcrete Blocks ☐Thatch ☐Cardboard ☐Other	B 1.04 ENUMERATOR: OBSERVE (DO NOT ASK) STATE OF THE DWELLING: ☐In excellent repair, no sign of wear ☐In good shape, some minor wear--and--tear or damage ☐In moderate condition, some damage and moderate wear--and-- tear ☐In poor shape, much damage In very bad shape.
B 1.05 WHAT IS THE MAIN TYPE OF TOILET YOUR HOUSEHOLD USES? ☐Flush Toilet (WC) Pit Latrine ☐KVIP ☐ Pan/Bucket ☐Public toilet (flush/bucket/KVIP) ☐ Toilet in another house ☐No toilet facility (bush, beach) ☐Other	B 1.06 IS THERE A WATER SOURCE INSIDE THE DWELLING? ☐Yes ☐No

Dwelling Characteristics

B 1.07 DOES THIS DWELLING HAVE ACCESS TO ELECTRICITY?	B 1.08 WHAT IS THE MAIN SOURCE OF COOKING FUEL FOR YOUR HOUSEHOLD?
☐Yes ☐No	☐Electricity ☐Piped or liquid propane gas (biogas) ☐Kerosene ☐Charcoal ☐Firewood ☐Animal dung ☐Agricultural crop residue ☐Other

Durable Goods

B 1.09 DOES YOUR HOUSEHOLD OWN:		
MOTORIZED CANOES	☒Yes	☐No
NONMOTORIZED CANOES	☐Yes	☐No
TRAWLERS OR INSHORE BOATS (CHINA--CHINA)	☐Yes	☐No
AQUACULTURE FISH PONDS	☐Yes	☐No
AQUACULTURE FISH CAGES	☐Yes	☐No
FISHING NETS OR GEAR	☐Yes	☐No
FISH SMOKERS	☐Yes	☐No
RADIO	☐Yes	☐No
TAPE OR CD/DVD PLAYER / VCR	☐Yes	☐No
TELEVISION	☐Yes	☐No
SEWING MACHINE	☐Yes	☐No
KEROSENE STOVE	☐Yes	☐No
ELECTRIC STOVE; HOT PLATE	☐Yes	☐No
GAS STOVE	☐Yes	☐No
REFRIGERATOR	☐Yes	☐No
BICYCLE	☐Yes	☐No
MOTORBIKE	☐Yes	☐No
COMPUTER EQUIPMENT	☐Yes	☐No
GENERATOR	☐Yes	☐No

Household Demographics

<table>
<tr><td colspan="4">NOTE TO ENUMERATOR: ALL APPLICABLE QUESTIONNAIRE SECTIONS SHOULD BE ASKED OF THE HEAD OF HOUSEHOLD AND SENIORMOST GENDER--OPPOSITE HOUSEHOLD MEMBER AS SEPARATE SURVEY ENTRIES.</td></tr>
<tr><td>B 2.01 IS THE RESPONDENT THE HEAD OF HOUSEHOLD, OR THE GENDER OPPOSITE SENIORMOST HOUSEHOLD MEMBER?
☐Head of Household
☐Gender--Opposite Senior most Member</td><td colspan="3">B 2.02 WHAT IS THE RESPONDENT'S GENDER?
☐Male
☐Female</td></tr>
<tr><td>B 2.03 WHAT IS THE RESPONDENT'S AGE IN YEARS?</td><td>B 2.04 WHAT IS THE RESPONDENT'S CIVIL OR MARITAL STATUS?
☐Never Married/Single
☐Informal/Consensual Union/Living together
☐Married
☐Separated
☐Divorced
☐Widowed</td><td>B 2.05 CAN THE RESPONDENT READ AND WRITE IN EITHER ENGLISH, THE LOCAL LANGUAGE, OR BOTH?
☐Yes
☐No</td><td>B 2.06 HAS THE RESPONDENT EVER ATTENDED SCHOOL?
☐Yes
☐No</td></tr>
<tr><td colspan="4">B 2.06A WHAT IS THE HIGHEST QUALIFICATION COMPLETED BY THE RESPONDENT?
☐None ☐MSLC ☐BECE
☐Voc/Comm ☐Teacher Tra A ☐Teacher Post Sec
☐GCE O Level ☐SSCE/WASSCE ☐GCE A Level
☐Tech/Prof Cert ☐Tech/Prof Dipl ☐HND
☐Bachelors ☐Masters ☐Doctorate
☐Primary ☐Other</td></tr>
<tr><td colspan="4">PLEASE SPECIFY (SINCE YOU SELECTED OTHER):</td></tr>
</table>

