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# SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

## Post-Harvest Processing Scoping Study Report

June, 2015



**Hen Mpoano**



**SNV SMART  
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## ACRONYMS

AOR	Administrative Officer Representative
ASSESS	Analytical Support Services and Evaluations for Sustainable Systems
CEMAG	Community Environmental Monitoring and Advocacy Group
CCLME	Canary Current Large Marine Ecosystem
CCM	Centre for Coastal Management
CDCS	Country Development Cooperation Strategy
CEWEFIA	Central and Western Region Fishmongers Improvement Association
COMFISH	Collaborative Management for a Sustainable Fisheries Future
CoP	Chief of Party
CPUE	Catch per Unit Effort
CR	Central Region
CRC	Coastal Resources Center at the Graduate School of Oceanography, University of Rhode Island
CRCC	Central Regional Coordinating Council
CSLP	Coastal Sustainable Landscapes Project
CSO	Civil Society Organization
DA	District Authorities
DAA	Development Action Association
DAASGIFT	Daasgift Quality Foundation
DFAS	Department of Fisheries and Aquatic Sciences
DFID	Department for International Development
DO	Development Objective
EBM	Ecosystem-Based Management
EG	Economic Growth
EMMP	Environmental Mitigation and Monitoring Plan
ERF	Environmental Review Form
ETP	Endangered, Threatened and Protected
FAO	Food and Agricultural Organization of the United Nations
FASDEP	Food and Agriculture Sector Development Program
FASDP	Fisheries and Aquaculture Sector Development Program
FC	Fisheries Commission
FCWCGG	Fisheries Committee for the West central Gulf of Guinea
FEU	Fisheries Enforcement Unit
FHI	Family Health International
FoN	Friends of Nation
FtF	Feed the Future
HM	Hen Mpoano
GCLME	Guinea Current Large Marine Ecosystem
GIFA	Ghana Inshore Fishermen's Association
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit
GLM	Generalized Linear Models
GNAFF	Ghana National Association of Farmers and Fishermen
GNCFC	Ghana National Canoe Fishermen's Council
GoG	Government of Ghana
GSA	Ghana Standards Authority
GSO	Graduate School of Oceanography, University of Rhode Island
ICFG	Integrated Coastal and Fisheries Governance
ICM	Integrated Coastal Management

ICT	Information, Communication Technology
IEE	Initial Environmental Examination
IR	Intermediate Results
IUCN	International Union for Conservation of Nature
IUU	Illegal Unreported Unregulated
JICA	Japan International Cooperation Agency
LEAP	Livelihood Enhancement against Poverty
LOE	Level of Effort
LOGODEP	Local Government Development Program
LoP	Life of Project
MCS	Monitoring, Control and Surveillance
METASIP	Medium Term Agricultural Investment Program
METSS	Monitoring, Evaluation and Technical Support Services
MFRD	Marine Fisheries Research Division
MOFAD	Ministry of Fisheries and Aquaculture Development
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MSME	Micro Small and Medium Enterprises
MSP	Marine Spatial Planning
M&E	Monitoring and Evaluation
NAFAG	National Fisheries Association of Ghana
NGO	Non-Governmental Organization
NC	National Committee
NRM	Natural Resources Management
PMEP	Performance Monitoring and Evaluation Plan
PMP	Performance Management Plan
PPP	Public Private Partnerships
RAVI	Rights and Voices Initiative
RCC	Regional Coordinating Council
RFA	Request for Application
RPA	Rapid Partnership Appraisal
SAMP	Special Area Management Plans
SFMP	Sustainable Fisheries Management Program
SMEs	Small and Medium Enterprises
SNV	Netherlands Development Organization
SS	Spatial Solutions
SSG	SSG Advisors
STEP	Sustainable, Transparent, Effective Partnerships
STWG	Scientific and Technical Working Group
UCAD	University Cheikh Anta Diop
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development
USG	United States Government
WA	West Africa
WARFP	West Africa Regional Fisheries Development Program
WASH	Water, Sanitation and Hygiene
WR	Western Region

