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# SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

Assessing the Economic Viability of  
Use of Ice Chests by fish Marketers  
and Processors and On-Board  
Canoes



**NOVEMBER, 2018**

THE  
UNIVERSITY  
OF RHODE ISLAND  
GRADUATE SCHOOL  
OF OCEANOGRAPHY



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## **ACRONYMS**

CCM	Centre for Coastal Management
CEWEFIA	Central and Western Region Fishmongers Improvement Association
CRC	Coastal Resource Center
CSLP	Coastal Sustainable Landscape Project
DAA	Development Action Association
DFAS	Department of Fisheries and Aquatic Science
DMFS	Department of Marine Fisheries Sciences
DQF	Daasgift Quality Foundation
FtF	Feed the Future
GIFA	Ghana Inshore Fishermen's Association
GIS	Geographic Information System
GNCFC	Ghana National Canoe Fishermen's Council
HM	Hen Mpoano
ICFG	Integrated Coastal and Fisheries Governance
MESTI	Ministry of Environment Science and Technology
MOFAD	Ministry of Fisheries and Aquaculture Development
NDPC	National Development Planning Commission
NGOs	Non-Governmental Organizations
SFMP	Sustainable Fisheries Management Project
SMEs	Small and Medium Enterprises
SNV	Netherlands Development Organization
SSG	SSG Advisors
STWG	Scientific and Technical Working Group
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development
WARFP	West Africa Regional Fisheries Development Program

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## **SECTION 1: BACKGROUND**

The use of ice is to preserve post-harvest fish quality on-board and on-shore. As an activity in the Year 3 Work Plan under the SFMP, the use of ice and insulated fish containers/ice chests have been piloted as a measure of improving freshly harvested fish quality. Increased sales prices and profits with ice usage were expected. This pilot adopted a similar approach that was used in The Gambia that demonstrated that use of ice on-board fishing vessels resulted in increased value of overall catch due to decrease in post-harvest losses. In the Gambian study, on the average fishermen using ice lost 14 percent less than fishermen not using ice.

The project intervention model under the SFMP for the fisheries value chain is to increase profitability and improve incomes for fishers and fish processors. The use of ice in insulated containers contributed to this goal. Twenty ice chests were built and distributed by the Fisheries Commission Post-Harvest Unit with support from the SFMP. Based on a preliminary scoping survey conducted in Year 4, there was some anecdotal evidence that suggests fishers in Moree (Central Region) took ice chests to sea. While this was not part of the study design, the extent to which fishermen use or lease the ice chests from fish processors will be explored. This study will investigate this phenomenon further using a survey questionnaire. The ice chests were made of fiberglass with the following dimensions: 4 ft H x 4 ft W x 3 ft. D ft. Dimensions of each ice chest will be measured in this study for consistency. The cost (of construction) of the ice chest will also be confirmed under the SFMP. The life expectancy of the ice chest will also be confirmed by the manufacturer.

The ice chests are located in Greater Accra, Central, Western and Volta region (see communities below). According to a scoping visit conducted in March and April of 2017, each ice chest is group owned. Bailey and Jentoft (1990) caution of equity issues and conflict of interest among beneficiaries of fisheries development project with respect to organizational development. Based on experiences with implemented aquaculture projects in Africa, the FAO (2006) strongly discourages communal and collective ownership of assets.

It is believed groups were formed through project partners under SFMP or associated organizations, such as the National Fish Processors and Traders Association. It is also believed that groups were formed between association leaders and other processors in the community (that may also belong to said association) and that have attended an ice chest training. It is believed, and will be confirmed in this study, the average group size is 5-8 people. Group selection must be explicitly described in this study.