Fishing Livelihood

C 1.01 ARE MEMBERS OF YOUR HOUSEHOLD ENGAGED IN ANY OF THE FOLLOWING LIVELIHOOD ACTIVITIES? (CHECK ALL THAT APPLY) ☐Fishing ☐Fish Processing / Smoking ☐Fish Trading ☐Farming food crops (cassava, vegetables, etc) ☐Farming plantation crops (cocoa, rubber, palm, etc) ☐Livestock Rearing ☐Other
C 1.01A WHAT ARE THE MAIN TYPES OF FISH YOU CATCH? (CHECK ALL THAT APPLY) ☐Small Pelagics (sardinella, anchovies and herring, mackeral) ☐Large Pelagics (tuna, marlin) ☐Bottom Demersals (red fish, grouper, cassava fish) ☐Shell Fish (Shrimps, Prawns, Crabs) ☐Other
C 1.01B WHICH GROUP OF FISH IS THE MOST IMPORTANT FOR YOUR LIVELIHOOD? ☐Small Pelagics (sardinella, anchovies and herring, mackeral) ☐Large Pelagics (tuna, marlin) ☐Bottom Demersals (red fish, grouper, cassava fish) ☐Shell Fish (Shrimps, Prawns, Crabs) ☐Other
C 1.01C WHICH LIVELIHOOD ACTIVITY IS THE MOST IMPORTANT TO YOUR HOUSEHOLD? ☐Fishing ☐Fish Processing / Smoking ☐Fish Trading ☐Farming food crops (cassava, vegetables, etc) ☐Farming plantation crops (cocoa, rubber, palm, etc) ☐Livestock Rearing ☐Other
C 1.01D WHICH LIVELIHOOD ACTIVITY IS THE SECOND MOST IMPORTANT TO YOUR HOUSEHOLD? ☐Fishing ☐Fish Processing / Smoking ☐Fish Trading ☐Farming food crops (cassava, vegetables, etc) ☐Farming plantation crops (cocoa, rubber, palm, etc) ☐Livestock Rearing ☐Other

Perceptions on Fishing

C 1.02 COMPARED TO 5 YEARS AGO, IS YOUR QUALITY OF LIFE OR STANDARD OF LIVING NOW: ☐Don't Know ☐Worse ☐About the same ☐Better
C 1.02 COMPARED TO 5 YEARS AGO, IS YOUR QUALITY OF LIFE OR STANDARD OF LIVING NOW: ☐Don't Know ☐Less ☐About the same ☐More
C 1.03 COMPARED TO 5 YEARS AGO, WOULD YOU SAY THE NUMBER OF "SMALL PELAGIC" FISH IN THE SEA IS NOW: ☐Don't Know ☐Less ☐About the same ☐More
C 1.04 COMPARED TO 5 YEARS AGO, WOULD YOU SAY THE NUMBER OF OTHER FISH (SUCH AS CASSAVA FISH, RED FISH, GROUPERS) IN THE SEA IS NOW: ☐Don't Know ☐Less ☐About the same ☐More
C 1.05 COMPARED TO 5 YEARS AGO, IS THE AMOUNT OF "SMALL PELAGIC" FISH YOU CATCH: ☐Don't Know ☐Less ☐About the same ☐More
C 1.06 COMPARED TO 5 YEARS AGO, IS THE AMOUNT OF "OTHER" FISH YOU CATCH: ☐Don't Know ☐Less ☐About the same ☐More
C 1.07 COMPARED TO 5 YRS AGO, WHICH STATEMENT DESCRIBES THE SITUATION TODAY? ☐It is easier to catch fish today ☐There is no change in the ease of catching fish ☐It is harder to catch fish today ☐Don't Know
C 1.08 COMPARED TO 5 YRS AGO, WHICH STATEMENT DESCRIBES THE SITUATION TODAY? ☐I spend less time to catch the same amount of fish ☐I spend about the same time to catch the same amount of fish ☐I have to spend more time to catch the same amount of fish ☐Don't Know

C 1.09 COMPARED TO 5 YRS AGO, WHICH STATEMENT DESCRIBES THE SITUATION TODAY? ☐I can catch more fish today with the same size net I used 5 years ago ☐I can catch the same amount of fish today with the same size net I used 5 years ago ☐I need to use bigger nets to catch the same amount of fish today that I did 5 years ago ☐Don't Know
C 1.10 WHAT ARE THE MAIN REASONS FOR THE CHANGES YOU MENTIONED, IF ANY? (CHECK ALL THAT APPLY) ☐Illegal fishing activities ☐Oil and Gas development offshore chasing the fish away ☐China--china and trawler vessels fishing take the fish ☐Increasing number of canoes and fishermen ☐Increasing number of china--china boats and trawlers ☐The sea conditions have changed compared to many years ago ☐Algal Blooms (like green--green) ☐It is God's will (Nyame) ☐It is primarily due to the actions of fishermen ☐The sea spirits are causing it (Busom, Nai, etc) ☐Other
C 1.10A PLEASE SPECIFY THE "OTHER" REASON:

Fishing Practices

C 1.11 COMPARED TO 5 YEARS AGO, HAS THE LEVEL OF LIGHT FISHING AMONG FISHERMEN IN YOUR COMMUNITY: ☐Don’t Know ☐Decreased a lot ☐Decreased somewhat ☐Stayed about the same ☐Increased somewhat ☐Increased a lot
C 1.12 COMPARED TO 5 YEARS AGO, HAS THE USE OF FINE MESH NETS AMONG FISHERMEN IN YOUR COMMUNITY: ☐Don’t Know ☐Decreased a lot ☐Decreased somewhat ☐Stayed about the same ☐Increased somewhat ☐Increased a lot
C 1.13 COMPARED TO 5 YEARS AGO, HAS THE LEVEL OF BOMB (DYNAMITE) FISHING AMONG FISHERMEN IN YOUR COMMUNITY: ☐Don’t Know ☐Decreased a lot ☐Decreased somewhat ☐Stayed about the same ☐Increased somewhat ☐Increased a lot
C 1.14 COMPARED TO 5 YEARS AGO, HAS THE LEVEL OF CARBIDE OR POISONOUS CHEMICAL FISHING AMONG FISHERMEN IN YOUR COMMUNITY: ☐Don’t Know