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## **1.0 INTRODUCTION**

The problem in Ghana's Marine fisheries sector is complex, tragic, and too- common, severely overexploited fisheries put at risk tens of thousands of metric tons of local food fish supply and threaten the livelihoods of people and many more fisheries resource dependent households. As part of the USAID-SFMP scoping study on post-harvest scoping study, SNV Netherlands Development Organisation undertook this research in Winneba, Apam, Elmina, Moree, Shama and Ankobra in Central and Western regions of Ghana in order to have a fair idea of what happens in our fishing communities thus determining the number and various types of fish smoking stoves, the processing techniques adopted by the fish processors, types of fishes normally processed, challenges that the fish processors encounter with respect to the adopted processing techniques as well as the stoves used for fish smoking. The study revealed that a number of methods are used to preserve fish. Some employ techniques based on temperature control, using ice, refrigeration or freezing; others on the control of water activity which includes drying, salting and smoking. About 95% of the processors were into fish smoking and the stoves identified were Kosmos, Morrison, Chorkor and Oil drum (in different shapes), while the other 5% constitute processors who are into salting, drying, frying and freezing. Processing fish involves primarily the application of preservation techniques in order to retain the quality and increase shelf life. It may also deal with value-adding to produce a wide variety of products.

The research was also in partial fulfilment of the Sustainable Fisheries Management Project (SFMP) which seeks to rebuild fish stocks by ending overfishing of key stocks important to local food security through a multi-pronged approach.

The SFMP supports the Government of Ghana's fisheries development policies and objectives and squarely aims to assist the country to end overfishing and rebuild targeted fish stocks as a central goal. Adoption of sustainable fishing practices and reduced exploitation to end overfishing is the only way Ghana can maintain the sustainability of its marine fisheries in order to increase its local marine food fish supply and brings greater profitability to the fishery, with the potential to benefit millions of people indirectly.

### **1.1 Methodology for Scoping Study**

The methods adopted for this study were Focus Group Discussions and Field Visitation Approaches (involving One-on-One interview with processors) that undertake various types of fish processing activities. A set of assessment questionnaires were designed to help take stock of existing knowledge and to capture information which otherwise had not been documented. This Scoping Study was carried out in the six pilot areas namely, Winneba, Apam, Elmina, Moree, Shama and Ankobra Estuary.

## **2.0 COMMUNITY REPORT – WINNEBA AND APAM**

### **2.1 Winneba**

Winneba is and the capital of Efutu Municipal district in central region. It's population as at the year 2013 was 60,331. Traditionally, Winneba is known as Simpa and it is a historic fishing port in Ghana, lying on the south coast, 90miles (140km) east of cape-coast with Coordinates: 5°20'N 0°37'W. The main industries in Winneba are fishing and services. The fishing areas visited under Winneba was, Warabeba, Ofunyiem, Yepemso, Ochoko Nnuase and Alata. Winneba has about three landing sites namely Warabeba, Ofunyiem round-about

and Yepemso landing sites where the fish processors buy the fishes brought from the sea, the women sometimes go to the Tema harbor to buy fish. Even though Winneba is a fishing town, there's only one fish smokers association called Nsuekyir Warabeba bofo yenna group located at warabeba, a suburb of Winneba. Here at Winneba, processing is done individually in the homes. The main fish processing activities are smoking as the dominant activity, followed by salting, drying, and frying respectively which are done by women only. The local NGOs operating in this community is Development Action Association (DAA).

