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**EXTENSION OF RESEARCH RESULTS TO END USERS
SUCCESS STORIES AND FAILURES: THE CASE OF THE
FAO/FOOD RESEARCH INSTITUTE CHORKOR SMOKER**

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BY

**Mrs. GLADYS NERQUAYE-TETTEH
FOOD RESEARCH INSTITUTE
P. O. BOX M 20, ACCRA**

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SUMMARY

The FAO/Food Research Institute Chorkor Smoker, a traditional improved fish smoking oven has been used to illustrate the extension of research results to the end users. Work on the development of this oven started in 1968 and by 1969 its extension to the end users commenced. The Chorkor Smoker has offered a truly appropriate solution to the constraints of traditional fish smoking as shown by its wide acceptance in Ghana as well as in some countries outside Ghana. About forty (40) fishing towns/villages are using the oven for commercial fish smoking. The successful extension of the Chorkor Smoker in Ghana has been attributed to factors such as: the origination of the project with full participation of the end users and their contribution to the project in various forms. The technology was needed and wanted. It did not only respond to the needs but also the desires of the fish processors. The oven was found to be economically affordable and worthwhile. It also conformed to local habits and customs. It was easily demonstrable and developed to the point where its advantages were evident. Material resources required for the construction of the oven were also available. The possibility of building the technology right in the villages with the users involved facilitated its acceptance in the communities. The simple techniques required in the building of the oven and the availability of funds for the project were very helpful.

Among a few factors that militated against the acceptability of the Chorkor Smoker include the following: lack of substantial working capital and lack of low interest organized credit to enable the processors expand their business to commensurate with the use of the technology. There has been increase in the costs of material resources required for the building of the oven, such as Wawa Board, Wire Mesh, Nails and Sheets of Plywood. The seasonal nature of fisheries in Ghana has also been a contributory factor.

EXTENSION OF RESEARCH RESULTS TO END USERS: SUCCESS STORIES AND FAILURES THE CASE OF THE FAO/FRI CHORKOR SMOKER

By Mrs. Gladys Nerquaye-Tetteh, Food Research Institute, Accra

INTRODUCTION

Under the topic mentioned above the case of the FAO/FRI Chorkor Smoker, which is an improved traditional fish smoking oven will be discussed. But before doing so it is necessary to provide some background information on the fishing industry, its important role in general, the distribution pattern, the processing/preservation methods and the processing equipment employed.

Ghana fisheries consist of three main sectors, which are:

- Long distance fleet.
- Indigenous canoe fleet, which are scattered all along the coastal areas.
- Inshore vessels fishing in the continental shelf of the country.

Fishing is done in sea, Volta Lake, rivers and lagoons in the country. Below is Table 1 showing marine fish production from 1980 to 1987.

Table 1 Marine Fish Production in Ghana 1980 – 1987 ('000MT).

Year	1980	1981	1982	1983	1984	1985	1986	1987
Canoe	141.8	149.8	140.9	137.3	171.2	159.9	190.2	168.0
Inshore	15.6	16.9	16.4	19.7	14.7	17.9	21.9	19.0
Deep Sea	19.1	15.4	12.9	16.8	16.4	21.9	22.3	20.0
Ghana Tuna	7.6	18.4	28.9	31.7	29.1	34.4	34.7	35.0
Total Domestic Catch	184.1	200.0	199.1	205.2	231.1	234.1	269.1	242.0

As shown in the above Table, the artisanal canoe fleet lands the bulk of marine fish. The supply of fish, particularly marine fish, is however subject to fluctuations caused by seasonal upwelling and other factors. During the peak fishing season, the fish processing and storage capacity of the women is often not able to cope with the quantity of fish landed. The Chorkor Smoker was developed to solve this problem among others.

Fish continue to serve as an important source of protein in the Ghanaian diet being the cheapest and most widely consumed source of animal protein. Fish is a highly perishable food commodity. Owing to the high temperatures and humidity that prevail in the country, the unavailability of ice and the poor distribution of cold storage facilities in the country, most of the fish landed need to be processed in one form or the other in order improve its storage life. Processed fish is therefore common and appreciated by the Ghanaian consumer. Traditional processing methods are employed to preserve the fish. These methods include smoking, salting and drying, sun-drying, fermentation and frying. Smoking is the most widely practised. In 1971, a survey on consumer attitudes to processed fish by Orraca-Tetteh and Nyanteng, showed that consumers in Ghana preferred smoked dried fish to fresh fish. It is estimated that about 80% of total fish catch is smoked (Reusse, 1968). Two types of smoking are practised. These are Hot Smoking and Smoke Drying, however the later is most widely used.

