

**IMPROVING LIVELIHOODS THROUGH EXPORTING ARTISANALLY
PROCESSED FISH**



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IMPROVING LIVELIHOODS THROUGH EXPORTING ARTISANALLY PROCESSED FISH

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PREPARATION OF THIS DOCUMENT

The study on improving livelihoods through exporting artisanally processed fish was proposed by FAO within the framework of the Cooperative Research Programme on Fish Technology in Africa coordinated by FAO's Fish Utilization and Marketing Service (FIU). This service and the Fisheries Department Group (RAFI) of the FAO Regional Office for Africa commissioned Dr Yvette Diei-Ouadi, Fish Technology and Quality Assurance Consultant at that time, to collect relevant data to appraise the performance and the impediments to the expansion of export-oriented traditionally processed fish production. The study covered operation units in Côte d'Ivoire and Ghana producing for export to "ethnic" markets. This study is reported in Part 1 of this report while Part 2 relates to the investigation along the Volta Lake, the primary production system of raw material in Ghana.

The objectives of the study were to:

- assess the dynamics of production and export of small-scale export fisheries;
- review the socio-economic effects of this type of fisheries;
- analyse key factors/conditions for development and sustainability;
- propose solutions for improved contribution of traditional fish products meant for export.

The mission was conducted in June 2002 in city-based export premises and in December 2002 in the freshwater fish processing sub-sector. The draft report was submitted on 30 March 2003. The report was subsequently edited and printed by FAO.

Diei-Ouadi, Y.; Mensah, M.E.

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ABSTRACT

A study was carried on the export of traditional African fishery products to “ethnic” markets in the European Union, United States and Canada. The study was conducted in Côte d’Ivoire and Ghana and covered export plants, their suppliers, the competent authorities for sanitary certification, the fisheries departments, export promotion councils, and other stakeholders.

The main export-oriented traditional fish products identified were smoke-dried fish and shrimps, sun-dried fish and live crabs. In both countries the socio-economic importance of traditional fish processing and export operations is considerably higher than indicated by official statistics, contributing to incomes of artisanal fishermen and women fish processors, incomes of small-scale fish exporters, employment, and foreign exchange earnings. Also the contribution to responsible fisheries was underestimated.

There are indications of unsatisfied demand but further growth of the sub-sector would depend on overcoming certain weaknesses identified by the study, such as weaknesses of competent authorities in effectively enforcing regulations, limited knowledge by operators of the sanitary regulations, misuse in some cases of registration numbers and inclusion of products from non-registered producers in consignments from registered ones, police harassments, low awareness among authorities of the importance of the trade, and lack of organization within the sub-sector. Also, the design of the facilities and of the smoking operations themselves seemed rather wasteful of fuel wood.

As a direct result of the study, authorities already committed themselves in reviewing the certification process in order to address its cumbersomeness and match the quality assurance systems with the rationale and systematic approach within the global sanitary concept; to deploy staff to exit points; and to improve relations with operators and providing them more advisory services.

They moreover confirmed the need for an in-depth study of the whole small-scale export sub-sector and for inclusion of the sub-sector in assistance programmes on the basis of a justification consistent with its importance for livelihoods in artisanal fisheries. Within the framework of an assistance programme certain actions would need to be addressed with priority, including developing standards for premises, raw material, processes, products, administration and export procedures; preparing a field guide for operators and extension workers on technical and sanitary requirements; providing training in quality assurance and simple book-keeping; and upgrading the facilities and operations.

It is furthermore recommended to conduct similar studies in other relevant countries.

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PART I

**DYNAMICS OF EXPORTS OF TRADITIONAL FISH PRODUCTS
IN CÔTE D'IVOIRE AND GHANA**

by

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1. INTRODUCTION

Artisanal fisheries contribute significantly to socio-economic conditions in fishing communities and to food security in Africa. In West Africa in particular, fish processing and marketing is a dynamic activity that involves cross border trade within the sub-region and export to “ethnic” markets overseas. These markets consist mainly in Africans abroad wishing to eat traditional African foods including fish.

The regional workshop¹ on problems and prospects for developing artisanal fish trade in West Africa held in Dakar, Senegal in June 2001 highlighted the importance of trade within the region, analysed the constraints and proposed solutions to address them for sustainable development of the sub-sector.

Furthermore the seventh FAO Expert Consultation on Fish Technology in Africa held in Saly-Mbour, Senegal, in December 2001 recognized the contribution to employment, to the provision of hard currency, and to fish utilization of export-oriented traditionally processed fish. It recommended in particular that fish export be promoted and sustained.

This study aimed at reviewing the socio-economics of this type of fisheries and analysing key factors/conditions for their sustainable development. It was conducted in Côte d’Ivoire and Ghana and concentrated on small-scale traditionally processed fish production units that export to the “ethnic” markets.

2. FRAMEWORK OF THE SURVEY

The choice of Ghana and Côte d’Ivoire was based on the experience of approved² traditional fish processing and marketing plants, the status of the units (artisanal/small scale rather than industrial) and the type of end products targeted (typical African products).

The three-week study was conducted in the premises of the units and in other places to collect relevant data and to appraise the performance and the impediments to the expansion of export-oriented traditional fisheries. It consisted in:

- reviewing relevant primary data on the production and marketing schemes;
- interviewing the operators and when possible, the suppliers of raw material;
- interviewing officers from the competent authority, the export promotion councils, and the fisheries departments;
- discussing with other stakeholders involved in the quality control of fishery products, in administrative arrangements prior to export, packaging, etc.

¹ Organized by the International Collective in Support of Fishworkers (ICSF) and the FAO/Department for International Development of the United Kingdom and Northern Ireland (DFID) Sustainable Fisheries Livelihoods Programme (SLPF).

² Approved in 1998 for export to the European Union by the national competent authority for sanitary certification recognized by the European Commission.

In Ghana, there are two plants registered with the Ghana Standard Board (GSB, the national competent authority). They were covered by the study as well as some non-registered processors targeting US and Canada markets. Accra and Tema were the main places where the study took place.