☐Decreased a lot
☐Decreased somewhat
☐Stayed about the same
☐Increased somewhat
☐Increased a lot

C 1.15A HOW AWARE ARE YOU OF GHANAIAN FISHING REGULATIONS?
☐Barely/Not at all
☐Somewhat
☐Very

C 1.15B I WILL READ YOU A LIST OF FISHING PRACTICES. FOR EACH, PLEASE TELL ME IF IT IS ILLEGAL UNDER GHANA FISHING LAW.
[ENUMERATOR: CHECK ALL THAT RESPONDENT SAYS ARE ILLEGAL]
☐Set gill nets
☐Monofilament nets (i.e. Rubber Nets, Sika Ye Abrantie)
☐Nets with mesh sizes smaller than 2.5cm
☐Beach seines
☐Fishing with lights
☐Nets with mesh sizes greater than 10cm
☐Catching of sword fish
☐Fish transferred from trawlers to canoes and then brought to shore (i.e. Saiko)
☐Catching of sea turtles
☐"Ali Poli Watcha" nets
☐Use of dynamite
☐Drift gill nets

C 1.16 ARE ANY OF THE FOLLOWING FISHING VESSELS CONDUCTING ILLEGAL FISHING ACTIVITIES NEAR YOUR COMMUNITY, SUCH AS LIGHT FISHING, DYNAMITE FISHING, CARBIDE FISHING, USING FINE MESH NETS OR TRAWLERS OPERATING SHORE? (CHECK ALL THAT APPLY)
☐Large Foreign industrial fishing boats
☐Ghanaian trawlers
☐Inshore china--china boats
☐Canoes

C 1.16A OF THOSE, WHO IS THE MOST FREQUENT VIOLATOR?
☐Large Foreign industrial fishing boats
☐Ghanaian trawlers
☐Inshore china--china boats
☐Canoes

C 1.17 HOW OFTEN DO YOU SEE THE MARINE POLICE OR FISHERIES COMMISSION ENFORCEMENT OFFICERS PATROLLING THE BEACHES IN YOUR COMMUNITY?
☐Don't Know
☐Not at all/Never
☐Rarely
☐Frequently
☐All the time

C 1.18 HOW OFTEN DO YOU SEE THE NAVY OR MARINE POLICE PATROLLING IN THE SEA?
☐Don't Know
☐Not at all/Never
☐Rarely

☐Frequently
☐All the time

C 1.19 HOW OFTEN DO ENFORCEMENT OFFICERS TALK TO YOU ABOUT THE REASONS FOR THE FISHERIES LAWS?
☐Don't Know
☐Not at all/Never
☐Rarely
☐Frequently
☐All the time

C 1.20 WHICH STATEMENT DO YOU FEEL REFLECTS YOUR OPINION ABOUT THE FISHERY:
☐If the fishing laws are followed by all fishermen it will increase fish catches in the future
☐The current fishing laws if followed by all fishermen, will not increase the fish catches in the future
☐Don't Know

C 1.21 WHAT IS THE LIKELIHOOD THAT A FISHERMAN WILL BE ARRESTED FOR ILLEGAL FISHING (SUCH AS LIGHT FISHING OR DYNAMITE FISHING)?
☐Don't Know
☐Not at all/Never
☐Rarely
☐Frequently
☐All the time

C 1.22 WHAT IS THE LIKELIHOOD THAT A FISHERMAN, IF ARRESTED, WILL HAVE GEAR CONFISCATED, PAY A FINE, OR GO TO JAIL?
☐Don't Know
☐Not at all/Never
☐Rarely
☐Frequently
☐All the time

C 1.23 TO WHAT EXTENT DO PEOPLE HIGH UP (SUCH AS POLITICIANS) INTERVENE ON BEHALF OF FISHERMEN IF THEY ARE ARRESTED TO GET THEM OFF WITH NO JAIL, NO FINE, OR RELEASE OF CONFISCATED GEAR?
☐Don't Know
☐Not at all/Never
☐Rarely
☐Frequently
☐All the time

C 1.24 WHICH STATEMENT MOST REFLECTS YOUR OPINION ABOUT FISHING PENALTIES?
☐The penalties are so small, it does not stop anyone from illegal fishing
☐The penalties are very severe and prevent fishermen from illegal fishing
☐Don't Know

C 1.25 IF YOU SEE A FISHERMAN WHO LIVES IN YOUR COMMUNITY USING ILLEGAL FISHING METHODS (SUCH AS LIGHT FISHING OR DYNAMITE FISHING), WHICH OF THE FOLLOWING ACTIONS WOULD YOU MOST LIKELY DO?
☐Nothing and ignore it
☐Tell them to stop using those fishing methods
☐Stop socializing with them if they were my friend
☐Report them to the chief fisherman

