

ASSESSMENT OF WOMEN'S PARTICIPATION IN ACTIVITIES  
RELATED TO SMALL SCALE FISHERIES

BY

MRS GLADYS A. NERQUAYE-TETTEH

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## SUMMARY

A study of the assessment of women's participation in activities related to small-scale fisheries has been carried out with emphasis on the following aspects:

1. Assessment and background of a positive experience of income generating activity for women in a fish smoking village.
2. Socio-economic analysis of the limitation of the experience and technical appraisal of the Kagan Fish Smoker.
3. Concrete proposals for extending its range of utilization in coastal Ghana.

In general, it was observed that, fish smoking was carried out generally by illiterate women. Though they displayed considerable industry and expertise for the process, due to various socio-economic constraints, the expansion of their work has been greatly retarded. It was also observed, however, that in the areas where the Kagan Fish Smoker has been introduced (Chorkor), the women had developed considerable skill both for its use and construction while for the other areas a reasonable degree of enthusiasm was exhibited for its possible adoption. In this regard, concrete proposals for extending its range of utilization in coastal Ghana, as well as suggestions for means of implementation have been made.



## INTRODUCTION

### Title and Terms of Reference

The title of this study is the "Assessment of women's participation in activities related to small-scale fisheries". In 1975, at the World Conference of the International Women's Year held in Mexico, after taking due cognizance of a whole range of social, economic and political factors that hinder genuine satisfaction of the needs of women. Also of the various resolutions of the General Assembly of the United Nations on these issues, the Conference decided to promulgate thirty principles amongst which the following is of direct relevance.

"Modernization of the agricultural sector of vast areas of the world is an indispensable element for programmes, particularly as it creates opportunities for millions of rural women to participate in development. Governments, the United Nations, its specialized agencies and other competent regional and international organizations should support projects designed to utilize the maximum potential and develop self-reliance of rural women."

This is because the project, which is covered by this study, is of the type that not only recognizes the generally important role of women in agricultural production. But also in the preparation and marketing of food (in this case fish) and thereby constitutes a substantial economic resource, and provides the opportunity to utilize the maximum potential to develop the self-reliance of rural women.

The Conference also drew up a World Plan of Action intended mainly to stimulate national and international action to solve problems of under-development and of the socio-economic structure which places women in an inferior position, in order to achieve the goals of International Women's Year. In this connection it was expected that National plans and strategies for its implementation should cater for the needs and problems of different age groups, and Governments should place special emphasis on improving the situation of women in rural and urban areas. Furthermore, in attempting to achieve gainful employment for women and to deal with problems of unemployment and underdevelopment, special effort should be made to create a variety of economic roles and to encourage and support self-employment. Self-help activities should be encouraged and strengthened through the participation of women.

Again, as part of the International and Regional action it was envisaged that a deliberate and large-scale effort is made to ensure that high priority and attention is given by Governments and the International community to programmes, projects, and activities that give women skills, training, and opportunities necessary to improve their situation. This will enable them to participate fully and effectively in the total development effort. Also field surveys should be undertaken in each region to assist Governments and international community by establishing the necessary database to develop projects that will implement the objectives of the Plan. The current study, though restricted to the narrow area of activities related to Small-scale Fisheries, provides information of direct

relevance to above mentioned requirements for the implementation of the action plan for realising some of the goals/objectives of women the world over, during the United Nations' Decade for Women.

It is worthy to note that, the Programme of Action of the World Conference on Agrarian Reform and Rural Development (WCARRD), as related to the issue of rural women, and the Programme of Action for the second half of the United Nation Decade for Women, provides specific guidelines for FAO's future strategies and programmes in relation to rural women. Specifically, at its 18<sup>th</sup> Session, the FAO Conference endorsed Council Resolution 2/66 "Integration of Women in Agricultural and Rural Development and Nutrition Policies" and adopted Resolution 10/75 "The role of Women in Rural Development".

These resolutions call upon the FAO to intensify its efforts in assisting Member Governments to improve the role and status of rural women and to make the integration of women in agricultural and rural development a continuing consideration in the formulation, design, implementation and evaluation of programmes and projects.

At the World Conference of UN Decade for Women held in Copenhagen, 1980, resolutions were also adopted which have direct bearing on FAO's work with and for rural women and their families. In fact, the resolution on women in agriculture



and rural areas calls on FAO specifically to train women in basic agricultural techniques and to promote the exchange of appropriate technology among them.

Besides, although activities for rural women are mainly the responsibility of the Human Resources, Institutions and Agrarian Reform Division, as part of the specific activities of relevance to the work of the various departments of the FAO, that of the Fisheries Department, specifically the provision of assistance to women in small-scale coastal fishing, and its related fish processing, storage and marketing is very pertinent to this study.

Between 1968 and 1970, the Food Research and Development Unit (now Food Research Institute) carried out studies on the Traditional Fish Smoking Practice at the Chorkor Beach in Accra, with the view to making proposals for improvement. The work which was undertaken by an FAO Expert on Fish Processing, Mr. B. Kagan together with the author of this study, resulted in the introduction of wooden framed nets designed to fit the original rectangular mud smoking ovens. This has since then been accepted and, used extensively at Chorkor beach, in Accra because of the recognition of its advantages over the traditional type of oven. Based on the successful introduction of this programme, and in line with the need to promote projects and/or specific activities aimed at fostering the achievements of some of the goals of the International Women's Decade already mentioned, vis-a-vis the participation of the UN specialized

agencies, this study was proposed, and has been carried out under contract with the Food and Agricultural Organization (FAO) of the United Nations.