In Côte d'Ivoire there are 5 plants that were approved in 2001 by the Direction of Food and Quality (DFQ, the competent authority). However, the airport-based municipal veterinary service in Abidjan issued monthly sanitary export certificates to about a dozen of exporters. The study team did not succeed in interviewing some of the non-approved exporters but community fish processing centres were visited that supply products to these persons and also to regular export units. Abidjan and Adiake were the places where the study took place.

3. OVERVIEW OF THE FISHERIES SECTOR

3.1 Côte d'Ivoire

Fish landings in Côte d'Ivoire in 2000, were 81 500³ tonnes, 56 percent of which were from the artisanal sector, the remaining are from industrial origin (42 percent) and aquaculture (2 percent). In the same year the country imported 238 000 tonnes of frozen tuna and small pelagics and some demersal fish for local consumption and as raw material for processing plants. The exports amounted 65 000 tonnes consisting of canned tuna, fresh and frozen fish and frozen tuna loins.

Despite the small national production, fisheries play an important role in the national economy, and in the social and nutritional conditions. In effect they contributed 3 percent to GDP of the primary sector and 0.8 percent of the total GDP. Thanks to exports of value-added products (especially canned and other tuna products), the national commercial balance for fisheries products presented a surplus of about 6 billion CFA francs (CFAF) in 2000. Fish as food is a major source of animal protein. FAO fisheries statistics reported an apparent annual per capita supply of fish and seafood of 15.4 kg (Table 1), which is among the average in sub-Saharan Africa.

In addition fisheries contribute substantially to the creation of employment of people involved in fishing and in upstream and downstream activities, the most labour intensive of which are post-harvest operations.

Table 1: Per capita supply of meat, eggs, fish and seafood in Côte d'Ivoire (2000).

| Food item | Annual per capita supply (kg/year/person) |
|----------------------|---|
| Beef and Veal | 3.5 |
| Mutton & Goat meat | 0.6 |
| Pig meat | 0.9 |
| Poultry meat | 4.1 |
| Other meat | 1.8 |
| Offal | 1.2 |
| Eggs | 0.8 |
| Freshwater fish | 0.9 |
| Demersal fish | 0.4 |
| Pelagic fish | 6.0 |
| Marine fish, other | 8.1 |
| Crustaceans | 0.0 |
| Cephalopods | 0.0 |
| Total Fish & Seafood | 15.4 |

Source: FAO Food balance sheets, 2000.

³ Source: Direction of Fisheries Production.

3.2 Ghana

Ghana is one of the main fishing nations in the Gulf of Guinea with fish landings in 2000 of 370 441 (FAOSTAT Database 2000). About 70 percent was from the artisanal sector and more than 80 percent from marine origin. In 1999, the country imported 28 000 tonnes and exported 52 000 tonnes. The imports consisted mainly of frozen small pelagics while exports were mainly frozen seafood, canned tuna and frozen tuna loins.

Per capita fish supplies in 2000. This is higher than the African average of 7.9 kg/year and also higher than the world's average of 15.9 kg/year. Table 2 gives the breakdown of the annual per capita of meats, eggs, fish and seafood for that period.

Table 2: Per capita supply of meat, eggs, fish and seafood in Ghana (2000).

| Food item | Annual per capita supply (kg/year/person) |
|----------------------|---|
| Beef and Veal | 1.4 |
| Mutton & Goat meat | 1.1 |
| Pig meat | 0.7 |
| Poultry meat | 1.8 |
| Other meat | 4.7 |
| Offal | 0.5 |
| Eggs | 0.9 |
| Freshwater fish | 4.2 |
| Demersal fish | 2.2 |
| Pelagic fish | 18.5 |
| Marine fish, other | 6.1 |
| Crustaceans | 0.0 |
| Cephalopods | 0.2 |
| Total Fish & Seafood | 31.2 |

Source: FAO Food balance sheets, 2000.

4. PRODUCTION AND EXPORT OF TRADITIONAL PRODUCTS

4.1 Côte d'Ivoire

Table 3 presents the 2000–2001 operational data of the five small-scale plants as reported by the operators and by some raw material suppliers.

The main species used were Guinea barracuda (*Sphyraena afra*), African threadfin (*Galeoides decadactylus*), catfish (*Arius* sp.), ray (*Raja* sp.), swordfish (*Xiphias gladius*), sardinella (*Sardinella maderensis*, *S. aurita*), mackerel (*Scomber scombrus*).

Table 3: Production figures of 5 export units in 2001 (based on interviews).

| Quantities (t/yr) | Raw material | Frozen and fresh fish ⁴ | 820–1,950 | |
|-------------------------|--------------|------------------------------------|--------------------------|----------------------|
| | End products | | Frozen and fresh shrimps | 250–580 |
| | | Smoked/dried fish | 328–780 | |
| | | Smoked/dried shrimps | 10–67 | |
| | | Live crabs | 15–480 | |
| | | Total exported | 353–1,327 | |
| Value (million CFAF/yr) | Local value | | Smoked/dried fish | 1 443.2–3 432 |
| | | | Smoked shrimps | 50–335 |
| | | | Live crabs | 30–960 |
| | | | Total⁵ | 1 523.2–4 727 |
| | Export value | | Smoked/dried fish | 3 239–7.0 |
| | | | Smoked shrimps | 90–603 |
| | | | Live crabs | 49.5–1 584 |
| | | | Total⁶ | 3 378.5–9 187 |

A typical consignment or production cycle consists generally of 5 percent small pelagics and 95 percent other species. The European Union market absorbs 80–90 percent of these products while the remaining is meant for the United States of America and Canada.

⁴ Overall tonnage of fish and shrimps is about 90 percent frozen and 10 percent fresh. Higher figures relate to peak periods (Easter for live crabs, Christmas and Easter for the other products).

⁵ Based on retail prices in domestic markets.

⁶ Based on wholesale prices at overseas destination.

France (70–80 percent of the European Union [EU] consignment), Italy, Belgium, Germany and United Kingdom are the common destinations of the Ivorian traditional products. The previous 4 years data showed no significant increase in volumes of export from the plants, but the operators recognized a slight improvement in value terms since the decline of the regional airline AIR AFRIQUE. The end of the airline's activities has not substantially decreased the number of such traders; however it had a positive effect on the actual price of the traditional products at destination. It was said that these effects were even more important than during the implementation of the EU third country's imports sanitary measures which led to a drop in traditional processed fish exporters to EU from 20 units before 1996 to barely 3 to 4 the following years.