Fish Smoking Methods/Equipment

Women in the coastal towns and villages do fish smoking at the artisanal level. Originally three main types of traditional fish smoking ovens were used. These were Cylindrical (round) Mud with or without thatch cover, Cylindrical (round) metal oven and Rectangular Mud Oven. They are described in detail below.

Cylindrical (round) Mud Oven

This oven is built from mud. Its use for fish smoking is common in some areas of the country. It exists in various sizes but typically, it has external diameter of about 132cm, internal diameter of about 105cm and a height of about 80cm. A ledge is created in the wall at a height of 50cm on which sticks can rest and used in supporting the layers of fish to be smoked. Where there are more than one layer of fresh fish, it is separated using sticks. A stoke hole through which firewood is fed of about 42 x 48cm is cut at the base of the oven. A thatch cover is sometimes used either to cover smoked fish in storage or for partially covering the oven during the latter part of the cooking period of the smoking process. In some cases, wire mesh is used to hold the fish instead of placing the fish on sticks inside the oven. The Cylindrical Mud Oven is used more the Central, Western and Volta Regions of the country. Some disadvantages associated with the use of this oven include the excessive handling of the fish during the smoking. This problem is more severe when fish species of small sizes such as Anchovy is smoked. The excessive handling leads to increased damage to the fish, which lowers the market value of the fish drastically. Another shortcoming of the Cylindrical Mud Oven is that due to the frequent reshuffling of the fish during smoking, the oven cannot be fully loaded which contributes to its low capacity. A typical Cylindrical Mud Oven is shown in Figure 1.

Cylindrical (round) Metal Oven

The Cylindrical Metal Oven is a development of the Cylindrical Mud Oven. Empty 44gallon metal oil drums are used in for its construction. It is normally constructed by welding together two or more opened oil drums and cutting a stoke hole at its base for feeding firewood into the oven. The external diameter is about 114cm and the height 88cm. Thick iron rods are welded at about 58cm up and used for supporting the fish during smoking. The stoke hole, is approximately 41 x 41cm. The Cylindrical metal oven is used extensively in Ghana and some West African countries. It is movable and very convenient to fish smokers who do not stay at one place but travel with the fishermen who move from place to place

following the fish. It is however, easily susceptible to rust and corrosion especially when close to the sea. It also suffers similar shortcomings as the Cylindrical Mud. A typical Cylindrical Metal Oven is shown in Figure 2.

Rectangular Mud Oven

As the name implies, this oven is rectangular in shape and is built using mud. Thick iron bars are placed across on top of the oven to support the layers of fresh fish during smoking. A stoke hole is cut along one of the longer sides of the oven. For smoking, the fish is arranged on pieces of wire mesh and placed on the supporting pieces of iron rods. Where more than one piece of wire mesh is used, the fish is separated using sticks. Some disadvantages of this oven include the following:

- Controlling of the fire is difficult.
- Difficulty in handling the hot wire mesh during smoking
- Excessive handling of the fish, which causes damage to the fish.
- In most cases fish falls through into the burning fire below leading reduction in the quantity of fish.
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- Loss of a lot of heat and smoke through the big stoke as well as by the sides of the layers of fish. This results in inefficient fuel usage.
- Low capacity.
- The sticks used to separate the fish tend to exert pressure on the fish contributing to disfiguring of the shape of the fish.

A typical Rectangular Mud Oven is shown in Figures 3a; 3b.

Since early 1950's the awareness of the above, elaborated shortcomings of the traditional, fish smoking ovens, stimulated work on the development and introduction of new improved fish smoking ovens models in Ghana. Examples

include, the Ivory Coast Oven (Maembe, 1982), Altona Oven (Anon, 1971), and the Adjetey Oven (Adjetey, 1962). The fish smokers have so far accepted none of these ovens. These ovens are described below.

The Ivory Coast Oven

The Ivory Coast Oven consists of a wooden frame to which are nailed flattened corrugated sheets to form the sides of the oven. The fire chamber is made from one and a half, empty 44gallon oil drums. It is welded together with the one end of drums removed. A hole is cut in the side of the welded drum through which smoke and heat will to escape during smoking. A perforated metal plate is suspended above this hole and used as a spreader of the smoke and heat generated from the fire below. Three trays made from wooden battens with wire mesh nailed across them go with the oven. Fish to be smoked is packed on these trays and placed on top of framed work. A cover made from corrugated iron sheets nailed to wooden battens is place on top of the fish and used to retain heat and smoke as desired.