The terms of reference were as follows:

1. Assessment and background of a positive experience of income generating activity for women in a fish smoking village.
2. Socio-economic analysis of the limitations of the experience and technical appraisal of the Kagan Fish Smoker (Wooden framed nets).
3. Concrete proposals for extending its range of utilization in coastal Ghana.

The information contained in this report was obtained through a survey carried out at various fish smoking areas using a questionnaire, a copy of which is attached as Appendix 2.

## FINDINGS

### General Information

A total of 39 respondents (15 at Chorkor, 14 at James Town and 10 at Elmina) were interviewed during the survey (Table 1). Out of this number only 3 persons knew their date of birth, while only 2 had been to school – one up to Primary Class 3 level and the other up to Middle Form 4 level (Table 2). The ages of the

respondents were therefore estimated on the basis of dates of known events, which occurred around the given birthdays, and the age of their children etc. The ages obtained ranged from 25 to 75 years (Table 3).

In accordance with expectations, the respondents at Chorkor and James Town were predominantly Ga. There was only one Ewe from the Volta Region among the group from Chorkor while those from Elmina were all Fantes.

All the 15 respondents at Chorkor were married to fishermen. For eleven (11) of them fish smoking was the only source of income while the other four engaged in it as a major source of income when good catches of fish were landed, but cooked other foods to sell when fresh fish was not available. Eleven of the respondents at James Town were married but not to fishermen and the other three were widows. All of them, however, carried out fish smoking as the only source of income. At Elmina, seven of the respondents engaged in fish smoking as a full – time venture. Of the remaining 3, one was a fishmonger, the second salted fish and the third cooked other food to sell in addition to the fish smoking activity. Out of the 10 respondents at Elmina, seven were married to fishermen and the other 3 were widows (Table 4 & 5).

In general, it was observed that in all the fish smoking sites, women were mainly engaged in this activity and they were predominantly illiterate (Table 4).

All the women involved in the fish smoking in the 3 areas covered in the survey had been brought up in the fish-smoking business. They were not familiar with any other type of business. Basically the respondents operate in teams of two main types: Personal and Partnership. Under the Personal type, the leader of the team is the sole owner of the business and is helped on the job by the other members who are generally her relatives. It is more or less a family business. With the Partnership type, the business is owned jointly by two or more partners each having a share capital. However, members who are not necessarily relatives also help them in the team. For example, at Chorkor, eight of the respondents worked together in partnership while the remaining seven operated on personal basis. However, all the 15 respondents worked in teams of various sizes ranging from 2 to 10 persons. At James Town, 13 of the respondents worked on personal basis while one was in partnership. They all also worked in teams of 2 to 8 persons. In Elmina, six of the respondents worked on personal basis whilst 4 operated in partnership. Here however, two of the respondents worked alone and the rest worked in teams of 2-4 persons (Table 6).

All the respondents at Chorkor, James Town and Elmina smoked only marine fish. Those at James Town smoked big sized fish such as Tunas, Sea Bream, Grouper and Snappers as well as Sardines. The respondents at Chorkor and Elmina smoked mostly small sized fish like Sardines, Anchovies, Burrito, Mackerel and Barracuda and occasionally Tuna, which are the species normally landed by their husbands.



### Pre-smoking practices

Depending on the type of fish to be smoked, the fish may be scaled, gutted, cut up into chunks or not scaled or gutted (Table 7). But all types of fish were washed with either sea or fresh water before they were smoked. It was learnt that when seawater was used for washing, the quality of the fish after smoking was greatly improved. Because of the extra work involved in fetching the seawater from the beach, which was incidentally some distance away from the processing area, the smokers normally used pipe-borne water, which was readily available. It was only when the pipe water was not running that they went for the seawater.

At Chorkor where they smoked mostly Sardines, Anchovies, Burrito and Mackerel, they only washed the fish and arranged them nicely on the smoking trays. But in the case of Tuna the guts were removed especially when the fish was not fresh otherwise during smoking the belly bursts with the guts protruding thereby making the smoked fish unattractive, consequently fetching a low price. In the case of the Anchovies the fish was always spread out on the trays and left to dry in the open for about an hour or more. Sardines however are not intentionally sun-dried before smoking. From the foregoing it was evident that there is practically no waste product.

At James Town big sized fish such as the Tuna, Grouper, Sea bream and Snappers were scaled, cut up into chunks, the head was cut off and divided into two and the gills removed. The pieces were then washed with seawater and



arranged nicely but not in any specific order and not pre-dried on the grills. About two to three layers were packed on the grill using thin sticks to separate the layers of fish. The waste products collected from the scaling and removal of the gills were thrown away.

At Elmina some of the respondents, (4) scaled and washed the fish, three washed the fish only and the other three did nothing to the fish before they were arranged on the grill for smoking. The fish was normally arranged head to head, head to tail, and sometimes in no specific order.

### **Smoking Process**

The survey confirmed that the traditional fish smokers used two main types of ovens for smoking of fish on commercial scale. At Chorkor, Rectangular Mud ovens were used while at James Town and Elmina Cylindrical ovens were used. The ovens at James Town were metallic and those at Elmina were constructed from mud. Details on the specifications of the various ovens are provided later in the report.

### **Fish Smoking Process at Chorkor, James Town and Elmina**

#### **Smoking at Chorkor**

The smoking sites were situated along the Chorkor beach in an open space close to the places of residence, and under a number of coconut trees which

provided shade. The pre-smoking as described earlier, as well as the smoking itself was both carried out at these places. There were fish landing places along side the processing sites. When the sea was not rough most of the fishermen who were husbands of the smokers landed the fish at these places, which were close to the processing sites. The fish was transported in head-pans and baskets to the sites for a fee.