The study revealed that a number of individuals were granted special tickets fare who were involved in fish exports to "ethnic" markets (most likely the United States and Canada). Their products lowered market prices and threatened the competitiveness of the approved units.

These data are closer to the projections of DFQ, which took over the certification process in March 2002 when exports from the four approved plants were recorded as 34 tonnes of traditional products to the EU. This gives an annual volume of at least 400 tonnes.

The official data published in the annual bulletin of the Fisheries Department placed the 2000 exports of all traditional fishery products between 500 and 550 tonnes, for an approximate value of CFAF250 millions. These data concerned all types of traditional products, including fish oil and dried shark fins. The destinations are as varied as the means of transport. These were mainly EU, United States, Canada, Asia (for shark fins), Africa region (essentially ECOWAS countries), and the Middle East. Export was either by road, sea, or air (the major transport means used by the approved plants). According to the 2001 records from the airport-based municipal certification service, out of the 244 tonnes of products recorded, 65 percent went to the EU and 30 percent to the United States and Canada; the remaining 5 percent went to Asian and African countries. The number of exporters to North America was 14.

The official data underestimate the magnitude of exports from traditional processing units. This was confirmed during the study where some marketing channels described by fishing communities were found beyond control of the statistical services in the field because of lack of personnel and/or logistics. An important exchange of products was found for instance between the southeastern part of Côte d'Ivoire and Ghana, especially fish consignments passing through Tiapoum and Mbratie and conveyed by canoes towards Ghana and vice versa. These quantities were not recorded by any official authority (customs, regional fisheries unit).

In the past years, the National Laboratory for Support to Agriculture Development (LANADA) centralized the certification of production and marketing operations of fishery products. It was also one of the institutions providing data on export volumes to the Fisheries Department. However, it lacked figures on products meant for USA and Canada. The EU records were also not very accurate, as some of the certificates bearing

export quantities were not returned by exporters to LANADA at the end of the administrative procedures prior to sending the fishery products off to their destinations.

Taking into consideration all these gaps, it can be assumed that the minimum annual volume of traditional products from Côte d'Ivoire to all destinations, be it by air, road, sea, or river, amounts to at least 700 tonnes. This data represents 12.5 percent of the total national export of fishery products, excluding high value canned tuna and tuna by-products (see Table 4).

Table 4. Export volumes of fish products from Côte d'Ivoire (tonnes).

| | |
|----------------------------|-------|
| Frozen fish | 4,701 |
| Fresh or refrigerated fish | 349 |
| Live fish | 1.5 |
| Smoked fish | 525.9 |
| Other processed fish | 19.5 |
| Total | 5 597 |

From a value point of view, no comparison can be made between the figures published by the Fisheries Department and the actual situation. As per the official data in Table 3 the overall value of traditional fish exported (CFAF250 million) is six times less than the value of the smoked/dried fish recorded in the five plants upon interview. The shrimps, live crabs, and the 74 tonnes of products recorded at the airport in 2001 for USA and Canada are not recorded in these figures. The latter had a local value in Côte d'Ivoire of CFAF100 million. Individuals unknown to neither LANADA nor DFQ carry out these exports. In compliance with regulations of the US Food and Drugs Administration their customers or importers might have inspected their plants. It was said that some of them purchased their products from the approved plants, the community processing centres or in domestic markets. In any case, the failure to find some reliable contacts of these exporters did not allow a discussion with them and visit their facilities.

4.2 Ghana

Among the four operators met including in the two approved plants three had some records. The operational data of the three plants are given in Table 5 as per the interviews and reviews of available records.

Table 5: Production figures of 3 export units in Ghana (2001).

| | | |
|----------------------------|---|-------------|
| Raw material (t/yr) | Frozen and fresh fish ⁷ | 371 |
| End products (t/yr) | Smoked/dried fish exported | 148–190 |
| | Local value in billion cedis ⁸ | 7 326–9 405 |
| | Estimation in billion cedis ⁹ of gross export revenues ¹⁰ | 12.3–15.80 |

The main species were freshwater perches (*Lates niloticus*), naked catfish (*Bagrus* sp.), bagrid catfish (*Chrysichthys nigrodigitatus*), tilapia (*Tilapia zilli*), barracuda (*Sphyraena* sp.), sea catfish (*Arius* sp.), round and flat Sardinella (*Sardinella aurita*, *S. maderensis*). Freshwater fish species, especially fish from the Lake composed the major share of the end-products from Ghana. These were collected all along the Volta Lake, including fishing sites such as Yeji, Kpando, Dzemeni, and Abotoase, etc. Lates is the major

⁷ Except in one plant where all the raw product is made up of freshwater fish, the total tonnage in the other cases consists in 70 percent of freshwater fish and 30 percent of frozen marine fish.

⁸ Based on retail prices on domestic markets.

⁹ June 2002: US\$1= 8 000 cedis.

¹⁰ Based on FOB prices.

species and also the most valuable, followed by catfish and other species. Sardinella, which represent about 5 percent of a consignment, is from marine and frozen origin.

Contrary to exports from Côte d'Ivoire, which are mainly sent to Europe, Ghanaian traditional products are mainly absorbed by the United States and Canada. Two of the three plants were exporting exclusively to these markets, while the third exported mainly to the EU. The owner of one of the first two plants is now making contacts to start exporting to the EU in addition to United States and Canada markets. One of the operators sold small quantities of products in the local market; they are not included in these data.

The United Kingdom, the Netherlands (supplying Belgium), Germany and Austria were the main European destinations. Official data from the competent authority (CA) indicated that there has been a steady increase of exports to these markets in the past 3 years, after the drop phase that followed the visit in 1998 of the European fish inspectors. People interviewed confirmed this statement. As an illustration, there has been an increase of 20 percent from 1999 to 2000 and 106 percent from 2000 to 2001 in the exports of smoked products to these markets.

The increase was also noted for the United States and Canada where the two operators in these markets indicated an increase of 12 percent over the same period.

Two key findings were drawn from the data provided by the CA and the Export Promotion Council (GEPC).