## **2.2 Apam**

Apam is a coastal town and capital of Goma-West district in the central region of Ghana, located approximately 45km east of the central regional capital of cape-coast with Coordinates: 5°16'44"N 0°44'23"W. Population as at the year 2013 was 26,466. Apam is the site Fort Ligdzaamheid or Fort Patience, a Dutch-built fort which was completed in 1702, which dominates the fishing harbor. It has a lot of fishermen and fishing is the main industry. The fishing areas visited under Apam was, Nnyanka Aboro, Shell no mu, Alata, Baka na no (as in 'the bank of Baka lagoon') and Egyaado. Apam has only one landing site called "Nsuo no ano" located at Alata, where all the fish processors buy their fishes brought either directly from the sea or Phsyco. The town has one fish processors association called fish mongers association. Processing is done individually in homes and designated sites such as Alata and Baka na no. The main fish processing activities are smoking as the dominant, followed by salting, drying, and frying respectively which are done by women only. The only local NGOs operating in this community is Development Action Association (DAA).

## **3.0 SURVEY FINDINGS – WINNEBA AND APAM**

The focus group discussion and interviews conducted revealed that a greater percentage of the people who live along the coast of Winneba and Apam are involved in fishing and fish processing. The fish processing activities that were identified in the various communities under Winneba and Apam were Smoking, Salting, drying and frying. Fish smoking happens to be the dominant activity followed by Salting, drying and frying respectively. Only women were involved in fish processing, however, their husbands may offer a helping hand when the need arises. There are about seven hundred and seventy nine (779) fish processors in the various communities visited under Winneba and Apam, out of this number, about three hundred and twenty nine (329) women are into fish smoking, three hundred and twenty three (323) into Salting, hundred and ten (110) into Drying and seventeen (17) into Frying. The men were only involved in fishing.

### **3.1 Fish Processing**

**Smoking:** Basically, the equipment needed is a stove and some numbers of trays. The identified stoves were Chorkor and Oil drum. Fishes normally processed by this method are Tantemena, Abrewa hono, Dr. Fish, safor, odoe, Nwanwangyan, eduri, sukwei, nsasaw, cassava fish, and bue. When the fishes are brought home, the scales on the fishes are removed if there are any; it is then washed and arranged on the trays. The firewood is lighted and the trays are then arranged on the smoker, the trays may be changed over from time to time (bottom tray goes up and vice versa) to ensure even distribution of heat to all the fishes. The trays are then taken off the smoker to allow the fishes to cool when smoking is complete. The process takes about 2-6 hours to complete depending on the size of the fishes and intensity of the fire. The main source of energy is firewood and the types of firewood used are Esa, ankyin, begye wo ba (come for your child), mmabaa ba.



During processing, the women sometimes encounter problems like processing loses such as fishes may burn due to excessive heat, people may also steal and animals may eat some. Aside the processing loses; the poor stove technology also poses threats to the health of the women such as headaches, eye problem, skin burns, dizziness and pregnancy miscarriage due to excessive heat and smoked produced by the stove

**Salting:** Fishes processed by this method are Eduri, odoe, boe, sukwei and safor. Fish salting may be done in two different ways; (a) salting and drying (b) salting

- Salting and drying: the tools needed for this type of processing are pans and a knife. All the fishes are kept in a pan(s) for a day before they are dissected to remove wastes like bile, the fishes are then washed again and salt is added to it and allowed to stay for another day. After the second day, the fishes are washed to take off most of the salt particles; then they are laid on the floor for about a day to dry to complete the process.
- Salting: This procedure is quite different from the above, here; the fishes are washed and kept in a barrel and salt added to it. The processor may decide to remove the fishes at any time she wishes. The fishes can stay in the barrel for about a year without going bad.

The problems encountered by these women during the processing period may be theft. The processors may also develop health problems like body pains due to long hours of washing the fishes, again the salt may react with their skin causing finger sores.

**Drying:** The types of fish that are usually processed by this method are Keta school boys (Aboobe), sasakwasi, ntantanmeri, they are washed and laid on a clean floor, at one point in time; the fishes may be turned over with a long stick so that they may dry evenly. The processing problems that the women encounter are that, people steal and animals eat some. However, this type of processing also comes with its own health issues like, waist pain due to long hours of standing and bending.