☐Report them to the police
C 1.26 FROM THE FOLLOWING LIST OF PEOPLE, WHO DO YOU RESPECT THE MOST IN ADVISING YOU ABOUT GOOD AND BAD FISHING PRACTICES? ☐Fisheries Commission Official ☐Chief Fisherman ☐Local Government Official ☐Chief Fishmonger (i.e. Kokohene) ☐Police ☐Traditional Leader (other than Chief Fisherman or Kokohene, i.e. Chief of community/Ohene)
C 1.27 DO LAW ENFORCEMENT OFFICERS EVER ACCEPT PAYMENT FROM FISHERMEN TO NOT ARREST THEM FOR ILLEGAL FISHING (SUCH AS LIGHT FISHING FISHING)? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.28 HOW OFTEN ARE YOU ASKED FOR YOUR OPINION ABOUT DEVELOPMENT OF FISHING LAWS BY THE FISHERIES COMMISSION? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.29 HOW OFTEN ARE YOU ASKED FOR YOUR OPINION ABOUT DEVELOPMENT OF FISHING LAWS BY LOCAL GOVERNMENT OFFICIALS? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.30 HOW OFTEN ARE YOU ASKED FOR YOUR OPINION ABOUT DEVELOPMENT OF FISHING LAWS BY CHIEF FISHERMEN OR TRADITIONAL LEADERS? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.31 WHO SHOULD BE THE PRIMARY GROUPS INVOLVED IN DECIDING RULES ABOUT FISHING? (CHOOSE NO MORE THAN 2) ☐Fishermen ☐Fish Processors / Traders ☐Chief Fishermen ☐Traditional Leaders ☐Local Government / District Assembly ☐National Fisheries Commission ☐Environmental Groups ☐Members of Parliament

WHICH OF THE FOLLOWING PRACTICES IN YOUR COMMUNITY DO YOU BELIEVE ARE ACCEPTABLE FOR PARENTS TO ALLOW?
C 1.32 CHILDREN UNDER THE AGE OF 15 YEARS: ☐Working on a fishing vessel ☐Selling fish or smoking fish after school ☐Selling or smoking fish during any time of the day ☐Parent taking payment from a person who promises to take care of the child at a location outside of the community
C 1.33 CHILDREN BETWEEN THE AGES OF AT LEAST 15 BUT BELOW 18 YEARS: ☐Working on a fishing vessel ☐Selling fish or smoking fish after school ☐Selling or smoking fish during any time of the day ☐Parent taking payment from a person who promises to take care of the child at a location outside of the community
C 1.35 IN YOUR OPINION, HOW WIDESPREAD IS THE PRACTICE OF PARENTS ALLOWING CHILDREN UNDER THE AGE OF 15 YEARS TO GO FISHING? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.36 IN YOUR OPINION, HOW WIDESPREAD IS THE PRACTICE OF PARENTS ALLOWING CHILDREN UNDER THE AGE OF 15 YEARS TO WORK DURING SCHOOL HOURS SMOKING FISH? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.37 IN YOUR OPINION, HOW WIDESPREAD IS THE PRACTICE OF PARENTS ALLOWING CHILDREN UNDER THE AGE OF 15 YEARS TO WORK DURING SCHOOL HOURS SELLING FISH? ☐Don't Know ☐Not at all/Never ☐Rarely ☐Frequently ☐All the time
C 1.38 SOMETIMES PARENTS IN FISHING COMMUNITIES TAKE PAYMENTS FROM A PERSON WHO PROMISES TO TAKE CARE OF A CHILD AT A LOCATION OUTSIDE YOUR COMMUNITY. IN YOUR OPINION, HOW WIDESPREAD IS THIS PRACTICE? ☐Many families in the community do this ☐Only a few families in the community do this ☐No one in the community ever does this
WHICH OF THE FOLLOWING PRACTICES DO YOU BELIEVE ARE ILLEGAL UNDER GHANA'S LABOR LAWS? CHECK ALL THAT APPLY
C 1.39 CHILDREN BELOW THE AGE OF 15 YEARS: ☐Working on a fishing vessel ☐Selling fish or smoking fish after school ☐Selling or smoking fish during any time of the day

☐Parent taking payment from a person who promises to take care of the child at a location outside of the community
C 1.40 CHILDREN BETWEEN THE AGES OF AT LEAST 15 BUT BELOW 18 YEARS: ☐Working on a fishing vessel ☐Selling fish or smoking fish after school ☐Selling or smoking fish during any time of the day ☐Parent taking payment from a person who promises to take care of the child at a location outside of the community

Household Hunger Scale

ENUMERATOR: ASK OF THE PERSON RESPONSIBLE FOR HOUSEHOLD FOOD PREPARATION	
D 1.01 IN THE LAST 4 WEEKS, WAS THERE EVER NO FOOD TO EAT OF ANY KIND IN YOUR DWELLING BECAUSE OF LACK OF RESOURCES TO GET FOOD? ☐Yes ☐No	D 1.01A HOW OFTEN DID THIS HAPPEN IN THE LAST 4 WEEKS? ☐Rarely (1-2 times) ☐Sometimes (3-10 times) ☐Often (more than 10 times)
D 1.02 IN THE LAST 4 WEEKS, DID YOU OR ANY HOUSEHOLD MEMBER GO TO SLEEP AT NIGHT HUNGRY BECAUSE THERE WAS NOT ENOUGH FOOD? ☐Yes ☐No	D 1.02A HOW OFTEN DID THIS HAPPEN IN THE LAST 4 WEEKS? ☐Rarely (1-2 times) ☐Sometimes (3-10 times) ☐Often (more than 10 times)
D 1.03 IN THE LAST 4 WEEKS, DID YOU OR ANY HOUSEHOLD MEMBER GO A WHOLE DAY AND NIGHT WITHOUT EATING ANYTHING AT ALL BECAUSE THERE WAS NOT ENOUGH FOOD? ☐Yes ☐No	D 1.03A HOW OFTEN DID THIS HAPPEN IN THE LAST 4 WEEKS? ☐Rarely (1--2 times) ☐Sometimes (3--10 times) ☐Often (more than 10 times)