- The exports of other fish and fishery products, encompassing frozen fish, live lobsters, fresh and frozen shrimps decreased, from 23 000 tonnes in 1999 to 15 000 tonnes in 2000–2001.
- The number of exporters of traditional products dropped drastically, from about 170 (more than 80 percent exported to EU markets) in 1997 to barely 16 in 2001, among which only 2 plants were registered for EU exports.

The GEPC's data at the exit points indicate that USA and Canada were formerly the first destinations of smoked fish and shrimps from Ghana, with 66.3 percent of the exports share. They were followed by Togo and Côte d'Ivoire (23%) between 1994 and 1996. But the trend has shifted since 1999.

Table 6. Exports of smoked and dried fishery products from Ghana.

The exports of smoked and dried fishery products from Ghana to all destinations doubled from 2 651 tonnes in 1997 to 5 807 tonnes in 2001 (see Table 6). A comparison of these figures from the CA with the records from the interviews showed that exports of some of the four operators were

| Year | All destinations (t) | EU and North America (t) | Value of exports to EU and North America (US\$) |
|------|----------------------|--------------------------|---|
| 1997 | 2 651 | | |
| 1999 | 2 855 | 514 | 266 000 |
| 2000 | 5 187 | | |
| 2001 | 5 807 | 930 | 437 750 |

not registered and the others have only two thirds or half of their products reported. This led to an underestimation of the traditional products as noted in Côte d'Ivoire.

In value terms, the consignments to EU and North America, which respectively represented 18 percent (514 tonnes) in 1999 and 16 percent (930 tonnes) in 2001 of all traditional products were worth US\$266 000 and US\$437 750.

4.3 Facilities and operational figures

Whether in Ghana or Côte d'Ivoire, the processing units visited have more than 5 years experience in the field of export to "ethnic" markets. Most of them were established before the visits of the European fish inspectors were conducted in 1996 and 1998 respectively in Côte d'Ivoire and Ghana. One of the most significant differences between the two countries is that for Côte d'Ivoire, the actual managers of the plants are based in EU (France in general) while some relatives take care of production and expedition with the help of the employees. These managers arrange for the distribution of the products to other EU countries or USA and Canada and sell in their own shops (1 to 2 shops per plant in the Paris region). So far the Ghana-based plants only have their buyers in North America and EU to whom they send the consignments directly, but the operators have been making arrangements to establish their own shops abroad, mainly in New York and London.

The main product is slightly salted smoked-dried predominantly smoked on Chorkor or modified Chorkor ovens or on drum ovens. These ovens have a raw material capacity of 50 to 300 kg. The unique case of the use of a mechanical oven with up to 1 tonne capacity was reported in one plant in Ghana, most likely for re-smoking. A little part of the consignments is made up of dried product and live crabs and snails in Côte d'Ivoire.

In both countries it was difficult to obtain data on the initial capital requirement to set up a plant handling and exporting a certain volume, and compliant with sanitary regulations.

The reasons were that most of the financial data were processed/detained by the managers based at the "headquarters" (case in Côte d'Ivoire), or the investment was made long time ago and the upgrading was a progressive process (there was no systematic record keeping of such data). One plant manager, who was present in Côte d'Ivoire during the study, estimated that at least CFAF3 million (US\$4 300) is required to set up compliant premises with a production capacity of 1 tonne per week. A plant owner in Ghana who exported 3 tonnes of smoked and dried products per month said that he had spent 40 million cedis (US\$5 000) since 1998 to improve the production conditions in his plant in order to succeed in the registration process (this included also the overall increase in human resources).

The calculations on the daily running of the business revealed that 50 percent of the gross income covers the purchase of raw material, and about 30 percent cater for the other production inputs (utility costs, labour, shipment arrangements, etc.).

Declaring an income is commonly a sensitive issue in artisanal fisheries and especially in small-scale export sub-sector. However, upon sensitization of the respondents on the objective of the study and raising the potential disadvantages of the sub-sector in producing false data, there has been a relatively good understanding of the relevance of accurate information. The figures varied according to a set of factors.

- The destination: EU markets are said to have higher purchasing power in most instances.
- Whether the consignment is sold to a wholesaler or at a retail price in the shops owned. The price can double in that case.
- The period of the year.

The net profit is roughly 20 to 25 percent of the value of the product. This was estimated as US\$0.8–1.5/kg in Côte d’Ivoire (at wholesale prices) to US\$1–5/kg in Ghana (US\$2–3/kg for USA and Canada and US\$3–5/kg for EU markets). It was noted that all products from Ghana are sold FOB (Free On Board); hence the importer incurs the transport fees.

The income earned is used in household purposes, in projects (upgrading, expanding, relocating the premises, real estate business), other fisheries activities (purchase own canoes, truck to transport products, and supplying fishing inputs to fishermen).

5. SOCIO-ECONOMIC FIGURES

The survey confirmed the contribution of traditional fish processing and export operations to the socio-economic indicators, as presented in Table 7. This importance is particularly in terms of:

Table 7: Additional performance indicators of the plants visited.

| Parameter | Côte d’Ivoire | Ghana |
|--|---|-----------------------------------|
| Average experience in export (years) | 7 | 11 |
| Main traditional products | Smoked and dried marine demersal fish species, smoked shrimps, live crabs | Smoked and dried fresh-water fish |
| Main destinations | EU (80–90%), USA/Canada | USA/Canada (60%), EU |
| Total staff | 22 ¹¹ | 35 ¹² |
| Monthly wage bill ¹³ US\$ ¹⁴ | 2 857 | 3 531 |
| Net profit (US\$/kg) | 0.8–1.5 | 1–5 |
| Total annual profit in US\$1 000 | 282.4– 1 990.5 | 148–950 |

- Increased incomes of small-scale fish processors and exporters: substantial net returns are gained from the “ethnic” markets. Besides, the use of income for other income generating activities, expanding processing operations and improving fish supplies by sustaining fishing activities play a considerable role in improving the livelihoods of these operators.

¹¹ 12 are permanently employed.

¹² About 1/3 are used jointly in vegetable and fruit processing operations.

¹³ Plant owners/Managers’ salary excluded.

¹⁴ June 2002: US\$1 = CFAF700; US\$1 = 8 000 Ghanaian cedis.