The fish was washed with tap water, occasionally with seawater and arranged nicely but not in any specific pattern on framed rectangular wire net. With the exception of Anchovies, which was left to pre-dry in open air for about an hour, all other types of fish was smoked directly after washing.

At the start of the smoking process, all respondents used 8-10 trays fish. The trays were placed one on top of each other so that a chimney was formed. Fire was set up in the two stoke holes of the oven using firewood. Examples of the commonly used firewood included Black bar, Neem tree, Stink wood, and Danta. They were preferred because they burn slowly, produce enough heat and smoke, impart the desired colour, taste and flavour to the fish. Sugarcane when used imparted attractive yellowish brown colour to the smoked product.

The smoking ovens were never pre-heated. The fish was piled up on the oven even before the fire was set up. When kerosine was used in lighting the firewood, the fire was allowed to burn for a few minutes before the fish was placed on the

oven. This was done to get rid of the kerosine flavour, which would otherwise penetrate the fish. Depending on the desired smoked product, the process may take 1 hour to 3 days. Hot smoking took 1-5 hours; smoke drying took 6 hours to 3 days depending on the size and fat content of the fish. It was observed that the more fatty the fish the more difficult and longer it took to smoke dry the fish. This was because the fat dripped into the fire and caused it to burn more thereby increasing the temperature to such a level that the burned.

During smoking, the fish was always turned. Large sized fish like, Tunas, were turned by hand singly on each tray and the trays rearranged so that the bottom ones were brought up to replace the top ones. Each tray of fish was also turned round before it was put back on the oven. Small sized fish like the Anchovies and Sardines were turned by overturning the tray of fish onto an empty tray and hitting the back of the wire mesh with so that all the fish dropped onto the empty tray. Then the fish was rearranged on the trays before placed back on the oven. The turning was done once or twice during the smoking. When the turning was done twice, during the second turning more than one tray was emptied onto an empty tray and the fish smoked further using moderate fire to remove more moisture from the fish. At this stage crushed sugarcane was added to the fire to produce smoke that gave a nice yellowish brown colour to the product. As many as 15 trays may be placed on an oven. The smoker decided whether the fish was well smoked or not by feel and colour. The fire was carefully tended to during the smoking in order to prevent burning or charring of the fish.



### **Smoking at James Town**

The smoking sites were in the open under the shade of coconut trees close to the beach. As at Chorkor, the pre smoking processes and the smoking were carried out in the open. The washed chunks of fish arranged nicely on a grill inside a cylindrical, metallic oven. One to three layers of fish separated from each other by sticks were arranged in an oven. The fish was smoked immediately they were placed in the oven without pre-heating the oven. The firewood commonly used was the same as that used at Chorkor. Most respondents at James Town practiced hot smoking and the smoking was done for 1-5hours. The fish was turned either singly in the same oven or singly and transferred into a second oven, so that as at Chorkor the top-most layer replaced the bottom layer of fish. This was done once to three times during the smoking process. The respondents decided when the fish was well smoked by feel and colour of the product. In addition, some of the respondents practiced smoke-drying using rectangular ovens and trays similar to those at Chorkor for the smoking of smaller sized fish. The only difference was that in this case, the ovens were made from 44-gallon metallic drums instead of mud.

### **Smoking at Elmina**

The smoking sites were also situated near the residences and again in the open. Cylindrical mud ovens with a single grill made from sticks were used. The common fish smoked at Elmina included Sardines, Burrito, Sea bream and other small to average sized species of fish. The fish was normally washed with

portable water. It was observed that one of the respondents used lagoon water to wash the fish. Sometimes fish such as Burrigo was scaled before it was washed for smoking. At Elmina, both hot smoking and smoke drying of fish were practiced.

The cleaned fish was arranged on the grill by head to tail, head to head and sometimes anyhow. Eight respondents out of ten normally put 2-3 layers of fish on a grill and two respondents put 4-5 layers. The layers of fish were separated with thin sticks or leaves. The fire was set up under the fish through the stoke hole. Without pre-heating of the oven, it took 1-5 hours to hot smoke the fish whereas smoke drying of the fish took 11 hours to 3 days depending on the size and fat content of the fish. During smoking the was turned singly and transferred from one oven to another. The turning which was observed to be cumbersome was done 2 or 3 times during the smoking period.

### **Sale of Smoked Fish**

All the respondents in the 3 places preferred selling the smoked fish in bulk to selling in small quantities. The bulk sale helped in faster reclaim of capital, which enabled the fish smokers to service their debts, and also for reinvestment. In view of the time consuming nature of the smoking process, the women did not have time for retailing of the smoked fish. At Chorkor, the smoked fish was sent to the market (Mamprobi Market) only on Tuesdays the market day and smoking was done on the other days of the week. Since most of the fish was smoke-dried,

it could be stored for months in specially constructed trays without the fish spoiling. The hot smoked fish from James Town was sold within one week because it had a shorter shelf life. At Elmina the smoked fish was stored in cylindrical mud ovens and sold at a time when the products have high market price.

Eight of the 15 respondents at Chorkor indicated that the smoking business provided enough to support them while some of the remaining 7 needed additional support from their husbands and the others made up by selling cooked foods. At James Town, 10 of the 14 respondents felt that the smoking business was enough to support them and the rest required additional support from their husbands. Nine out of the 10 respondents at Elmina indicated that the smoking business could not support them and they received assistance from their husbands and children. Some also sold cooked foods.