The ice chest is placed at one location. Locations are based on proximity to a fish landing site, safety (within a compound to avoid theft), or seniority (leadership role within a fish processing association). A scoping visit was conducted in April, 2018 to see the ice chests in the field. From this visit, it appeared that ice was readily available in the communities. Ice was typically sold in a plastic sleeve, the size of a shoe box. The cost per unit of ice was 5 Cedis (~1 USD). During this scoping visit, four fish processors stated that the cost and availability of ice was not perceived as a burden. Fish processors stated that they collectively contributed to the cost of ice. Fish processors “mark” their fish consignment to separate it within the ice chest, or they alternately use it depending who has fish to keep fresh. Some advantages and disadvantages were discussed that helped to inform the design of this study. They are:

Advantages are:

- Preserves fresh demersal species for sales till the next day, in other words extends shelf-life (avoid additional cost of smoking fish and avoid discounting price of fresh fish due to deterioration)
- Stores fish overnight (prevent theft at beach - before women used baskets)
- Good if you have a lot of fish (for storage)
- “Leasing” it out to fishermen who want to store their fish (Moree and Elmina for 30 Cedis/day)

Disadvantages are:

- Ice chest is not mobile (traders need to sell at various locations)
- Ice chest not accessible if leader of group is not home (seen in Kumsum Beach)
- Theft of fish if the ice chest is not secured or guarded (seen in Kumsum Beach)

This study is being piloted in several (exact number per community to be confirmed by this study) fishing communities and ice chests were distributed for use in Year 4. In Year 5, an assessment of the ice chests will be conducted after several months of usage by the clients and will be led by the SFMP M&E team in cooperation with the FC M&E unit and PHU and SFMP fisheries specialist.

### **1.1 theory of change**

Improved preservation techniques, such as use of ice and ice chests post-harvest (on-shore at processing and landing sites) is expected to have the following results:

- Reduce post-harvest quality-related loss
- Extend shelf-life of fresh fish
- Maintain quality for further processing, or prevent need for further processing (i.e. smoking)
- Increase price for improved quality of fish
- Potentially provide access to different markets (fresh fish markets)

### **1.2 purpose of the study**

- Assess the economic viability of the use of ice and ice chests to preserve fish to determine if there is an economic incentive to using ice to improve product quality of fish and achieve scale.
- Evaluate the effectiveness of implementation strategy of group ownership versus individual ownership.
- Document current perceptions and practices of processors and traders regarding use of ice.

### **1.3 methodology**

- To answer the first assessment question under the study purpose (Assess the economic viability of the use of ice and ice chests to preserve fish to determine if there is an economic incentive to using ice to improve product quality of fish.) A survey instrument will be used to collect price data for each group and direct observation of ice box usage and marketing will also be conducted.
- To answer the second question(s) (Evaluate the effectiveness of the implementation strategy of group ownership versus individual ownership) will involve the use of key informant interviews and focus groups



## 1.4 study period

Two weeks in November, 2018.

## 1.5 activity intervention sites

**Table 1: 20 Ice chests were distributed within the following communities**

Region	Community	Number of Ice Chests distributed/groups formed
Greater Accra	Tema Manhean	To be confirmed at time of study
	Tema Harbor	
	Tsokomeh	
	Bortianor	
	Kokrobite	
Central	Moree	
	Elmina	
	Apam	
	Mumford	
Western	Sekondi	
Volta	Adina	
	Keta	
	Ketu	

## SECTION 2: DESIGN FOR THE ECONOMIC ASSESSMENT

### 2.1 Sampling

Six processing groups using ice (one processing group per region) will be selected for the survey and focus groups. The sample should include locations where vessels are using ice chests (if and when this component is started, or those renting out from processors). One sample in Volta and Western regions, two each from Greater Accra and Central regions.

As focus groups may tend to have biased responses, in this case, 3 women in the group will be interviewed as key informants and may or may not include the group leader. Two individuals in the community that work in close proximity to the ice chest will also be queried. In addition, one member of the implementing organization from FC Post-harvest unit, CEWEFIA, DAA, NAFPTA will be interviewed.