Women's Dietary Diversity

ENUMERATOR ASK: NOW I WOULD LIKE TO ASK YOU ABOUT (OTHER) LIQUIDS OR FOODS THAT YOU ATE YESTERDAY, DURING DAY ORNIGHT. I [ENUMERATOR] AM INTERESTED IN WHETHER YOU ATE THE ITEM EVEN IF IT WAS COMBINED WITH OTHER FOODS. PLEASE DESCRIBE EVERYTHING THAT YOU ATE YESTERDAY DURING THE DAY OR NIGHT, WHETHER AT HOME OR OUTSIDE THE HOME.
1. Think about when you first woke up yesterday. Did you eat anything at that time? If yes: please tell me everything you ate at that time. Probe: anything else? Until respondent says nothing else. If no, continue to next question.
2. What did you do after that? Did you eat anything at that time? If yes: please tell me everything you ate at that time. Probe: anything else? Until respondent says nothing else. Repeat this until respondent says she went to sleep until the next day. If a respondent mentions mixed dishes like a porridge sauce or stew, probe with the following question:
3. What ingredients were in that mixed dish? Probe: Anything else? Until Respondent Says nothing else.

ENUMERATOR INSTRUCTION: AS THE RESPONDENT RECALLS FOODS, SELECT "YES" FOR THE CORRESPONDING FOOD BELOW. IF ANY FOOD IS NOT LISTED IN THE FOOD GROUPS BELOW, ENTER IT IN THE "OTHER FOODS" TEXT BOX. IF FOODS ARE USED IN SMALL AMOUNTS FOR SEASONING OR AS A CONDIMENT, THEY SHOULD BE INCLUDED IN THE OPTION "CONDIMENTS"
ONCE THE RESPONDENT FINISHES RECALLING THE FOODS EATEN, READ EACH FOOD GROUP WHICH WAS NOT MARKED "YES", ASK THE FOLLOWING QUESTION, AND MARK EITHER "YES", "NO" OR "DON'T KNOW" FOR THE GROUP: YESTERDAY DURING THE DAY OR NIGHT, DID YOU DRINK/EAT ANY [FOOD GROUP ITEMS]?
MILK SUCH AS TINNED, POWDERED, OR FRESH ANIMAL MILK ☐Yes ☐No ☐Don't Know/No Response
TEA OR COFFEE ☐Yes ☐No ☐Don't Know/No Response
ANY OTHER LIQUIDS (JUICE, COCOA) ☐Yes ☐No ☐Don't Know/No Response
BREAD, RICE, NOODLES, OR OTHER FOODS MADE FROM GRAINS (KENKEY, BANKU, KOKO, TUO ZAAFI, AKPLE, WEANIMIX) ☐Yes ☐No ☐Don't Know/No Response
PUMPKIN, RED OR YELLOW YAMS, CARROTS, SWEET POTATOES THAT ARE YELLOW OR ORANGE INSIDE ☐Yes ☐No ☐Don't Know/No Response
WHITE POTATOES, WHITE YAMS, MANIOC, CASSAVA, COCOYAM, FUFU, OR ANY OTHER FOODS MADE FROM ROOTS, TUBERS, OR PLANTAIN ☐Yes ☐No ☐Don't Know/No Response
ANY DARK GREEN, LEAFY VEGETABLES (KONTOMIRE, ALEEFU, AYOYO, KALE, CASSAVA LEAVES) ☐Yes ☐No ☐Don't Know/No Response
RIPE MANGOES, PAWPAW ☐Yes ☐No ☐Don't Know/No Response
ANY OTHER FRUITS OR VEGETABLES (E.G. BANANAS, AVOCADOS, TOMATOES, ORANGES, APPLES) ☐Yes ☐No

☐Don't Know/No Response
LIVER, KIDNEY, HEART, OR OTHER ORGAN MEATS ☐Yes ☐No ☐Don't Know/No Response
ANY MEAT, SUCH AS BEEF, PORK, LAMB, GOAT, CHICKEN, OR DUCK ☐Yes ☐No ☐Don't Know/No Response
EGGS ☐Yes ☐No ☐Don't Know/No Response
FRESH OR DRIED FISH OR SHELLFISH (E.G. PRAWN, LOBSTER) ☐Yes ☐No ☐Don't Know/No Response
ANY FOODS MADE FROM BEANS, PEAS, LENTILS, NUTS, OR SEEDS ☐Yes ☐No ☐Don't Know/No Response
YOGURT, CHEESE, OR OTHER MILK PRODUCTS ☐Yes ☐No ☐Don't Know/No Response
ANY OIL, FATS, OR BUTTER, OR FOODS MADE WITH ANY OF THESE ☐Yes ☐No ☐Don't Know/No Response
ANY SUGARY FOODS SUCH AS CHOCOLATES, SWEETS, CANDIES, PASTRIES, CAKES, OR BISCUITS ☐Yes ☐No ☐Don't Know/No Response
CONDIMENTS FOR FLAVOR, SUCH AS CHILLIES, SPICES, HERBS, OR FISH POWDER ☐Yes ☐No ☐Don't Know/No Response
GRUBS, SNAILS, OR INSECTS ☐Yes ☐No ☐Don't Know/No Response
FOODS MADE WITH RED PALM OIL, RED PALM NUT, OR RED PALM NUT PULP SAUCE ☐Yes ☐No ☐Don't Know/No Response

OTHER FOODS ☐Yes ☐No

Empowerment in Agriculture Index (modified)

Enumerator note: ask to conduct the interview for this section in private or where other members of the household cannot overhear or contribute answers. Do not attempt to make responses between the primary and secondary respondent the same - it is ok for them to be different. Ensure that you code the outcome of the interview at the end of the interview for each target respondent under this section.