Maembe (1982) concluded that the Ivory Coast Oven was not acceptable to the fish smokers at the Lake Chad because the processors did not always have sufficient funds to purchase fish to fill the oven to full capacity. The use of the drum fire chamber was found to be cumbersome. The smoked product did not have acceptable appearance. The oven showed wide variations in temperature during smoking and this militated against it. Figure 5 shows the Ivory Coast Oven.

The Altona Oven

The Altona Oven was imported to Ghana from the Federal Republic of Germany. The German Volunteer Service introduced it, to the fish smokers of Biriwa in the Central Region of Ghana. The oven consists of a combustion chamber (firing) chamber constructed from burnt bricks. The chamber has one stoke hole at the bottom of the centre front wall for the feeding of firewood and controlling of the

fire. There is a smoke unit fixed with concrete on top of the combustion chamber. It is enclosed with two doors and constructed from heavy metal. The fish to be smoked is threaded through the eyes on iron rods and hanged in the enclosed chamber. This model was not accepted by the fish smoker because of many reasons such as, the cost of the oven was high, the method of piercing through the eyes of the fish leaving a hole was foreign to consumers who were used to smoked fish with the head and eyes intact.

Later, a modified Altona Oven was introduced as a way of solving some of the problems associated with the original model of the oven. The modified oven also has the brick combustion chamber. But the smoke unit is made up of a wooden batten frame covered with flattened corrugated iron sheets and fitted with seven parallel supports. There are seven framed wire mesh trays for holding the fish for smoking Figure 2. The Altona oven also has a limited acceptance in Ghana because it did not solve the problem of its use being a complete departure from what the women were used to. The trays were too heavy when filled fish and also too high for women to lift into the smoking unit, the cost of the oven was still too high for the fish processors.

The Adjetey Oven

The Adjetey Oven is constructed from heavy metal. It has a combustion chamber, which is located to the side of the smoking unit with a tube connecting the two chambers. The fish smokers because of the high cost and the inconvenience in operation rejected this oven. Its operation departed a lot from what the processors were used to. The smoked products obtained using this oven did not come out as dry as that obtained using the traditional smoking ovens (Figure 4).

As a result of the constraints and disadvantages associated with the ovens introduced earlier in the country, and the knowledge gathered on the traditional fish smoking ovens in use, the FAO/FRI Chorkor Smoker was

developed in 1968 by Mr. B. Kagan, (FAO Expert on Fish Processing Technology) with the assistance of Mrs. G. Nerquaye-Tetteh who was the national counterpart. It was noted that, the technology must be needed and wanted. That is, it must respond not only to the needs but also the desires of the fish smokers. It must be economically affordable and worthwhile. It must conform to the local habits and operation. It must also be easily demonstrable to the point where its advantages are evident. It must be able to operate and continue to operate in the relevant environment, with the human and material resources available. The Chorkor Smoker was based on the already existing Rectangular Mud Oven.

Development of the FAO/FRI Chorkor Smoker

The FAO/FRI Chorkor Smoker

The Chorkor Smoker consists of a combustion chamber and a smoking unit made of set of trays. The combustion chamber is rectangular in shape constructed with prepared mud, and of the following specifications: 230 x 114 x 65cm. It has a middle wall dividing the combustion chamber into two equal parts. The wall also gave added strength and support to the loaded trays of fish as well as protecting the median, cross pieces of the trays from the fire below. Each half of the combustion chamber has a stoke hole of 40 x 40cm and a fire pit of approximately 16cm deep to increase the distance between the fire and the bottom tray of fish. The stoke holes, are arched to give greater strength. The top of the oven wall must be flat so that the trays fit flush and not allow heat and smoke to escape. The trays must also fit closely onto each other to form a kind of chimney. The wall thickness was 12cm.

The trays were constructed from wire mesh of 18-20gauge and $\frac{1}{2}$ or $\frac{3}{4}$ " width held rigidly on wooden battens. The Chorkor Smoker is shown in Figure 6. A maximum of 15 trays of fish may be smoked at a time although 10 is the usual number. When large species of fish like Tuna are smoked a maximum of 5 tray is

used. Each tray can take 18-25kg of wet fish. Each oven has a sheet of plywood, which is used as a cover during smoking. The materials used in building the oven were available, locally.