### 2.2 Assumptions

- Ice is affordable and available in each community, although price will likely vary by site
- There is a demand for improved quality fish and possible price premium for it

### 2.3 Factors

- Location
- Species (based on the type of buyers at that landing site, seasonality)

## 2.4 Analysis

This is a qualitative formative assessment of the benefits of using ice chests based on key informant interviews and focus group discussions. A summative report on the overall findings and general patterns of answers to the semi-structured interview questions would be provided, noting any significant differences in responses among or between various groups or key informants. Recommendations for subsequent ice chest interventions to improve the intervention design should be detailed in the report. The report may or may not make a recommendation whether future interventions on ice chests should be made or not? Should such a program be discontinued and if so why? (e.g. if there is no real economic benefit and if fishers and processors cannot afford to purchase them without full subsidy). Specific discussion in the report should focus on the two main research questions, both degree of economic benefits and model of group ownership of the ice chests. If the ice chests do show significant economic benefits, then a non-subsidized approach to extension promotion of purchase and use should be recommended.

## 2.5 Potential Issues

Possible Issues for investigation if these situations are present at the sample location, in-depth interviews with key informants should elucidate these issues and how they are or could be addressed in the future:

- Not all processors who were randomly selected from the beneficiary list received training on use of the ice chest
- Elite capture of processing groups (criteria for selection must be explicit)
- Processors do not purchase fish daily
- Quality of landed fish differs, can icing it on land improve it, or just prevent further deterioration?
- Ahotor takes credit for better quality fish, not ice

## 2.6 Survey Equipment

- questionnaire
- refreshments for focus group
- camera for pictures to document condition of the ice chest (cleanliness), use of ice chest (or abandonment)

## 2.7 Interview Methodology

Prior to conducting the interview, explain the purpose of the interview. The purpose of the interview is to assess whether use of ice chests is beneficial or not and how to improve future interventions on promoting use of ice and ice chests among processors and fishermen.

The interviewer should record the answers on the questionnaire sheet and elaborate any other observations or comments or importance on a sheet of paper or notebook.

Following the interview, the interviewer should review notes and add additional information **and observations** that may not have been initially captured and ensure the notes accurately reflect comments of participants. Take photos of the container, location and pictures illustrating any problems or beneficial features, physical modifications if any made by clients, and way it is being used.

## SECTION 3: KEY INFORMANT INTERVIEWS OF THE GROUP MEMBERS

Date: \_\_\_\_\_ Interviewer: \_\_\_\_\_

Study site/community where ice chest is located: \_\_\_\_\_

Beach landing site/market where fish is purchased: \_\_\_\_\_

Location of the Ice chest: \_\_\_\_\_

Occupation/role in the study of the key informant: \_\_\_\_\_

### 3.1 Implementation strategy

#### 3.1.2 Questions about group/individual ownership

Group name if any: \_\_\_\_\_

Group ownership of ice box \_\_\_\_\_, or individual ownership of ice box \_\_\_\_\_?

Total Number of members in a group: \_\_\_\_\_ #/Male \_\_\_\_\_, #/Female \_\_\_\_\_?

How was the group formed and members selected? \_\_\_\_\_

Does every group member have access to use the ice box? \_\_\_\_\_

### 3.3 Location and maintenance of ice and ice chest

Where is the ice box located in relation to other groups members? \_\_\_\_\_

Who maintains the ice box (cleans it)? \_\_\_\_\_

Who pays for the ice? \_\_\_\_\_

What type of fish is kept in the ice chest? (list species & mark which is most frequent or most important) and why?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Are you aware of any types of fish that should not be iced? Yes \_\_\_\_\_, No \_\_\_\_\_

If yes, list the types of fish that should **NOT** be iced:

\_\_\_\_\_

Why shouldn't they be iced?

\_\_\_\_\_

How long do you keep the fish in the ice chest? \_\_\_\_\_

How many days does your fish stay fresh using the ice chest? \_\_\_\_\_

How did you store your ice before the ice chest? \_\_\_\_\_

What do you do if your fresh fish does not sell at the market?

\_\_\_\_\_

### 3.4 Benefits of use of ice and ice chests

List benefits (free listing) and ask group about them - why are they benefits?

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### 3.5 Challenges of use of ice and ice chests

List challenges (free listing) and ask group about these – why are they challenges?