## **FISH SMOKING OVENS**

### **Rectangular Mud Oven**

It was rectangular in shape, constructed with mud and used at Chorkor, Faana and Botianor all in the Greater Accra Region. The consistency of the clay used for the construction was observed to have been determined over the years through experience. The construction was effected in two phases using the technique of piling softballs of mud in a rectangular shape drawn in the ground.



The mud was piled up to about half the desired height of the oven. At this stage it was left to dry for 3 days after which, the final half was added. This was to prevent cracking which, inevitably occurred if the complete oven is constructed at ago. Two stoke holes were made along one of the longer sides of the oven, each of which led into a hole about 30cm deep. This was done to increase the distance between the fish and the fire. The building of the ovens was normally done by hired labour, usually male, and occasionally by some of the smokers.

The total cost of an oven excluding trays, was calculated to range from ₺200.00 - ₺250.00. (Official exchange rate: ₺2.7 = \$1; Unofficial rate: ₺50.00 = \$1).

The fish was arranged on framed wire mesh with specifications matching the oven bases. The specifications of 33 specimens of ovens examined, the height ranged from 58.0-79.0cm; length 195.0 – 232.0cm; breadth 102.0-138cm and thickness 11.0 – 20.0 cm (Table 9). Estimates of the capacities of the 3 types of oven are given in Table 10. Thirty five specimens of the framed wire nets examined had heights ranging from 6.0 – 9.0 cm; length 178.0 – 215.0 cm; breadth 90.0 – 112.0 cm. Bigger sizes of the framed wire nets were used for storage of the smoked fish. The following specifications were obtained from 17 storage trays examined: heights of 13.0 – 17cm; heights 179.0 – 215.0 cm; and breadth 91.0 – 109.0cm.

### **Cylindrical Mud Oven**

The oven is cylindrical and constructed with clay/mud using the same procedure as done for the rectangular oven. The mud used at Elmina where, this type of

oven was used was black. A wooden grill on which, the fish was arranged for smoking was fitted to the oven about one-third from the top of the oven. Only one stoke whole was made at the base through which, firewood was fed. The sizes of the ovens examined are given in Tables 9, 10, and 11. At Elmina, it was observed that the smokers always did the construction of the ovens. The cost of an oven was estimated to be ₱50.00 - ₱100.00.

### Cylindrical Metal Oven

This type of oven was constructed from one, two or three 44 gallon metal drums opened and joined together to form a larger cylinder. Like the mud type, a grill was fitted about a third from the top of the oven to form a compartment where the fish was arranged for smoking. There was one stoke hole to each oven. Of the thirty seven (37) specimens examined at James Town, where this type of oven was used, the following specifications were obtained: Height 75-108cm; thickness either 0.3cm or 0.5cm; and circumference ranged from 252-416cm. The respondents also indicated that it cost between ₱400.00 and ₱1,500.00 to construct one oven depending on the size and cost of the drum.

## **SOCIO-ECONOMIC ANALYSIS OF LIMITATIONS OF EXPERIENCE AND TECHNICAL APPRAISAL OF KAGAN FISH SMOKER**

With respect to the above stated aspect of the study, the following observations were noteworthy:



When the Kagan Fish Smoker was introduced in 1969, the cost of construction was ten cedis (¢10.00), and between three cedis sixty five pesewas (¢3.65), and four cedis twenty five pesewas (¢4.25) for a tray. Materials needed for construction were then readily obtainable from shops and the fish smokers did not experience any difficulties in purchasing them. Consequently, this facilitated the adoption of the oven. Also the materials then available were more durable and of better quality as compared to the present ones. For example the wire mesh available at that time was  $\frac{1}{2}$ " or  $\frac{3}{4}$ " mesh; 20 gauge and of 3 or 4ft. in width. At the time of the study, only 1" and 22 gauge variety (which is not strong enough) was available. Even this was difficult to obtain due to general scarcity of goods on the market. They were also very expensive, costing ¢362.00; ¢402.00 and ¢520.00 for a roll of 50yards, 3ft.in width, and 1";  $\frac{3}{4}$ " and  $\frac{1}{2}$ " wide respectively when obtained at the controlled price. Where this is not possible which is most often the case, the smokers had to pay as much as ¢1,500.00 for the same quantity, not to mention the difficulties they had to undergo. However, the better quality variety was costing only ¢36.00 per roll of the same specifications in 1970.

The type of wood used for making the fish smoking trays was originally of the red hard type, and locally called Odanta, Odum, Sapele and Emere could be obtained at reasonably cheap prices. But at the time of study, the smokers have had to resort to the use of the soft, white type of wood locally called Wawa,

because these were relatively cheaper than the original hard type. Added to these limitations was the fact also that the smokers had to pay more for the construction of the ovens and frames than was the case before. This latter limitation has been occasioned by the general increase in cost of living with its attendant increase in wages for workers.

These have been the major limitations arising from the changes in the socio-economic pattern of the country that became associated with the use of the Kagan Fish Smoker over the years since its introduction. In connection with the technical appraisal of the oven, it was noted that on the whole the respondents who were using it had found it very useful and labour saving. In view of its larger capacity as compared to the traditional ovens it could accommodate greater quantities of fish at a time and thereby reduced the number of smoking times for a given batch of fish. Furthermore, they also realized that it smoke dried the fish more effectively and faster and thus saved time. This made it possible to handle more fish for same period of time than previously when the other ovens were used. Another worthwhile observation made was that the smokers had on their own developed larger varieties of trays used for storing smoked fish instead of using the traditional round mud ovens for storage of the fish.