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The development of Chorkor Smoker originated with the full participation of the user agencies, which in this case were two women fish smokers at Chorkor, a suburb of West Accra. In fact the first set of trays were constructed to the specifications of one of the Rectangular Mud Ovens used by these women.

Introduction of the Chorkor Smoker to the Fish Smoking Community in Ghana

The first set of 10 trays was presented free to two fish smokers at Chorkor in 1969. The idea was that the women would use the trays for their usual fish smoking whilst they were visited to find their views on the performance of the improved technology.

Six months later, the following were the comments obtained from the women:

- Handling of the fish during smoking was greatly reduced since the fish did not need to be rearranged as many times as when using the traditional ovens.
- More fish could be smoked on the oven at a time because it was possible to arrange the fish on the trays up to the corners. Ten trays of fish were smoked at a time.

- The product was uniformly smoked due to a greater retention of heat and improved smoke circulation.
- The smoking process became less tedious with the use of the trays.
- The trays formed a sort of chimney, so that there were no spaces through which smoke could escape.
- This reduced fuel wood consumption.

At this stage, other fish smokers along the Chorkor beach started showing interest in the new technology and expressed interest in having one. With a small grant from the Freedom from Hunger Campaign (FFHC), more of the trays were constructed and this time sold at subsidised cost to more fish smokers in the area. This process continued until 1971.

In the ensuing years, the use of the Chorkor fish smoking technique spread gradually along the length and breadth of the Chorkor community. This was because the advantages of the oven were very obvious. They were therefore quick to adopt it. At this stage, the women started copying the oven. That meant that some carpenters as well as masons around the Chorkor beach started making the ovens for the women and charging them a small fee.

Following the ready acceptance of the technology by the Chorkor Community, it was intended to extend its use to fish processing communities throughout the country. But with the discontinuation of the assistance both material and financial from FAO, efforts in this direction were severely hampered. Ten years after the initial introduction of the oven at Chorkor it was still fairly unknown outside this area.

A study carried out (Nerquaye-Tetteh, 1982) showed that due to various socio-economic constraints, the expansion of the fish smoking industry had greatly declined. It was observed however that in areas where the Chorkor Smoker had been introduced, the fish processors had developed considerable skill both for its

use and construction while in other areas a reasonable degree of enthusiasm was exhibited for its possible adoption. In this regard concrete proposals for extending the range of utilization of the Chorkor Smoker in Ghana as well as suggestions for means of its implementation were made.

In 1982/83 UNICEF (Ghana) funded a project undertaken by the National Council for Women and Development (NCWD) with technical assistance from the Food Research Institute. The project was aimed at promoting the adoption of the Chorkor Smoker in areas outside Chorkor. The fish processing communities covered under this project were Oshiyie, Akplabanya, Lolonya, Anyamam, and Goi in the Greater Accra Region, Tetekokpe, Tegbi, Woe and Dzelukope in the Volta Region. The extension techniques applied were participatory with demonstration. The women made contributions in various forms such as providing mud, water, and physically participating in the construction of the oven. In each of the community, at least a mason and a carpenter were trained in how to construction the oven. Effort was made to make the key features known to them. They were also made aware of the essential aspects of the oven.

To add to the extension of the oven, a publication on " A Practical Guide to Improved Fish Smoking in West Africa" was produced and published by UNICEF in 1983. The manual was in English and French and was to be use as a training manual of the Chorkor Smoker. It was widely distributed in Ghana and outside and provided useful information on the construction use and maintenance of the Chorkor Smoker.

The International Labour Organization through a generous grant from the Netherlands, government, initiated a project in 1985 with the NCWD. It was to identify, promote and introduce income and employment generation technologies for food preservation, food processing and home based industries with a view to increasing the productivity of women and reducing drudgery and burden of the activities of rural women in Ghana.

The dissemination of a modified form of the Chorkor Oven in some fishing communities again formed part of this project. The communities were Kokrobite, Nyanyano, Apam, Mumford in the Central Region. The approach of the introduction differed slightly from what was used in earlier projects. The ovens were provided on credit to the smokers.