**Frying:** The equipment needed are a stove, perforated long ladle, a cane basket or sieve and a frying pan. The main source of energy is firewood. Firewood types like Esa, ankyin, begye wo ba (come for your child), mmabaa ba, cocoa may be used during the processing. Cassava fish, Nsasaw, Odoe, and Sukwei are the types the women usually fry. The firewood is lighted inside the stove and a frying pan contain oil is placed on the stove; fishes are washed in salt solution. When the oil becomes hot, the fishes may be fetched with the long perforated ladle and poured into the oil. Frying takes about twenty (20) minutes to complete. When the process is due, the perforated ladle may be used to fetch the fishes from the oil. The fried fishes are then poured into the sieve or cane basket to drain the oil before they are taken to the market or stored. The poor stove technology poses health threats to the women like headaches eye problems and skin burns due to excessive smoke and heat produced.

## **4.0 COMMUNITY REPORT – ELMINA AND MOREE**

### **4.1 Elmina**

The name Elmina is derived from the Portuguese “La Mina” which means “The Mine”. The Portuguese named the town as such when it became the center of commerce in gold after the Portuguese settled and built the St. George’s Castle in the town in 1482. Economic activities include food production (cassava, maize, groundnuts, palm oil, yam,

sugar cane), food provision (especially for the local market and the European garrison), fishing and other essential services like transport (porters, canoes, boats), security, storage, as well as artisanal activities like pottery, carpentry, and masonry. The various communities in Elmina which are close to the sea shores have at least one landing site, due to this, most of the men and women who dwell in those communities are into fishing and fish processing respectively.

A total of 627 women are involved in the various post-harvest processing of fish in the five selected communities in Elmina which were Awonakrom, Bantoma, Nzeaye, Ayisa and Mbofra Akyenim. The various types of processing activities identified in the communities visited were Smoking as the dominant activity followed by frying, salting and drying. Freezing is done periodically. The sea is basically their major source of fish.

## **4.2 Moree**

**Moree** or **Mori** (formerly also known as *Mouri* or *Mouree*) is a village and small seaside resort in Abura-Asebu-Kwamankese District (AAK), a district in the Central Region of Southern Ghana. Moree developed around Fort Nassau, which was the original fort on the Gold Coast taken over by the Dutch West India Company when it was founded in 1621.

Economic activities include fishing and food production (cassava, maize, groundnuts, palm oil, yam, sugar cane) and food provision (especially for the local market and the European garrison), essential services like transport (porters, canoes, boats). Alata, Baintsir, Nkum, Apease and Abokomaano which were the various communities in Moree have at least one landing site. Men and women close to the shores take advantage of the sea by engaging themselves in fishing and various fish preservation. The various types of processing activities identified in the communities visited were Smoking as the dominant activity followed by frying, salting and drying. Freezing is done periodically. The sea is basically their major source of fish processes. In Moree, an estimated number of 1,358 women are involved in post-harvest fish processing.

## **4.3 Survey Findings – Elmina and Moree**

In Elmina and Moree, it was identified through our focus group discussion and the interviews we conducted that fish processing was solely a job for women. Those engaged in the processing activities were the women closer to the shores of the sea. A total of about 1,985 are involved in fish processing. The fish processing activities that were identified in the various communities under Elmina and Moree were Smoking as the dominant activity followed by frying, salting and drying. Freezing is done periodically. The Identified NGO was the Central and Western Region Fishmongers Improvement Association (CEWEFIA).