## DISCUSSIONS

From the accounts of the fish smoking process as practiced at the three areas covered under the survey, as well as the description of types of oven used, their

construction, vis-à-vis the socio-economic analysis of the experience and technical appraisal of the Kagan Fish Smoker, the following observations were noteworthy:

Fish smoking was practiced predominantly by illiterate women mainly along the coastal areas. It constituted their main business activity, and was often the main source of income for the whole family.

The women had over the years acquired remarkable skill in the smoking process and with even the Kagan Fish Smoker in areas where it was used especially at Chorkor to the extent that they were quite adept at its construction. It is pertinent to note that even in areas where other types of ovens were used, a reasonable enthusiasm was expressed for possible adoption of the Kagan Fish Smoker if a conscious effort was made to introduce it to them.

Although the women displayed a considerable degree of industry in their work, expansion of their activities was retarded by various factors. Notably among were the following:

- Difficulty in obtaining the necessary materials for the construction of the trays and other inputs required for the smooth functioning of the ovens because of the peculiar situation of acute shortages being experienced.



- Lack of effective storage of smoked fish causing losses through exposure to the weather and through activities of thieves.
- High cost of materials and inputs resulting in increased cost of construction and maintenance of ovens.
- Lack of easily accessible financial credit facilities.
- Irregular supply of fresh fish.
- Absence of a properly organized group or co-operative to ensure the regular supply of the needed inputs at controlled prices for the construction of the infrastructure required for fish smoking, storage, transportation and marketing.
- Lack of proper planning and effective utilization and management of available resources arising mainly as a result of ignorance. For example, they do not record expenditure on firewood and other incidental expenses resulting in unnecessary losses.

In spite of the limitations and constraints, it was noted that the respondents in general, found the fish smoking business very rewarding. In particular those of them using the Kagan Fish Smoker had recognized and indeed appreciated the advantages of the Kagan Smoker over the other types of oven. The fish smokers

reported that the unit cost for smoking fish was lower with the Kagan Smoker than with the other traditional ovens.

## **PROPOSALS FOR EXTENDING RANGE OF UTILIZATION OF KAGAN FISH SMOKER ALONG COASTAL GHANA**

Taking into account the various findings in respect of the acceptance and general usage of the Kagan Fish Smoker in areas where it was employed, it is evident that any programme for extending its range of utilization in other parts of coastal Ghana is likely to succeed. This assessment is buttressed by observations made in other areas, e.g. Elmina and James Town, where people are still using the other types of oven. The women for possible adoption of the Kagan Fish Smoker expressed a reasonable degree of enthusiasm. The main reason why they had not adopted it was the fact that they have never been introduced to its usage and also they had only had the chance of being exposed to cylindrical mud or metal ovens they were using.

It was evident from the foregoing observations, that the smokers at James Town, Elmina, and other parts of coastal Ghana, would readily accept the Kagan Fish Smoker if they are educated on its use, its advantages. Also if definite arrangements are made for making the necessary materials required for its construction, easily available.

In this connection, it is recommended for consideration that as part of a concrete programme to extend the range of use of the Kagan Fish Smoker, the following procedure be adopted:

1. As a first step, free samples of ovens and sets of framed nets be supplied to selected fish smokers in various areas for trial.
2. This should be followed by the collection of feedback information on their experiences with the new oven compared to the traditional ones through direct communication.
3. Depending on the response, further materials can be supplied at subsidised rate for a period before they are finally left on their own.
4. In order to sustain their interest it may be useful to arrange for the supply of materials from a central source to their leaders for distribution. In this regard, it may be worthwhile to introduce them to the idea of forming co-operative groups to oversee and ensure that their needs are catered for. This idea can also be extended to areas where the Kagan Fish Smoker is already in use.

The proposal for the formation of co-operative group came up from the observation made from the survey that irregular supply of the required inputs at controlled prices was the main contributory factor that retarded the expansion of the fish smoking activities. A similar problem experienced by the fishermen who previously operated more or less on individual basis



greatly improved through the formation of various fishermen's co-operatives. Their executives made the needed representations to appropriate government agencies for the supply of their input. The respondents generally displayed keen interest and willingness to form such co-operatives groups when sounded on the idea during the survey.

5. In connection with the foregoing proposal, the need for extension work to be carried out was realized during the exercise. Especially, as it became evident, that occasionally some respondents were not readily open and receptive and would therefore need some amount of properly organized education, in order to get them to embrace the scheme completely. In this respect, the Ghana National Council on Women and Development (NCWD) which already has had some such experience in organizing rural women for other small-scale activities, notably the establishment of various cottage industries could be of considerable assistance if invited to participate in this aspect. The Fisheries Department of the Ministry of Agriculture is another government agency which, could be of assistance not only in this extension aspect of the work but also in connection with arrangements for the purchase and supply of the needed inputs. However the activities of this department at present, are centred mainly on the production aspect of the fishing industry. Nevertheless since they already have a cadre of trained technical personnel who could be used, there will only be the need to approach them with the view to orienting part of their

activities towards the processing aspect of fish which will be covered under this project. Finally, the Food Research Institute as the agency that originally introduced the Kagan Fish Smoker in 1968-1970 could provide the relevant technical support that would be needed. Consequently, it is envisaged that a coordinated programme involving these three organizations could be used in implementing the project.

6. It is also pertinent to note that of the three fish smoking sites covered in the survey, it was only at Elmina where the Kagan Fish Smoker was not in use. Majority of the respondents at Elmina, however, expressed their willingness to accept any oven if it proved to operate more efficiently. There is the possibility of the use of the Kagan Smoker spreading to other fishing communities in the Central Region such as Biriwa, Moree and Cape Coast when the usefulness of the Smoker is realized at Elmina. There is a Fisheries School at Kpando (Torkor) in the Volta Region with facilities for training in both fishing and fish processing as a vocation. This school could be used in introducing the Smoker. The students will be agents for the extension of the Smoker.
  