In a report of FAO Expert Consultation on Fish Technology in Africa (1985), it was recommended that the FAO develop a methodology for testing fish smoking oven and use to conduct a comparative evaluation of the ovens commonly used in Africa. A Technical Cooperation Programme (TCP) project was therefore funded by FAO and implemented by Food Research Institute in 1986/87. The project had the following objectives:

- To carry out practical training for fish processors on fish smoking using the Chorkor Smoker and to obtain data on temperature distribution, smoking time, humidity, amount of fuel wood used etc.
- To establish a training/demonstration unit to be used for fish smoking and select different construction materials for durability testing.
- To prepare extension materials on fish smoking to be used in training.
- Traditional Fish Smoking Equipment and Method Used for Fish Smoking in Ghana.

The project produced a video on "Improved Fish Smoking in the Tropics" for use in educational programmes for rural producers of smoked fish as well as fishery extension officers and students. The Chorkor Smoker featured prominently in the video, which had the following chapters:

- Chapter 1 Fish Smoking for Food and Income.
- Chapter 2 How to Construct the Chorkor Oven.
- Chapter 3 Preparation and Smoking of Fish on the Chorkor Oven
- Chapter 4 Packaging, Storage and Marketing of Smoked Fish.

As part of this project, fish smokers in six communities namely, Kpone, Old Ningo, Prampram in Greater Accra Region, Kromantse 1 & 2 and Ankaful in the Central Region were provided with Chorkor Ovens. A total of 69 ovens, 580 smoking trays and 57 sheets of plywood covers were distributed to the smokers in these communities.

In all cases of the extension of the Chorkor Smokers in the communities the ovens were constructed at sites the smokers found convenient. Individual fish smokers and not groups or associations owned the ovens. The ovens were therefore scattered in the communities. This contributed to the spread of the oven within the communities as other fish smokers copied from those who had the Chorkor Smoker.

Below is Table showing towns/villages where Chorkor Smokers has been introduced through various projects over the years.

Table 2 Towns/Villages Where Chorkor Smoker Has Been Extended

Region	Greater Accra	Volta Region	Central Region
Town/Village	Oshiyie	Tetekokpe	Biriwa
	Kokrobite	Tegbi	Kromantse 1 & 2
	Bortianor	Woe	Ankaful
	Akplabanya	Dzelukokpe	Mankesedo
	Goi		Moree
	Lolonya		Cape Coast
	Anyamam		Elmina
	Teshie		Nyanyano
	Kpone		Fete
	Prampram		Apam
	Old Ningo		Mumford
	Anhwiam		Winneba

	Chorkor Lekpongunor		Woarbeba
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As part of the celebrations of the World Food Day in 1986, the construction, use and, maintenance of the Chorkor Smoker was demonstrated to fish processors of inland fish at Dzemeni, in the Volta Region, an important fish processing community on the Volta Lake.

Extension of Chorkor Smoker in Other African Countries

All these years knowledge of the Chorkor Smoker was spreading both inside and outside Ghana. The manual on "A Practical Guide to Improved Fish Smoking in West Africa", which was developed earlier on and published in both English and French was very useful the extension exercises undertaken. Knowledge and sharing of ideas on the Chorkor Smoker also took place at various workshops and conferences organized by FAO. Projects for fish processors started off in Benin (1982) and Guinea (1983). They were financed by UNIFEM and executed by FAO. The projects organized women in fish processing and marketing into cooperatives and the oven introduced to them. The oven was meant to reduce drudgery of work as well as increase their income.

Later in 1985, another UNIFEM/FAO project on the promotion the Chorkor Smoker was executed in Togo. As part of the Togo project, a group of women fish smokers, together with an extension officer, a mason and a carpenter were sent to Ghana to understudy the women fish smokers. The group spent 7 days with the Winneba fish smokers where they went through the construction, use and maintenance of the Chorkor Smoker. UNIFEM again funded a similar project in Gabon in 1988 for women in inland fisheries.

The FAO Project for Integrated Development of Artisanal Fisheries in Benin followed up the earlier project by developing a modified model of the Chorkor

Smoker. This was by rounding the inside corners of the combustion chamber. This was to improve the fuel efficiency of the oven further.

FAO in 1985 also supported the Gambian Fisheries Department through the demonstration and experimenting with improved fish processing techniques including the Chorkor Smoker.

In the Cameroon, FAO carried out a training programme on fish smoking for fish processors in collaboration with the Department of Fisheries and "Ministere de la Condition Feminine". In Sierra Leone the Tombo project (GTZ), the small Scale Fisheries Project for the Shenge Region (FAO), the Kambia Fisheries Project (EDF) as well as Plan International are involved in promotion of activities on the Chorkor Smoker. Through recent initiatives of the women's expert of a UNTCD/UNDP, extension of the oven has been done as part of the village self help project. A few Chorkor Smokers can also be found in Cote D'Ivoire.