Role in Household Decision--making around production and income generation

G 1.01 DID YOU (SINGULAR) PARTICIPATE IN FISHING OR FISHPOND CULTURE IN THE PAST 12 MONTHS? ☐Yes ☐No	G 1.01A HOW MUCH INPUT DID YOU HAVE IN MAKING DECISIONS ABOUT FISHING OR FISHPOND CULTURE? ☐No input ☐Input into very few decisions ☐Input into some decisions ☐Input into most decisions ☐Input into all decisions ☐No decision made

Access to Productive Capital

"NOW I'D LIKE TO ASK YOU ABOUT YOUR HOUSEHOLD'S OWNERSHIP OF A NUMBER OF ITEMS THAT COULD BE USED TO GENERATE INCOME."	
G 1.02 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY AGRICULTURAL LAND (PIECES/PLOTS)? ☐Yes ☐No	G 1.02A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.03 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY LIVESTOCK OR POULTRY (OXEN, CATTLE, GOATS, PIGS, SHEEP, CHICKENS, DUCKS, TURKEYS, PIGEONS, ETC)? ☐Yes ☐No	G 1.03A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s)

	☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.04 1. DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY FISHING BOATS OR GEAR? ☐Yes ☐No	G 1.04A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

HOW MANY MOTORIZED CANOES?	HOW MANY NONMOTORIZED CANOES?	HOW MANY SEMI-INDUSTRIAL BOATS?	HOW MANY TRAWLERS?	HOW MANY FISHING NETS OR GEAR?

G 1.04 2. DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY AQUACULTURE EQUIPMENT (PONDS OR CAGES)? ☐Yes ☐No	G 1.04 2A. WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

HOW MANY AQUACULTURE PONDS?	HOW MANY AQUACULTURE CAGES?

G 1.04 3. DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY FISH SMOKING EQUIPMENT? ☐Yes ☐No	G 1.04 3A. WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

HOW MANY FISH SMOKERS?	
G 1.05 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY HOUSES? ☐Yes ☐No	G 1.05A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

G 1.06 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE ANY CELLPHONES? ☐Yes ☐No		
G 1.06A WHO WOULD YOU SAY OWNS MOSTOF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	G 1.06B WHAT TYPE(S) OF PHONE (I.E. IPHONE, ANDROID, BASIC SMS/VOICE, ETC) ☐Smart Phone (iPhone Android phone with internet connectivity and keyboard, etc) ☐Basic Phone (SMS/Voice only)	G 1.06C WHICH CELL PROVIDERS? ☐MTN ☐Tigo (Millicom) ☐Glo ☐Expresso ☐Airtel ☐Vodafone ☐Other
G 1.07 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE OTHER LAND NOT USED FOR AGRICULTURAL PURPOSES (PIECES/PLOTS, RESIDENTIAL OR COMMERCIAL LAND, ETC)? ☐Yes ☐No	G 1.07A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	

G 1.08 DOES ANYONE IN YOUR HOUSEHOLD CURRENTLY HAVE MEANS OF TRANSPORTATION (BICYCLE, MOTORCYCLE, CAR, ETC)? ☐Yes ☐No	G 1.08A WHO WOULD YOU SAY OWNS MOST OF THIS ITEM? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

Access to Credit

"NEXT I'D LIKE TO ASK ABOUT YOUR HOUSEHOLD'S EXPERIENCE WITH BORROWING MONEY OR OTHER ITEMS IN THE PAST 12 MONTHS."		
G 1.09 DOES ANYONE IN YOUR HOUSEHOLD HAVE A BANK ACCOUNT? ☐Yes ☐No ☐Don't Know/No Response		
G 1.09A WHAT KIND OF ACCOUNT? ☐Current ☐Savings ☐Both current and savings	G 1.09B WHO IS THE OWNER OF THE ACCOUNT? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	G 1.09C WHO MAKES DECISIONS REGARDING WITHDRAWALS FROM THE ACCOUNT? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.09D DO YOU REGULARLY DEPOSIT SOME OF YOUR INCOME IN YOUR ACCOUNT(S)? ☐Yes ☐No		
G 1.10 HAS ANYONE IN YOUR HOUSEHOLD TAKEN ANY LOANS OR BORROWED CASH/IN--KIND FROM A NON-GOVERNMENT ORGANIZATION (NGO) IN THE PAST 12 MONTHS? ☐Yes ☐No ☐Don't Know / No Response		
G 1.10A WHAT TYPE OF LOAN/BORROWING?	G 1.10B WHO MADE THE DECISION TO BORROW FROM THIS SOURCE? ☐Self ☐Partner / Spouse	G 1.10C WHO MAKES THE DECISION ABOUT WHAT TO DO WITH MONEY OR ITEMS BORROWED FROM THIS SOURCE? ☐Self