- Source of income for small scale fishers: while in Côte d’Ivoire the main supply source of raw material are the cold stores, in Ghana, essentially the Lake fish from artisanal fishing units form 70 to 75 percent of the processed fish. The live crabs and snails are also purchased from small-scale fishing units. This is a substantial source of livelihood for these communities, most of which are in isolated places. One woman exporter to USA based at Adabraka¹⁵ market in Accra, stated that she spends per consignment about 7 million cedis (almost US\$900) in raw material from artisanal fishermen. The higher purchase prices, the trust among buyers and sellers in terms of cash payment or supply with fishing inputs, and in some cases the fact that the exporters withstand bad road conditions to access inland fishing centres are key advantages encouraging the fishing communities to deal with fish exporters. This is the case for instance in Ghana for fishing villages along Lake Volta, and in Côte d’Ivoire for Assomlan, an Aby Lagoon fishing village known for its important catches of crabs. The services of experienced artisanal fish processors were used in some fish processing plants.
- Employment. In most instances, the employees are low-qualification people (fish handlers, processors, messengers, etc.). They generally earn more than the respective national minimum wages in both countries. Once in the ethnic markets, 90 percent of the traditional products are sold and distributed by the African Diaspora abroad. This is also a non negligible source of income for these immigrant communities.
- Contribution to sustain the activities of all companies involved in the administrative arrangements prior to export: certification service, forwarders, middlemen, etc.
- National income tax (customs and other taxes payable after export). This is the case in Ghana where the private operator is liable to corporate taxes (8 percent of the profit) to be paid to the Government.
- Foreign exchange revenues of the whole country. The equivalent in local currency of the trade value of these products have been shown on Table 7, supports the statement that traditional fish takes an important part in the commercial balance of the fisheries products in these countries.

6. CONTRIBUTION TO FISH UTILIZATION

Processing of traditional products is an important fish utilization method.

- It adds value to low-value fish, mainly frozen small pelagics. As an illustration, about 235 000 tonnes of frozen fish are imported annually in Côte d’Ivoire to meet local demand. The value of the raw material of the 5 export-oriented traditional plants is 0.4 to 1 percent the value of these imports, but the value of

¹⁵ Most important processed freshwater fish and fishery products’ market in Accra, Ghana.

their end-products represented 1.5 to 5 percent of the value of exported fishery products from Côte d'Ivoire.

- It contributes to reducing post-harvest losses, especially in inland fishing areas, which in most cases are difficult to access. The case of live crabs fishing villages and Lake Volta fisheries are revealing examples. Loss reduction is more perceivable during glut fishing seasons due to the limited processing capacity of the artisanal fishing communities. Some purchasers go to these areas to buy raw material for the processing sites.

An additional contribution of “ethnic” fish export is to resource conservation, as chunks of big specimen of fish are more demanded, especially in Ghana case study.

These data show the importance of traditional products meant for “ethnic” markets. Their support is great and the trends in the demands indicate that there is a potential for this support to grow and sustain. This can be possible only if the operations overcome certain constraints faced in both countries and that are real threats to further development of the activities.

7. PROBLEMS AND CONSTRAINTS

7.1 Operational constraints

- The inadequate design of the smoking ovens, which is not perceived by the processors themselves, is a threat to the sustainability of the operations. In 80 per cent of the cases, the ovens were not fuel effective. Facilities harbouring improved ovens with an adequate fish/fuel wood consumption rate were scarce in the premises visited. The rate generally known for a Chorkor oven is 0.2 to 0.3 kg wood per kg of fish, and for other types of ovens (Altona, Côte d'Ivoire, round drum) it is 0.4 to 0.9 if adequately designed. But the study revealed that many processors were using 3 to 4 kg wood per kilo of fish, because of the inadequacy of the ovens, being round or square-shaped ovens made from oil drums with large openings and leakage of smoke and heat. There is a need to provide appropriate information and training to these small-scale processors in the construction of technically effective equipment to reduce the operation costs (cost for fuel wood) and prevent the environmental degradation by fish smoking operations.
- The production capacity in some plants is not enough to meet the increasing export demands. This has forced some owners to discretely seek for assistance from experienced community fish processing centres. These centres, as already explained, have not been inspected and certified by the competent authorities, and therefore the processing conditions might not guarantee the safety of the end-products obtained. It was said that the level of investment required to expand or upgrade the plants is the main reason leading to this practice.

- Lack of appropriate banking arrangements to facilitate access to credit at bearable interest rates. In this situation, unless some friends or relatives accept to assist financially, it is practically difficult for a small-scale exporter to have the relevant amount of cash to meet the requirements in design and layout of the facilities.

7.2 Constraints linked to national institutions

Some of them were addressed during the debriefing of the authorities. They may need a follow-up to check the level of implementation.

Three points were common to both countries:

- i. Lack of control of the entire export process or chain, especially the United States, Canada and other destinations than the EU. The sanitary certificates for these destinations are issued at the airports. The competent authority in Côte d'Ivoire restricted the export to these countries by the registered processing units. Consequently, the requests are made at the points of expedition.
- ii. Lack of coordination of the certification between the competent authority and the airport-based services leading to exports by persons who bypass the regular registration process. They might not have any processing facility and thus might be unfair competitors to authentic operators.
- iii. The difficulty in appraising the actual importance of small scale fish export units to “ethnic” markets and within the Africa region. The current context of weak data collection does not permit the delivery of accurate figures. Yet, they are essential to identify priority areas and interventions in any assistance programme to the benefit of the sub-sector.

In most instances in Côte d'Ivoire, several other problems linked to the national authorities have been reported that impede the development of the export oriented traditional fish processing activities. They included:

- Inappropriate certification system which is resource and time consuming. The service in place since March 2002 employed directly only one veterinary, for all the exported fishery products from Côte d'Ivoire. This lack of staff led to some measures which were very much penalizing the exporters. The export of live crabs and fresh fish, mostly purchased hinterland, where there is no regional representation of the competent authority is one of the cases concerned by those measures. The system needs to be reviewed to take into account the perishable nature of the products, especially when a “quarantine” of 1 or 2 days is imposed prior to export from Abidjan.
- Insufficient staff and technical expertise/knowledge of the competent authority to effectively conduct the inspection and quality assurance tasks.