### **4.3.1 Fish Processing**

**Smoking:** The common type of fish that are processed are Herrings, Ntar, Amoni, Gyaase, Pole, Nnei mba, Ewure Sirekye, Kyekyewere, Ntantamina, Shrimps, Ibuei, Apoku. Equipment needed for this type of processing are Stoves, especially Chorkor Smoker, traditional round ovens and smoking trays. When the fishes are brought home, the scales on the fishes are removed if there are any; it is then washed and arranged on the trays. The firewood is lighted and the trays are then arranged on the smoker, the trays may be changed over from time to time (bottom tray goes up and vice versa) to ensure even distribution of heat to all the fishes. The trays are then taken off the smoker to allow the fishes to cool when smoking is complete. The process takes about 2-6 hours to complete depending on the size of

the fishes and intensity of the fire. The main source of energy is firewood and the types of firewood used are Ankyin, Begyewoba, Papia and Essia. Fish smoking is labor intensive which comes with its own health problems like Headaches, and general body pains, however, the poor stove technology also add up to the aforementioned health problems as it produces more smoke and excessive heat. Also, the current traditional fish processing equipment are made of inferior materials therefore the processors are burdened with issues of constant maintenance to keep the equipment in shape and working. Aside these, processors also encounter losses like theft and fishes getting burnt during processing.

**Salting and Drying:** The common types of fishes processed are Ntantamina, Ibuei, Apoku, and Nkanfona, anuuku Nkokora, Ibuei, Safor, Epei and Sukwei. Equipment needed for this type of processing are concrete walled bowls, baskets, raised structures. The only source of energy is Solar (Sun drying). Salting and drying usually take about 3-6 hours depending on the fish size. The fishes are washed to remove dirt, they may be cured depending on the type, and they are then poured into basins containing sea water or salt solution to be salted for a day. The fishes are either spread on raised structures or a cemented floor to where it can receive direct sunlight for drying. Salting and drying is also labor intensive which comes with its own health problems like Headaches and waist pains. Processors also encounter losses like theft.

**Frying:** The common types of fishes fried are Ibuei, Safor, Epei and Sukwei. A frying pan, Stove, big perforated ladle and a colander are the equipment needed for this process. Before the fishes are fried, it is usually cured to remove the scales, washed and put into basins containing sea water or pipe-borne water with salt. The process may take about an hour or two depending on the fish quantity. The very source of energy is firewood which sometimes varies depending on the location of the fish processor. The types of firewood used are Issa, cocoa trees, orange trees, Begyewoba, Papia and Essia. Frying is not labor intensive as compared to the other processing activities. However, the women encounter health problems like skin burns and eye problem due to excessive heat and smoke respectively.

**Freezing:** The equipment needed is a pan and a deep freezer. This process is simple and not labor intensive as compared to other fish preservation processes, here, the fish is washed with sea water or pipe-borne water and put in deep freezers. The required energy for the process is electricity.

## **5.0 COMMUNITY REPORT – ANKOBRA AND SHAMA**

### **5.1 Ankobra**

Ankobra is a village situated along a point where river Ankobra enters the sea, in the western region. The main language spoken is Nzema nevertheless other languages like Fante, Ahanta and Ewe are also popular. The actual name of the town is Sanwoma.

Ankobra has two landing beach namely river side and main beach. The town has got one fishmongers association. Here at Sanwoma (Ankobra), processing is done individually in the homes. Fish smoking is the leading smoking activity by salting, drying, and frying respectively which are done by women only. The sea is their main source of fish, however, they sometimes patronize cold store fishes when fish harvest from the sea is very low. The local NGO's identified were Friends of the nation (FON) and Hen Mpo Ano

### **5.2 Shama**

Shama lies about 20 km east of Sekondi-Takoradi, on the bank of Pra River. The town is situated in the Shama Ahanta East Metropolitan district and Shama constituency. The inhabitants of the town are mostly engaged in fishing and its related activities such as fish processing for local markets. Shama is the sixtieth most crowded settlement in Ghana, in terms of population which is about 23,699 people. Shama is the English name of the town which originally and locally was called Esima.