☐Cash ☐In--kind ☐Cash and in--kind	☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.11 HAS ANYONE IN YOUR HOUSEHOLD TAKEN ANY LOANS OR BORROWED CASH/IN--KIND FROM AN INFORMAL LENDER IN THE PAST 12 MONTHS? ☐Yes ☐No ☐Don't Know/No Response		
G 1.11A WHAT TYPE OF LOAN/BORROWING? ☐Cash ☐In-kind ☐Cash and in--kind	G 1.11B WHO MADE THE DECISION TO BORROW FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	G 1.11C WHO MAKES THE DECISION ABOUT WHAT TO DO WITH MONEY OR ITEMS BORROWED FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.12 HAS ANYONE IN YOUR HOUSEHOLD TAKEN ANY LOANS OR BORROWED CASH FROM A FORMAL LENDER (BANK/FINANCIAL/INSTITUTION) IN THE PAST 12 MONTHS? ☐Yes ☐No ☐Don't Know / No Response		
G 1.12A WHAT TYPE OF LOAN/BORROWING? ☐Cash ☐In--kind ☐Cash and in--kind	G 1.12B WHO MADE THE DECISION TO BORROW FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s)	G 1.12C WHO MAKES THE DECISION ABOUT WHAT TO DO WITH MONEY OR ITEMS BORROWED FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household

	☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.13 HAS ANYONE IN YOUR HOUSEHOLD TAKEN ANY LOANS OR BORROWED CASH/IN-KIND FROM A FRIEND OR RELATIVE IN THE PAST 12 MONTHS? ☐Yes ☐No ☐Don't Know / No Response		
G 1.13A WHAT TYPE OF LOAN/ BORROWING ? ☐Cash ☐In-kind ☐Cash and in-kind	G 1.13B WHO MADE THE DECISION TO BORROW FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	G 1.13C WHO MAKES THE DECISION ABOUT WHAT TO DO WITH MONEY OR ITEMS BORROWED FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people ☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.
G 1.14 HAS ANYONE IN YOUR HOUSEHOLD TAKEN ANY LOANS OR BORROWED CASH/IN-KIND FROM A GROUP BASED MICRO-FINANCE OR LENDING (INCLUDING VILLAGE SAVINGS AND LOAN ASSOCIATIONS VLSA OR SUSU OR MERRY--GO--ROUNDS, ETC) IN THE PAST 12 MONTHS? ☐Yes ☐No ☐Don't Know / No Response		
G 1.14A WHAT TYPE OF LOAN/BORROWING? ☐Cash ☐In-kind ☐Cash and in-kind	G 1.14B WHO MADE THE DECISION TO BORROW FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people	G 1.14C WHO MAKES THE DECISION ABOUT WHAT TO DO WITH MONEY OR ITEMS BORROWED FROM THIS SOURCE? ☐Self ☐Partner / Spouse ☐Self and Partner/Spouse jointly ☐Other household member(s) ☐Self and other household member(s) ☐Partner/Spouse and other household member(s) ☐Someone (or group of people) outside the household ☐Self and other outside people

	☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.	☐Partner/Spouse and other outside people ☐Self, partner/spouse, and other outside people.

Individual Leadership and Influence in the Community

G 1.15 DO YOU FEEL COMFORTABLE SPEAKING UP IN PUBLIC TO HELP DECIDE ON INFRASTRUCTURE (LIKE SMALL WELLS, ROADS, WATER SUPPLIES) TO BE BUILT IN YOUR COMMUNITY? ☐No, not at all comfortable ☐Yes, but with a great deal of difficulty ☐Yes, but with a little difficulty ☐Yes, fairly comfortable ☐Yes, very comfortable
G 1.16 DO YOU FEEL COMFORTABLE SPEAKING UP IN PUBLIC TO ENSURE PROPER PAYMENT OF WAGES FOR PUBLIC WORKS OR OTHER SIMILAR PROGRAMS? ☐No, not at all comfortable ☐Yes, but with a great deal of difficulty ☐Yes, but with a little difficulty ☐Yes, fairly comfortable ☐Yes, very comfortable
G 1.17 DO YOU FEEL COMFORTABLE SPEAKING UP IN PUBLIC TO PROTEST THE MISBEHAVIOR OF AUTHORITIES OR ELECTED OFFICIALS? ☐No, not at all comfortable ☐Yes, but with a great deal of difficulty ☐Yes, but with a little difficulty ☐Yes, fairly comfortable ☐Yes, very comfortable
G 1.18 DO YOU FEEL COMFORTABLE SPEAKING UP IN PUBLIC TO PROTEST ILLEGAL FISHING ACTIVITIES? ☐No, not at all comfortable ☐Yes, but with a great deal of difficulty ☐Yes, but with a little difficulty ☐Yes, fairly comfortable ☐Yes, very comfortable
G 1.19 DO YOU FEEL COMFORTABLE SPEAKING UP IN PUBLIC TO PROPOSE NEW FISHING RULES NEEDED TO REBUILD THE FISHERY? ☐No, not at all comfortable ☐Yes, but with a great deal of difficulty ☐Yes, but with a little difficulty ☐Yes, fairly comfortable ☐Yes, very comfortable