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### 3.6 Economic viability

#### 3.6.1 Markets

How did you store your ice before the ice chest? \_\_\_\_\_

What type of transport do you use to take fish to the market? \_\_\_\_\_

List your most important market for sale of iced fish \_\_\_\_\_

Why is this your most important market? \_\_\_\_\_

Has the ice chest helped you access other (new) markets? Y\_\_ N\_\_ (explain why)

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If yes, what new markets are you selling your fish at? \_\_\_\_\_

List the advantages of selling to a new market/customer? \_\_\_\_\_

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Since you started using ice chest, how can you compare the difference between the quality of fish compared to how you used to store fish before? \_\_\_\_\_

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Do other people notice a difference between use of ice and non-use of ice? Y\_\_ N\_\_ (explain)

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Aside from selling fresh fish stored in the ice chest, does the ice chest help you with other types of processing and why (i.e. smoking, drying, salting)?

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### 3.7 Perceptions and practices regarding use of ice and ice chests

#### 3.7.1 Cost

Would you buy an ice chest if it cost (TBD)? Yes \_\_\_\_ No \_\_\_\_ Don't know \_\_\_\_

If no, why?

---

What would you be willing to pay for an ice chest?

---

Would you charge someone else money to store fish in the ice chest (i.e. rent it)?

Y\_\_ N\_\_

If so, how much would you rent it for?

---

If yes, why do you think others would want to rent it from you?

---

### 3.8 Attributes of the Ice Chest

What do you think about the ice chest itself – size, type of materials, weight, cover/top opening and if you could design your own, how would you build it differently? **Ask them to draw a pic as they discuss this.**

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Draw picture here:

If the following do not come up in the discussions, ask respondents questions directly about the ice chests such as:

Is there a latch to lock it? \_\_\_\_\_

What are the exact size/dimensions?

---

What is the shape and depth? \_\_\_\_\_

What is the thickness and weight? \_\_\_\_\_

What were the materials used? \_\_\_\_\_

### 3.9 Conflict management

Is the ice chest in a secure location? (from theft) \_\_\_\_\_

Have you ever had fish stolen from the ice chest? \_\_\_\_\_

If yes, how do you prevent theft from the ice chest? \_\_\_\_\_

Have there been conflicts or arguments over use between members with the ice chests:

Other fish processors sharing the ice chest \_\_\_\_\_

Fishermen \_\_\_\_\_

Another person (identify) \_\_\_\_\_

Why? \_\_\_\_\_

\_\_\_\_\_

Did you decide on group norms or rules for usage of the ice chest and if yes, how did you do that?

\_\_\_\_\_

\_\_\_\_\_

Did FC, SFMP or the association (NAFPTA, CEWEFIA, DAA, etc.) facilitate discussions and agreements on rules of use? Y\_\_ N\_\_

Do you think the ice chests should be group owned or individually owned and why?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank the participant(s) for taking the time to engage in the discussions and mention that this information will be used to design better ice chest activities in the future.

Ask if you can attribute quotes to the individual or person who made the remarks, or whether they would prefer to remain anonymous. Note response here: \_\_\_\_\_

## **SECTION 4: INTERVIEW QUESTIONS FOR FACILITATING ORGANIZATIONS**

Describe in as much detail how groups for each ice chest were formed:

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How often do you visit the ice chests at in your project site?

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What feedback have your received about the ice chests:

Positive feedback:

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Negative feedback:

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General (neutral) comments:

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## **SECTION 5: INTERVIEW QUESTION FOR NON-USERS WITH PROXIMITY OF THE ICE CHEST**

What is role/occupation? \_\_\_\_\_

Have you heard about ice chests being used near this landing/processing site?

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What have you heard about the ice chests (probe if necessary)?

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## **REFERENCES**

Bailey, C., & Jentoft, S. (1990). Hard choices in fisheries development. *Marine Policy*, 14(4), 333-344.

Moehl, John; Brummett, Randall; Boniface, Mulonda Kalende; Coche, André. **GUIDING PRINCIPLES FOR PROMOTING AQUACULTURE IN AFRICA: benchmarks for sustainable development.** CIFA Occasional Paper; FAO. Rome Iss. 28, (2006): I,III,IV,V,VI,VII,1-122