### **5.3 Survey Findings – Ankobra and Shama**

In Shama and Ankobra, it was also identified through our focus group discussion and the interviews we conducted that fish processing was solely a job for women. Those engaged in the processing activities were the women closer to the shores of the sea. A total of about 1,020 are involved in fish processing. The fish processing activities that were identified in the various communities under Shama and Ankobra were Smoking as the dominant activity followed by frying, salting and drying. Freezing is done periodically.

#### **5.3.1 Processing Activities**

**Smoking:** About 500 women practice this method. Different types of fishes like Ekyinekyin, Tuna and Salmon are mostly processed by this method. Equipment used is chorkor stoves and pans. Before the fishes are smoked, they are first washed and dried, this is done to drain out the water in the fish to prevent to reduce the long hours of smoking. Even though the chorkor is simple and easy to use, its poor technology results in the production of excessive smoke and heat which affects the health of the women, the stove is also unable to retain heat therefore the process may need to push in more firewood during smoking to get the required results. Usually, the process may take a maximum of 3hours to complete depending on the quantity of fishes.

**Salting:** About 220 women are involved in this processing activity. Fish processed by this method is mainly Shark (semin). The tools needed are knife, pans and baskets. The problems encountered by these women during the processing period may be cuts in their palms. The processors may also develop health problems like waist and body pains due to long hours of bending and lifting, again the salt may react with their skin causing finger sores.

**Drying:** There are about 180 women also involved in this practice. Solar is the main source of energy for this process. The types of fish that are usually processed by this method are shark (semin). The tools used are Sacks (ewir) and mats. The processing problems that the women encounter are unfavorable weather conditions. This process takes a week to complete if the sun is consistent.

**Frying:** The number of women involved in this are about 120. The fishes are usually scraped, salted and dried and before frying. Herrings are smoked more often than the other species of fishes. The tools required are frying pans and long flat ladles. The processing duration can take up to an hour or more depending on the quantity of fishes. The dangers associated with this type of processing are skin caused by hot oil getting into contact with one's skin especially if distance are not kept, eye problem as a result of smoke entering the eye.

## **6.0 GENERAL FINDINGS**

These are trends which cut across all the six pilot communities. Women are the sole dominant players when it comes to Post-harvest processing of fish. About 99% of these Women are solely reliant on Fish processing as the only livelihood and do not have any alternative livelihood. The rest are involved in petty trading. Most of them are out of business during the lean fishing season. The dominant processing technology deployed for post-harvest

processing of fish is smoking. About 95% of fish caught in these areas are smoked. The remaining percentage constitutes the drying salting and frying technologies.

Fish caught by unapproved methods especially with chemicals often go bad even if the Post-harvest processing technologies are applied, this leads to heavy losses on the part of fish processors.

Another observation made was that, the women make sure the fishes are not over processed as it may lead to undue loss in weight because it greatly affects the market value of the final product most especially with the smoked fish.

During bumper harvest seasons, larger quantity of fish may be salted, this is because there is limited number of stoves and trays as well as employees to smoke the fishes. Salting technology is then adopted to prevent the excess fishes from going bad. Usually, the type of salt used for the salting process is the local one which looks like tiny gravels. This is because it is quiet cheaper as compared to the iodized salt.

We also identified that in order to keep business running, the women sometimes give the fishermen money to buy fuel and other logistics for their work, this is because the fishermen sometimes give the excuse that they have no money. The fishermen sometimes refuse to pay back the money and in attempts to collect back the money, the fishermen may quit doing business with the women. This is really problematic to processors.

## **7.0 CONCLUSION**

With respect to the survey findings, we can say that the major occupation of the communities at the shores of Central and Western regions is fishing and fish processing therefore the implementation of the Sustainable Fisheries Management Project (SFMP) which seeks to rebuild fish stocks by ending overfishing of key stocks important to local food security is very necessary

## **8.0 RECOMMENDATION**

SNV together with its local partners can organize a forum to educate fish smokers on the need of getting improved stoves which can make the processing easier and cost effective.