Acceptance of the Chorkor Smoker- Comparison of Performance of Chorkor Smoker against other Ovens

A comparative assessment of the technical and economic performance of 7 ovens, traditional and improved ovens, including the Chorkor Smoker, showed that large variations in temperature distribution occurred within all the ovens. Control of the smoking and drying rates could only be achieved by either rearranging the layers of fish or adding and taking away firewood from the fire. All the ovens eventually produced acceptable products, but the design of oven, which was most fuel efficient, preferred by the fish smokers as well as producing the most consistent quality of smoked products was the Chorkor Smoker (Stroud, 1986).

The Chorkor Smoker, which originated from Chorkor, a suburb of Accra has received wide acceptance in Ghana. Its introduction has increased the enthusiasm of women in fish smoking as well as inducing integrated programmes

such as sanitation, environmental education and development of infrastructure, banking etc. All these activities have led to socio-economic improvement and rural development of the communities. Akplabanya, a fishing community of the Greater Accra Region, Ada District is a good example of a community where the introduction of the Chorkor Smoker in 1982, has led to its complete upliftment. This is illustrated below:

- The community members and school children are mobilised to participate in community projects, for example environmental sanitation.
- Both fish processors and fishermen in the community have been exposed to credit facilities with the bank.
- Domestic animals, which were roaming about the village, have been put in simple inexpensive structures.
- Most of women have constructed simple inexpensive sheds over the smoking ovens.
- The Chorkor Smoker has completely replaced the old smoking ovens.
- The fish processors have been introduced to banking. Due to their good banking practices with the Ada Rural Bank, an agency of the bank now operates right in Akplabanya on Tuesdays.

Factors Militating Against the Acceptability of Chorkor Smoker

In Ghana, a few factors have been identified militating against the ready acceptability of the Chorkor Smoker. Among these are the following:

- Increasing cost of the construction materials such as wawa board, wire mesh, nails and plywood is affecting its adoption.
- The seasonability of fisheries in Ghana leads to frequent interruptions in fresh fish supply. This prevents the use of the ovens throughout the year and sometimes smoking is not done at full capacity and makes

the use of the oven economically not viable. This applies in Togo and Benin.

- Currently the correct quality of the wire mesh is not available on the local market.
- Lack of substantial working capital and non-availability of low interest organized credit makes the initial investment cost difficult to overcome.

In Sierra Leone most fish processors operate on a semi-industrial scale because large quantities of fish are caught. The fish smokers therefore did not perceive the Chorkor Smoker as having a high enough capacity especially during the peak seasons. This militated against the adoption of the oven. The processors are also reluctant to change their traditional fish packaging methods of packing the fish side by side with the belly down during smoking to placing the fish flat as is done in Ghana. In addition they are not happy with marks made on the smoked products by the wire mesh.

CONCLUSION

Although the Chorkor Smoker can be said to offer a truly appropriate solution to the constraints of the traditional fish smoking ovens, its acceptability is determined by factors such as the following:

- Funds availability.
- Fish volumes processed per production unit by the processor.
- The realization of the advantages offered by the Chorkor Smoker compared to the traditional ovens.

The successful extension of the Chorkor Smoker in Ghana can be attributed to the following factors:

- It originated with full participation of the user agency (fish smoker).

- The construction techniques employed were simple and in fact not much different from the techniques used in the construction of mud houses in some of the communities where the oven was extended.
- Follow-up visits are made to places where the oven is introduced.
- In each community women fish processors and at least a carpenter and a mason were trained on how to construct the oven.
- In most instances funds and transport were made available by external projects for the promotion of the oven.
- The materials required for the construction were for some time easily available locally.
- The possibility of constructing the technology right in the community in the presence of the users facilitated its acceptance.
- The problems of the traditional ovens identified by the fish processors were considered in the development of the new technology and the extension activities.
- The users contributed in kind by providing mud and water for the construction of the oven.

It is important to note that the Chorkor Smoker needs simple modifications in conformity with local circumstances. For example in areas with low fish catch, half -size of the normal Chorkor Smoker may be used. At domestic level ie in homes and institutions, $\frac{1}{4}$ of the normal size may be more appropriate. The height of the combustion chamber and trays can be increased in areas where freshwater fish is smoked.

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