- Police harassments. Though these were not specifically directed against traditional fish processors, they were identified as significant causes of economic losses and waste of time. These practices prevailed during the transport of raw material from hinterland to Abidjan but also the transport of end-products from the processing premises to the airport.

7.3 Constraints linked to the operators

- Inappropriate knowledge and lack of training. Most of the time, fish processing and marketing is a family business, people involved do not have any qualification and are trained on-the-job. The direct implication was the difficulty in understanding the standards for the design and layout of premises. This situation discouraged many operators to establish or upgrade their processing facilities, because they found these standards complicated or even excessive. The discussion brought up the lack of a simplified grassroots guide on regulatory requirements to the attention of these operators and to anyone willing to get involved into that business. They suggested that it should be simple, with illustrations and examples referring to locally available materials. One woman who was setting up her facilities in Ghana drew the study team’s attention. She stated that she had to travel to neighbouring Côte d’Ivoire to realize that “it was not a castle” that was required but just a partitioned house with basic equipment.
- Lack of organization within the sub-sector. Collective concerns such as relations with the competent authorities, the certification of live crabs, the lack of food labelling information would have found a better framework of discussion and be effectively addressed if the processors were organized into socio-professional groups.
- Lack of transparency in the management of registration numbers. This was mainly noted at the airport. A statement from the CA was that this was in complicity with few plant managers who “rent” their registration numbers. The exporters rejected this accusation and said that these practices were done without their consent. In any case this could be a dramatic matter when a sanitary problem will emerge, as the conditions of production of the products have not been assessed. Besides, the practices create an unfair competition to the plants, which operate honestly. Though a slight decrease in the number of these practices have been reported since the beginning of the year thanks to the decline of the late continental airline AIR AFRIQUE, effective actions need to be taken to track the perpetrators.

8. ACTIONS TO BE CONSIDERED

8.1 On the part of the national institutions

Two measures were announced during the discussion with national authorities and small-scale fish exporters. These were:

- Review of the certification process in Côte d’Ivoire, to take into account the complaints about its cumbersomeness and irrelevance with regard to particular products (example of live crabs) which cannot be inspected inland for insufficiency of staff. This measure is necessary in the process of complying with the worldwide new quality assurance concept, which is preventive rather than repressive, and resource consuming. The issuance of certificates based solely on the laboratory analyses as currently done by the DFQ should not be the approach. The fishery plants should be ranked according to their sanitary status and performance, which will determine the frequency of inspections. Certificates should be issued taken into account this classification and the effectiveness of the quality assurance programme in each plant, while analyses should be made randomly and not on every consignment.
- Deployment of the competent authority’s staff for better control at the exit points. The representative of the DFQ announced the setting up of a desk at Abidjan airport in replacement of the veterinary service. In Ghana, GSB has informed the surveyor that contacts have been established with AFKO (airport authority) for an office within the premises of the airport currently under rehabilitation.

Some further actions to be considered are:

- An in-depth study on the whole small scale export sub-sector (all destinations). This FAO study, which is the first in assessing the importance of export-oriented small scale fisheries in specific production countries, should be strengthened by a complete appraisal by the national authorities for a better understanding of the dynamics of these fisheries. The results will be useful in the justification of any assistance programme for their development.
- Marketing of safe and good quality fish should be both a national and an export concern. There is a need to address the problem of compliance by community processing centres and also of “unreported” exports. Bilateral or multilateral assistance should be sought to assist in upgrading these centres and train the processors. Cleaning up the export channel will put more pressure on the registered plants, which already have limited capacity to meet the demands from “ethnic” markets. These centres once upgraded could serve for both domestic markets and legal suppliers to these plants or can export their products directly. This measure would improve their incomes on a sustainable basis.
- Putting in place mechanisms to facilitate access to credit by the operators.

8.2 On the part of the private operators

In both countries, the operators agreed to form traditional fish exporters associations. This will include the officially approved operators as well as the exporters to other destinations than the EU (mainly the United States and Canada). They would thus effectively address their common concerns to relevant institutions, sensitise their members on correct marketing practices, share experiences, and set up a focal point to

provide relevant market information including trade fairs, prices, products, standards, regulations, etc.

8.3 On the part of FAO

FAO can contribute to the expansion of export oriented small-scale fisheries with an assistance programme consisting of:

- Publishing a field guide to be used by the artisanal operators and fisheries extension officers. This one should be a simple formulation of the technical and sanitary requirements in the design and layout of premises and the equipment of smoked, dried and fermented fish, and shrimp or fish flour processing units.
- Assisting the relevant institutions in the development of standards for traditional fishery products, not only for the product itself, but also for the raw material and other ingredients, processing facilities, equipment, process parameters, packaging, storage, transport and marketing. These standards can be effectively developed in the pilot centres, which have been initially upgraded.
- Training in quality assurance of the competent authority as well as private operators, who in addition need training in simple bookkeeping.
- Assisting member countries in formulating a project document on the upgrading of major community fish processing centres, to be addressed to bilateral or multilateral counterparts. FAO could also be a catalyst in the process of interaction between stakeholders, for example through a regional Technical Cooperation Programme (TCP).

PART II

**PROCESSING FOR EXPORT OF TRADITIONAL FISHERY PRODUCTS
ALONG THE VOLTA LAKE IN GHANA**

by

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1. INTRODUCTION

FAO conducted a study on "Dynamics of exports of traditional fish products in Côte d'Ivoire and Ghana" in May and June 2002. This study revealed that the socio-economic importance of export-oriented traditional fisheries was actually more substantial than indicated in official figures in both countries. Another key finding was that operational constraints due to inappropriate processing capacity of the export units limited their ability to meet the increasing demands from the European Union (EU), North American and Japanese markets, generally known as "ethnic" markets. Within the framework of international sanitary regulations on handling and processing of fish, there has been a drastic drop in Ghana in the number of exporters of traditional fishery products. Figures from the Ghana Export Promotion Council (GEPC) indicated that from nearly 200 exporters (more than 80 percent exported to EU markets) in 1997, 16 remained in 2001, among which only two units were registered for EU exports. It was noted that in most cases, artisanal community fish processing centres, especially inland fisheries, were the major suppliers to these exporters. Between 70–75 percent of exports of smoked and salted-dried products is estimated to be made up of freshwater fish processed from the Volta Lake. Some exporters purchase the end products, mainly smoked and salted-dried products, at indirect marketing centres and pack them for shipment. These figures demonstrated clearly the involvement of small-scale fish operators predominantly the women in the international trade.