Other Post-harvest processing technologies such drying, salting, standardization of processing methods should be improved. Studies should be conducted on the microbial level, shelf life of processed products. This would inform issues on standardization and to formalize their processes.

The fish processors should also form vibrant groups, this will enable them push their concerns to concerned organization and seek for financial assistance from donors and other financial institutions. Development of alternative livelihood programmes should be develop through a participatory approach. This is keep the processors in gainful business during the lean seasons.

## **APPENDIX**

### **A1 Data Collection Tool**

#### **Sustainable Fisheries Management Project (SFMP)**

#### **Intermediate Result 4.8.1:**

#### **Post Harvesting Processing Knowledge Development, Dissemination and Consensus Building**

#### **Post Harvesting Processing Scoping Study Data Collection Tool**

SNV Netherlands Development Organization is under a scoping study as part of implementation of post-harvest lost knowledge development and improvement interventions in 6 coastal communities in the Western and Central regions. The scoping study is part of the USAID Ghana/Sustainable Fisheries Management Project which seeks to rebuild fish stocks by ending overfishing of key stocks important to local food security through a multi-pronged approach. The information provided as part of this scoping study shall be kept confidential.

**SFMP is funded by USAID/Ghana and implemented by CRC-URI through a consortium of partners:**

**Hen Mpoano, Friends of the Nation, SNV, SSG Advisors, Daasgift, DAA, CEWEFIA and Spatial Solutions**

**Name of Enumerator:**

**Date:**

**Name of Community:**

**District:**

**Region**

- 1) How many fish landing sites are within this community? Please list them.
  
- 2) In case fish processing is done in groups in this area, please state the number of fish processing sites located in this community (name, leader of group, location to landmark etc)
  
- 3) What are the types of fish that are processed in this community by smoking, salting, frying, drying, freezing, etc.? Please list them (either by local or English names).
  
- 4) Which of the above named processing methods is the most dominant in this community and what types of fish are processed with those methods? State either local or English names.
  
- 5) What are the sources of the fish that is processed in this community (as in above). List as many. State either local or English names.

- 6) Estimate which source provides the largest volume of fish for this community.
- 7) What are the types of equipment (including traditional ways) used in the various fish processing methods (e.g. Stoves) as identified in this community?
- 8) Can you identify (by picture and names etc.) some improved fish processing technologies in this community? List the identified improved fish smoking stoves, if they exist within this community? Give further details on name of owner, year built, builder etc
- 9) What are the main identified steps involved in each of the following post-harvest fish processing method (smoking, salting, frying, drying, freezing, etc.) as observed in this community?
- 10) By observation and expert opinion (from processors), what are the post-harvest losses that occur during processing?
- 11) What are the problems encountered by the processors in the use of the following current “traditional” fish processing techniques?
- 12) What is the possible estimate of individuals involved in the various post-harvest processing of fish (i.e. Fish smokers, etc.)?
- 13) What is the possible estimate of identifiable groups involved in the various post-harvest processing of fish (i.e. Fish smokers, etc.)? List the names of the groups, their leader and location and contact information.
- 14) Averagely, how long does a particular post-harvest method take to obtain a finished product? Please state with each fish processing method.
- 15) What are the sources of energy for post-harvest processing of fish for the various fish processing methods?

- 16) In fish smoking and frying, list the types of wood used for processing
  
- 17) What is the impact of the various current traditional post-harvest processing methods of fish on the health of the processors? Ask probing questions; and by observations.
  
- 18) What is the estimated population size of fish processors in each identified community?
  
- 19) Identify and list volunteer groups and local NGOs, which operate in this community? Provide contact details.
  
- 20) Which Gender demographic is involved in Post-harvest Processing of fish; what is the estimated Percentage or ratio?
  
- 21) Identify relevant and vibrant focus Groups/association under post-harvest processing activities (i.e. Fish Smoker, etc.) within the community, who can be engaged in subsequent field assessments?