7. It is known from historical records that Ga women, like women of other West African people along the coast, have been involved in trading as long as can be determined. Although trade in commodities such as slaves, gold and, ivory, were done by men, trade in fish and vegetables were



always undertaken by women. It is recorded that, before Accra became built up in 1930's, many women helped their husbands with farming when they were not trading, but significantly their trading usually included the sale of their husbands' agricultural surplus or fish. This is still the common practice in Ga settlements outside Accra and was indeed observed during this survey work not only among the fishing communities at James Town and Chorkor but also at Elmina , a Fante fishing town. In other studies of fishing communities in Labadi and Teshie two Ga villages east of Accra, the continued importance of co-operation between spouses in carrying on the fishing industry has been reported. Husbands caught fish and wives processed and marketed them. This arrangement provided the economic background of the family.

It is worthy to note that this arrangement was still manifest in all the communities covered during this survey. In Chorkor where the Kagan Smoker has been in use, the fish smoking business has expanded tremendously both in terms of quantities of fish processed and the associated turnover as compared to the original state in 1968 when the introduction was done. Consequently, it is believed that the expansion of the range of utilization of the Kagan Smoker will have a similar impact in other parts of coastal Ghana and therefore enhance the viability of the communities so affected.

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TABLE 1: Sample Size at Chorkor, James Town and Elmina

Area/Town	Number	Percentages
Chorkor	15	38.46
James Town	14	35.90
Elmina	10	25.64
<b>Total</b>	<b>39</b>	<b>100.00</b>

TABLE 2: Educational Background of Respondents

Type of Education	Chorkor	James Town	Elmina	Total	Percentage
No formal education	13	12	10	35	89.76
Primary	1	2	0	3	7.68
Middle	1	0	0	1	2.56
<b>TOTAL</b>	<b>15</b>	<b>14</b>	<b>10</b>	<b>39</b>	<b>100.00</b>



**TABLE 3: Age Distribution of Respondents**

Age Range	Chorkor	James Town	Elmina	Total	Percentage
24.5 – 29.5	3	0	2	5	12.82
29.5 – 34.5	3	0	1	4	10.26
34.5 – 39.5	2	7	0	9	23.09
39.5 – 44.5	3	1	1	5	12.82
44.5 – 49.5	3	3	2	8	20.51
49.5 – 54.5	1	0	1	2	5.13
54.5 – 59.5	0	1	2	3	7.69
59.5 – 64.5	0	1	0	1	2.56
64.5 – 69.5	0	1	0	1	2.56
69.5 – 74.5	0	0	1	1	2.56
<b>Total</b>	<b>15</b>	<b>14</b>	<b>10</b>	<b>39</b>	<b>100.00</b>

**TABLE 4: Sex, Marital Status of Respondents**

	Female	Male	Married	Divorced	Widowed	Single
Chorkor	15	0	15 11	0 0	0 3	0 0
James Town	14	0	11	0	3	0
Elmina	10	0	7	0	3	0

**TABLE 5: Smoking Experience**

Years	Chorkor	James Town	Elmina	Total	Percentage
1 –15	6	1	4	11	28.21
16 – 30	9	10	2	21	53.84
Over 30	0	3	4	7	17.95
<b>Total</b>	<b>15</b>	<b>14</b>	<b>10</b>	<b>39</b>	<b>100.00</b>

TABLE 6: Size of Team

No. of people	Chorkor	James Town	Elmina	Total	Percentage
2	2	5	3	10	27.02
3	0	6	2	8	21.63
4	5	2	3	10	22.02
5	3	0	0	3	8.11
6	2	0	0	2	5.41
7	0	0	0	0	0.00
8	2	1	0	3	8.11
10	1	0	0	1	2.70
Total	15	14	8	37	100.00

TABLE 7: Scientific, English and Local Names of Common Species of Marine Fish Used for Fish Smoking at Chorkor, James Town and Elmina

Family	Species	English name	Ga/ Adangbe	Ewe	Akan	Hot Smoking	Dry Smoking
Clupeidae	Sardinella auritus, Sardinella maderensis	Sardines	Kaakama Man, Antebo	Vetsime, Adruku, Dayi	Krankrama, Mban, Emame, Antere	x	x
Engraulidae	Engraulis encrasicolus	Anchovies	Amoni	Abobi	-		x
Pomadasyidae	Brachydeuterus auritus	Burrito	Boboe	Hawni	Eboe, Ahinabadzi, Kyerewaya		x
Lethrinidae	Lethrinus atlanticus	Sea bream	Tsile, Sikasika, Yiyiwa		Sikasika, Wiriwiriwa	x	
Thunnidae	Thunnus abesus	Tuna	Odaa		Odaa	x	
Serranidae	Epinephelus goreensis	Grouper	Shoifie		Esoe, Ofi	x	
Lutjanidae	Lutjanus modestus, Lutjanus agennes	Red snapper Grey snapper	Ta Nfi, Ta		Esui, Eposor, Offien	x	
Sphyraenidae		Barracuda	Odiem, Nfii	Lidzi	Edo, Dwiredne	x	x
Carangidae	Decapterus rhonchus	Mackerel			Emure	x	x



TABLE 8: Scientific, English and Local Names of Firewood Used for Fish Smoking at Chorkor, James Town and Elmina