The international trade, as a result of globalisation is faced with new priorities; henceforth the key measures to be put in place are rules governing public health and safety of fisheries products and rules to ensure that fishing and aquaculture are compatible with sustainable development. The framework of the prevailing rules places the liability for food safety on the producer. It is clearly established that the conditions of production and marketing should be monitored and controlled throughout the fish production chain from farm and fishing boat to consumer. Furthermore, these conditions should meet established health standards.

Considering the contribution of the lake fisheries to that trade, foreign currency earnings and increased incomes of small-scale fishers, sustainable artisanal fish production for export should be a major concern.

To this end, the Fisheries group of the FAO Regional office for Africa conducted a field mission to take account of the practical conditions under which the operations were taking place. This aimed at assessing the level of compliance to the sanitary provisions by identifying the strengths and weaknesses and making proposals for improvements to sustain the supply chain and livelihoods for all the stakeholders.

This document is a presentation of the issues raised during the mission along Lake Volta in Ghana.

2. BACKGROUND INFORMATION ON LAKE VOLTA FISHERIES

The Volta Lake is one of the largest man made lakes in the world. It has a surface area of 8 482 km² and a shoreline of 4 880 km. The lake formed from 1964 to 1968 and changed the fishing from river fishing to lake fishing. The fishermen had been fishing on the main Volta, including the Black Volta and the White Volta, the Afram and the Oti rivers and other tributaries of the Volta before the lake was formed. Many of these fishermen migrated from the Lower Volta areas, in particular from Tongu, Bator, Sokpe, Tefle, Mafi, Bakpa. The situation caused the formation of new settlements by the fishermen around the lake and initially about 1 500 villages sprang up in the whole Volta Lake basin.

In the late 60s/early 70s there were about 14 000 to 15 000 fishing canoes on the Lake and approximately 25 000 fishermen. These fishermen adapted well to the lake conditions since they successfully applied their experience gained over the years in the river and marine fishing. Fishermen in the marine sector along the coast for example, the Anlo, the Ga-Adagme and the Fanti also settled on the lake.

At present according to the village survey carried out by the Directorate of Fisheries (MOFA) in the year 2000, the number of villages is 1 232, the number of canoes is 24 035 and the number of fishermen is 71 861.

Many of the villages are remote and have no road connections to the existing road heads to the urban centres and the surrounding towns. This gave rise to a new marketing system with lake side markets spontaneously springing up at strategic points, which served as gateways from the lake fishing villages to the urban centres and other towns in the country.

There are more than 100 species of fish in the Lake Volta system. About 16 are commercially processed and marketed, but landings are dominated by tilapia species, *Chrysichtys* sp., *Synodontis*, *Mormyrids*, *Heterotis*, *Clarias* sp., *Schilbeide*, *Odaxothrissa mento*, *Bagrus* sp. and *Citharinus*. The minor species in quantities are grouped under others.

Total fish landings declined from 36 000 tonnes in 1971 to 28 373 tonnes in 1998, with annual decline in catch per unit effort estimated at 0.255 kg/boat/day. Of the total inland fish production for 2002 of about 88 000 tonnes, the Lake Volta contributed 85 percent. It accounts for about 16 percent as national output.

These fish species are landed from small planked canoes, which use mainly gill nets, traps, hook and line. Generally only 25 percent of fishing villages on the lake use outboard motors and only 4 percent of all boats are equipped with engines. The 1998 Volta Lake frame survey suggest that the 24 035 boats of all types were equipped with 973 outboard motors and no inboard engines. The nets are set in the evening or late afternoon and inspected in the morning to remove the fish. Bigger canoes have been introduced called "winch net" canoes which mostly do illegal fishing by using banned

nets like purse seines and beach seines or drag nets. These nets are used in marine fishing and are not allowed in the freshwater system.

2.1 Fish preservation

Since there is no electric power supply to most of these remote villages, icing and freezing are not popular methods of fish preservation on the lake except in very few areas where fresh fish can easily be marketed due to access to bigger urban centres or towns where mostly tilapia are put on ice and transported by road to the urban centres. Fish caught are mostly processed by the traditional methods of drying, salting and smoking. The processing method is chosen according to species and consumer preference. Most of the tilapia species caught are salted and sundried. *Heterotis* can be salted and sundried. Most of the fish landed on the verge of spoilage are also salted and sundried as fermented products. The rest of the species are smoked. Smoking is therefore the major method of fish preservation on the Volta Lake. It is estimated that over 80 percent of the lake fish is smoked. The traditional drum and clay ovens are mostly used in the fishing villages. The clay or mud ovens are used on the lake and are in the majority. Drum ovens are normally found in the lakeside marketing centres. The rectangular clay oven, which has been modified to carry more trays, and is called the "Chorkor" kiln has been poorly adopted along the lake.

The processed products are stored in the villages on smoking ovens, stores or kitchens to get the quantities which can be economically transported to the lakeside markets by transport launches powered by outboard motors on market days. These market days are in five days cycle or operate on weekly basis.

2.2 Marketing systems

Most of the fish on the lake are marketed by water transportation. As already stated the fish are carried by transport launches, which are powered by outboard motors, mostly 40 horse power. These launches are designed to make them suitable for operating in very shallow depth, which is necessary for serving the numerous villages. The number of these launches operating at any lakeside market depends on the number of villages, which are served by that market. The services of these launches are augmented by fishing canoes owned by the fishermen who take their produce and some other passengers to the marketing centres (Map 1).

This system of transport launches and canoes doing the criss-cross from one village to the other and to a marketing centre is a very important factor in the Volta Lake fisheries and forms the live-wire of all the fish marketed on the lake. These launches also carry agricultural commodities. There is another transport system involving the large ferryboats, which transport goods from South to North and bring down mostly agricultural commodities. Some few fishermen and fishmongers transport fish to Akosombo en route to Accra for sale.