Group Membership

<table>
<tr><td colspan="2">"NOW I'M GOING TO ASK YOU ABOUT GROUPS IN THE COMMUNITY. THESE CAN BE EITHER FORMAL OR INFORMAL AND CUSTOMARY GROUPS."</td></tr>
<tr><td colspan="2">G 2.01 IS THERE A NATIONAL IN--SHORE FISHERMEN'S ASSOCIATION (GIFA) GROUP?
☐Yes
☐No
☐Don't Know / No Response</td></tr>
<tr><td>G 2.01A ARE YOU AN ACTIVE MEMBER OF THIS GROUP?
☐Yes
☐No</td><td>G 2.01B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP?
☐No input
☐Input into very few decisions
☐Input into some decisions
☐Input into most decisions
☐Input into all decisions.</td></tr>
<tr><td colspan="2">G 2.02 IS THERE A NATIONAL CANOE FISHERMEN'S COUNCIL (GNCFC) GROUP?
☐Yes
☐No
☐Don't Know / No Response</td></tr>
<tr><td>G 2.02A ARE YOU AN ACTIVE MEMBER OF THIS GROUP?
☐Yes
☐No</td><td>G 2.02B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP?
☐No input
☐Input into very few decisions
☐Input into some decisions
☐Input into most decisions
☐Input into all decisions.</td></tr>
<tr><td colspan="2">G 2.03 IS THERE A CEWEFIA (CENTRAL AND WESTERN REGION FISHMONGERS IMPROVEMENT ASSOCIATION) GROUP?
☐Yes
☐No
☐Don't Know / No Response</td></tr>
<tr><td>G 2.03A ARE YOU AN ACTIVE MEMBER OF THIS GROUP?
☐Yes
☐No</td><td>G 2.03B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP?
☐No input
☐Input into very few decisions
☐Input into some decisions
☐Input into most decisions
☐Input into all decisions.</td></tr>
<tr><td colspan="2">G 2.04 IS THERE A DAA (DEVELOPMENT ACTION ASSOCIATION) GROUP?
☐Yes
☐No
☐Don't Know / No Response</td></tr>
<tr><td>G 2.04A ARE YOU AN ACTIVE MEMBER OF THIS GROUP?
☐Yes
☐No</td><td>G 2.04B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP?
☐No input
☐Input into very few decisions
☐Input into some decisions
☐Input into most decisions
☐Input into all decisions</td></tr>
</table>

G 2.05 IS THERE A (NATIONAL FISH PROCESSORS AND TRADERS ASSOCIATION) GROUP ☐Yes ☐No ☐Don't Know / No Response	
G 2.05A ARE YOU AN ACTIVE MEMBER OF THIS GROUP? ☐Yes ☐No	G 2.05B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP? ☐No input ☐Input into very few decisions ☐Input into some decisions ☐Input into most decisions ☐Input into all decisions
G 2.06 IS THERE ANOTHER FISHMONGER OR PROCESSOR GROUP? ☐Yes ☐No ☐Don't Know / No Response	
G 2.06A ARE YOU AN ACTIVE MEMBER OF THIS GROUP? ☐Yes ☐No	G 2.06B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP? ☐No input ☐Input into very few decisions ☐Input into some decisions ☐Input into most decisions ☐Input into all decisions
G 2.07 IS THERE A CREDIT OR MICROFINANCE (INCLUDING SUSU / VILLAGE SAVINGS AND LOAN ASSOCIATIONS -- VSLA) GROUP? ☐Yes ☐No ☐Don't Know / No Response	
G 2.07A ARE YOU AN ACTIVE MEMBER OF THIS GROUP? ☐Yes ☐No	G 2.07B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP? ☐No input ☐Input into very few decisions ☐Input into some decisions ☐Input into most decisions ☐Input into all decisions
G 2.08 IS THERE A TRADE AND BUSINESS ASSOCIATION? ☐Yes ☐No ☐Don't Know / No Response	
G 2.08A ARE YOU AN ACTIVE MEMBER OF THIS GROUP? ☐Yes ☐No	G 2.08B HOW MUCH INPUT DO YOU HAVE IN MAKING DECISIONS IN THIS GROUP? ☐No input ☐Input into very few decisions ☐Input into some decisions ☐Input into most decisions ☐Input into all decisions

Decision Making

"NOW I HAVE SOME QUESTIONS ABOUT MAKING DECISIONS ABOUT VARIOUS ASPECTS OF HOUSEHOLD LIFE."
G 3.01 WHEN DECISIONS ARE MADE REGARDING GETTING INPUTS FOR FISHING, WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.02 WHEN DECISIONS ARE MADE REGARDING THE TYPE OF FISHING, WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.03 WHEN DECISIONS ARE MADE REGARDING TAKING FISH SMOKING OR PROCESSING, WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.04 WHEN DECISIONS ARE MADE REGARDING TAKING FISH TO THE MARKET (OR NOT), WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.05 WHEN DECISIONS ARE MADE REGARDING YOUR OWN (SINGULAR) WAGE OR SALARY EMPLOYMENT, WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly

☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.06 WHEN DECISIONS ARE MADE REGARDING MAJOR HOUSEHOLD EXPENDITURES (SUCH AS A LARGE APPLIANCE FOR THE HOUSE LIKE REFRIGERATOR), WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
G 3.07 WHEN DECISIONS ARE MADE REGARDING MINOR HOUSEHOLD EXPENDITURES (SUCH AS FOOD FOR DAILY CONSUMPTION OR OTHER HOUSEHOLD NEEDS), WHO IS IT THAT NORMALLY TAKES THE DECISION? ☐Main male or husband ☐Main female or wife ☐Husband and wife jointly ☐Someone else in the household ☐Jointly with someone else inside the household ☐Jointly with someone else outside the household ☐Someone outside the household / other ☐Household does not engage in activity / Decision not made
ENUMERATOR: ABILITY TO BE INTERVIEWED ALONE ☐Alone ☐With adult females present ☐With adult males present ☐With adults mixed sex present ☐With children present ☐With adults mixed sex and children present