Family	Species	English name	Ga/ Adangbe	Ewe	Akan
Combretaceae	<i>Terminalia ivorensis</i>	Black bar, Shingle wood	Emere	Dzobedodo	Amire
Maliaceae	<i>Azadirochita vindica</i>	Nim tree, Mogasa tree	Kingtso		Abode
Lecythidaceae	<i>Combretodendron macrocarpum</i>	Stinkwood tree	Osa		Esa Esiakokobin
Strerculiaceae	<i>Nesogordonia papaverifera</i>		Odanta		Danta, Odanta Akumadua, Akumaaba, Apuro
Papilionaceae	<i>Baplia nitida</i>	Camwood	Aboloo baatso	Odzori, Toti	Odwen, Odwene
		Sugarcane	She		Ahwerew

TABLE 9: Specifications of Samples of Fish Smoking Ovens

Specification		Chorkor	James Town	Elmina
Height (cm)	Mean	65.4	86.5	93.8
	Range	18.0	38.0	47.0
	Sd	4.6	9.4	13.0
	c.v. %	7.03	10.87	13.86
Thickness (cm)	Mean	16.2	0.35	9.8
	Range	9.0	0.3	5.0
	Sd	2.2	0.09	1.66
	c.v. %	13.58	25.79	16.94
Length (cm)	Mean	216.8	N/A	N/A
	Range	36.0		
	Sd	10.7		
	c.v. %	4.94		
Breadth (cm)	Mean	113.9	N/A	N/A
	Range	29.0		
	Sd	8.5		
	c.v. %	7.46		
Circumference (cm)	Mean	N/A	333.9	380.1
	Range		158.0	353.0
	Sd		43.5	107.2
	c.v. %		13.03	28.2
Volume (cm <sup>3</sup> )	Mean	1406020.98	235516.34	397874.86
	Range	902115	331128.85	639659.68
	Sd	165382.69	75824.94	206283.11
	c.v. %	11.76	32.2	51.85

Table 10 Capacity of ovens used at Chorkor, James Town, Elmina

No. of crates	Chorkor	James Town	Elmina	Total	Percentage
1.5 - 1	-	2	2	4	10.26
1	-	3	8	11	28.21
2- 3	1	-	-	1	2.56
4	12	-	-	12	30.77
5	1	-	-	1	2.56
6	1	-	-	1	2.56
7	-	9	-	9	23.08
Total	15	14	10	39	100.00



Table 11 Size of smoking and storage trays sampled at Chorkor

Specifications	Smoking Trays	Storage Trays
Height (cm) Mean	7.1	14.9
Range	3.0	3.0
Sd	0.6	1.0
Cv %	8.45	6.71
Length (cm) Mean	201.6	201.2
Range	41.0	31.5
Sd	10.0	11.2
Cv %	4.96	5.57
Breadth (cm) Mean	98.2	97.3
Range	35.0	17.5
Sd	7.3	5.4
c.v %	7.43	5.55
Volume (cm <sup>3</sup> ) Mean	1406020.98	N/A
Range	902115.00	
Sd	165382.69	
c.v%	11.79	

Table 12 Number of Ovens Used Per Respondent

No. of ovens	Chorkor	James Town	Elmina	Total	Percent
2	1	-	-	1	2.56
3	-	5	7	12	30.79
4	3	4	1	8	20.51
5	3	1	1	5	12.82
6	1	4	1	6	15.38
7	-	-	-	-	-
8	4	-	-	4	10.26
9	-	-	-	-	-
10	3	-	-	3	7.68
<b>Total</b>	<b>15</b>	<b>14</b>	<b>10</b>	<b>39</b>	<b>100.00</b>

Appendix 2 Questionnaire

ASSESSMENT OF WOMEN'S PARTICIPATION IN ACTIVITIES RELATED TO SMALL SCALE FISHERIES

SECTION 1

General Information

1. Name..... Date:.....
2. Address:..... Region:.....
3. Place of Birth: Town/Village.....
4. (a) Do you know your date of birth? Yes/No  
Date:.....  
If he/she does not know the date of birth, ask Q4b  
If he/she knows the date of birth put age in Q4b  
(b) How old are you?
5. Have you ever attended school?  
Present.....Past.....Never.....
6. What (is, was) the highest level attained?  
Primary..... Post  
Secondary.....  
Middle.....  
Advance/Specialist.....  
Secondary..... Diploma/University  
degree.....  
Com/Tech/Voca:..... Any other (specify)
7. What (is, was) the highest class, standard, form or years completed in the level?
8. What is your ethnic origin?  
Akan:..... Ga:.....  
Ewe:..... Northern:.....  
Others, specify:.....
9. a) What economic activities (for income) do you undertake?  
Major.....Minor.....  
b) What is your marital status?  
i) Married..... ii) Single.....  
ii) Separated..... iv) Widow.....  
v) Others, specify.....
10. For how long have you been smoking  
fish?.....
11. Where (site) have you been  
smoking?.....
12. Do you work alone or in a team?  
Alone/team:.....  
If he/she works in a team, how many are  
you?.....
13. Have you ever worked alone since you started fish smoking? Yes/No  
If yes, for how long?.....
14. Why are you not working alone  
now?.....
15. Why are you a fish smoker as against the other business  
activities?.....
16. a) What type of business organization are you in?  
Personal..... Family..... Partnership.....



- b) Which do you prefer?.....
17. How occupied are you when fish is not in season?.....
18. Do you know of other areas where fish is smoked on commercial scale?.....

**SECTION 3  
MECHANICS AND ECONOMICS OF FISH SMOKING**

19. What type of fish do you smoke?  
a) Marine fish  
b) Freshwater fish  
c) Lagoon fish
20. What do you do to the fish before it is processed?  
a) Washing  
    If washing is it with freshwater?..... Pipe borne water?.....  
    Lagoon water?..... Sea water?.....  
b) Scaling  
c) Gutting  
d) Gills removed  
e) Cutting into pieces  
f) Head removed  
g) Other treatment, specify.....
21. What do you do with the waste products from question 20?  
Throw it away..... Used for manure.....  
Sell it..... Used for fish meal.....  
Others, specify.....
22. What type of smoked fish do you produce?  
a) Hot smoked..... b) Smoked dry  
c) Others, specify.....
23. How much fish do you a) Hot smoke b) Smoke dry in a day?  
(Estimate weight as accurately as possible)
24. What do you do to the fish before smoking?  
a) Pre-drying..... c) Others, specify.....  
b) Presalting.....
25. If predried, where?  
In the sun..... In an oven.....  
Others, specify.....
26. For how long is the fish predried?.....
27. What do you do to the fish after predrying/or presalting?  
Fish arranged on a) Grills..... b) Trays  
c) Hang on tenter..... Others, specify.....
28. How is the fish arranged?  
a) Head to head..... b) Head to tail.....  
c) Others, specify.....
29. Do you put more than one layer on a  
a) Grill..... b) Tray..... Yes/No
30. If yes, how many layers do you have on a Grill/Tray? 1.....2-3..... More than 4  
specify
31. Do you separate the layers? Yes/No
32. If yes, what do you use to separate the layers?  
With sticks..... Leaves..... Others, specify
33. How many a) Grills b) Trays c) Tenters do you put in an oven?  
(Circle and put appropriate letter against any of the following)  
1..... 2..... 3..... 4..... 5.....  
6..... 7..... 8..... 9..... 10.....
34. Is the oven preheated? Yes/No



- If yes, how long do you preheat?  
 1-10min..... 11-15min.....  
 16-20min..... 21-25min.....
35. How long do you allow for a) Hot smoking b) Smoke drying  
 1-5 hrs..... 6-10 hrs..... 11-16 hrs.  
 16-20 hrs..... 21-25 hrs.....  
 2 but less than 3 days 3 days or more, specify.....
36. Do you turn the fish whilst smoking? Yes/No  
 If yes, how do you turn the fish?  
 a) By turning singly..... b) Transferring from one oven to another.....  
 b) Pouring from one tray to another..... d) Turning tenter.....  
 d) Others specify.....
37. How often do you turn the fish for a) Hot smoking b) Smoke drying?  
 Once..... Twice..... Thrice..... More than 3, specify.....
38. How do you know when the fish is a) Hot smoked b) Smoked dried?  
 a) By colour..... b) By feel..... c) By texture..... d) Others,  
 specify.....
39. What type of firewood do you use for a) Hot smoking b) Smoke drying?  
 Guava tree..... Camwood..... Black  
 tumbler..... Stinkwood.....  
 Calabash..... Mangrove..... Wild Mango..... Candle  
 wood.....  
 Sugarcane..... Coconut husk..... Others,  
 specify.....
40. Why your preference?  
 It is cheap..... Easily available..... Gives nice  
 colour.....  
 Gives desirable taste..... It burns slowly..... Produces a lot of  
 smoke.....  
 Others, specify.....
41. How much firewood do you use to finish a batch when a) Hot smoking b) Smoke drying?  
 (Estimate weight as accurately as possible)
42. How do you dispose of the smoked fish?  
 Sell in bulk..... Retail..... Why? Others, specify.....
43. Does the income from the fish business fully support you? Yes/No  
 If No, who supplements your income?  
 Relative, specify..... Husband..... Others,  
 specify.....
44. What problem do you encounter in smoking and how do you resolve  
 them?.....

#### SECTION 4 FISH SMOKING OVENS

45. What type(s) of oven (s) do you use?  
 Rectangular Mud..... Cylindrical Mud..... Rectangular Metal.....  
 Cylindrical Metal..... Others, specify.....
46. What are the specifications (in cm) of the oven?  
 Length..... Breadth..... Height..... Circumference..... Thickness.....
47. What is the capacity of the oven? (specify the type of container)  
 1..... 2..... 3..... 4..... 5..... 6.....  
 7..... 8..... 9..... 10..... More than 10,  
 specify.....
48. How many of these do you have?

Rectangular mud.....Cylindrical mud.....Rectangular metal.....  
 Cylindrical metal.....Oil drum.....Others, specify.....

49.

What are the construction materials of component parts of oven?

Component part	Mud	Burnt bricks	Wood	Metal	Oil drum
Body					
Frames					
Grills					
Others, specify					

50. a) How did you acquire the oven?

Built it.....Bought it ready-made.....Ordered to be built.....  
 Others, specify.....

b) What is the total cost of the oven?.....

51. How often do you acquire a new oven?

Less than a year.....Once a year.....Once in every 2 years.....

Once every 3 years.....Once every 4 years.....Once every 5 years.....  
 Others, specify.....

52. How much do you spend in a year maintaining an oven?

53. How long do you use an oven before changing it?

54. How many people are required to operate an oven?

55. How do you control the smoke in the oven?

Not controlled.....By reducing quantity of firewood.....  
 By adding other types of fuel.....Others, specify.....

56. How is the temperature controlled within the oven?

Not controlled.....By reducing the quantity of firewood.....Others, specify.....

57. Do you know about other type of oven? Yes/No

If yes, describe.....

58. If yes to Q57, how does your fish compare with fish smoked in other oven types?

59. What are your reasons for your choice of oven?.....

60. Would you accept an oven type different from yours if it is proved to operate more efficiently than your oven type? Yes/No

If No, what are your reasons?.....  
 .....  
 .....  
 .....