On the lake, the eastern, southern and the northern part have major roads passing through these areas, which led to the development of the major lakeside markets. The state of the roads therefore has effect on the performance of these markets. On the Eastern shore, six lakeside markets sprang up namely Dzemeni, Wusuta, Kpandu Torkor, Kwamekrom, Abotoase and Dumbai. Wusuta died off due to poor road connection. Yeji and Buipe came up on the northern sector. On the southern sector, Kwahu Adawso, Nketepa, Dedeso and Akate came up. The deterioration of the road network at the southern sector has lowered all activities in these markets. The activities of these markets have drastically shifted to Dzemeni due to the improvement of the trunk road passing through the area.

In addition to the centres mentioned above, there are other lakeside markets most of these are nearer big towns. These markets are serviced by the small fishing canoes. There are footpaths leading to some of these markets. All the major landing lakeside markets and the smaller ones contribute to effective evacuation of fish from the lake area. The sizes of the lakeside markets are not static; they are subject to changes around the lake in addition to social and economic changes.

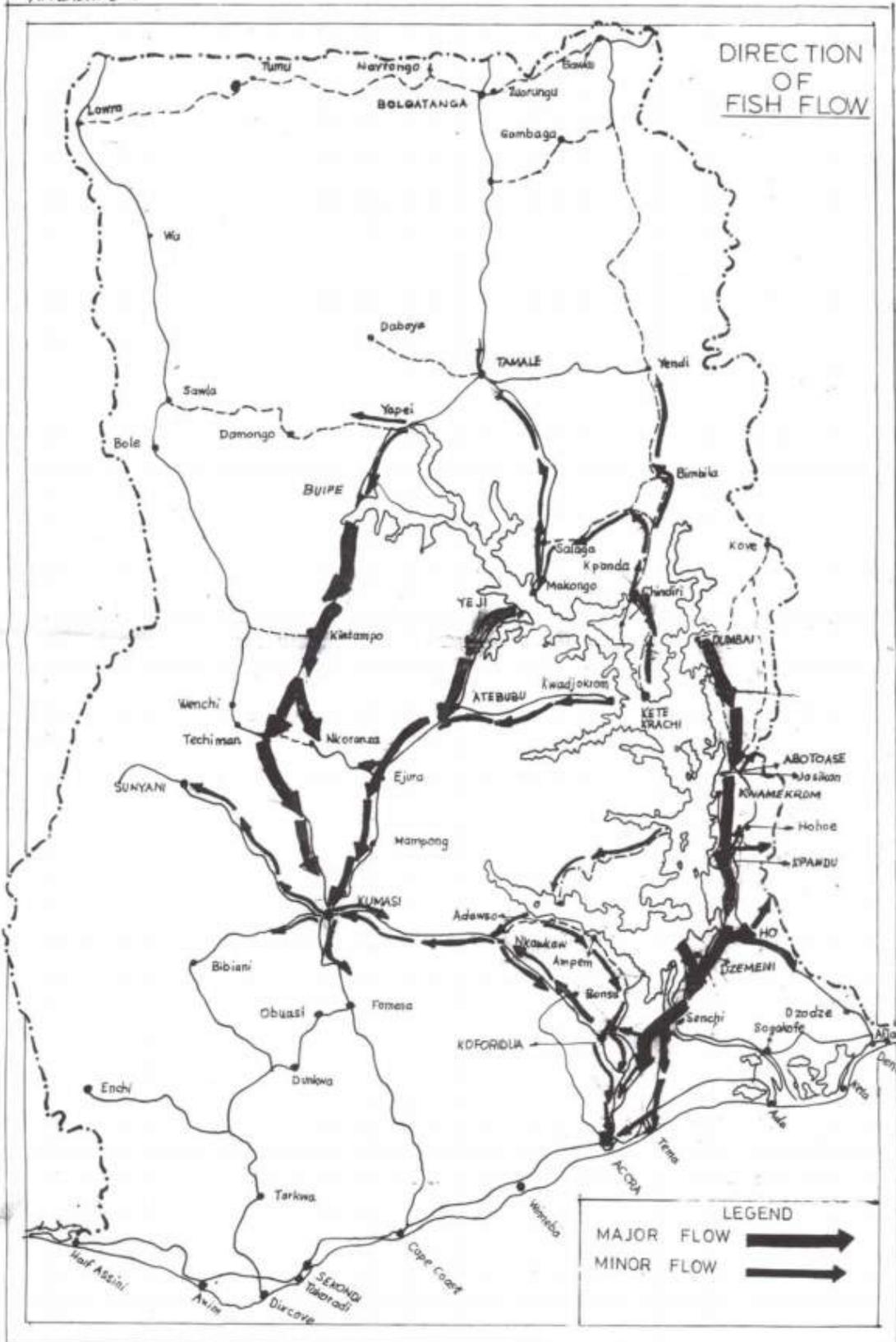
2.3 Prices and factors affecting prices

The pattern of pricing depends on many factors and that makes it difficult to obtain reliable wholesale prices. There is considerable price variation depending on the season, location, trade conditions, etc. Prices offered to fishermen depended greatly on their location in relation to the lakeside markets and the inland markets. Prices obtained by the fish traders also depended on their bargaining powers and how far they could travel into the lake area. Map 2 shows the different flows of the catches.

The present socio-economic condition in the country had changed this pattern. Fishermen, their wives or partners in the fish trade travel to the lakeside markets themselves to sell their fish either directly or through their hosts. Some of them travel to the major consumption centres like Accra and Kumasi to market their fish. They even connect to the exporters themselves. The fish mammy traders who used to travel to the lake villages now prefer to be at the major lakeside markets or be in Accra or Kumasi to receive the fish. This affords them the opportunity to compare prices to avoid incurring losses by buying expensive fish on the lake only to come and meet lower prices on the fish markets. There is therefore competition to produce a better product to attract higher prices especially when the product qualifies for the export market. Some processors process according to specification for the export market while others produce products, which can be sold in any market.

INLAND DISTRIBUTION OF VOLTA LAKE FISH

APPENDIX 3



2.4 Projects

Three projects could easily be identified which had made significant contributions to the development of the Volta Lake namely:

- (i) Volta Lake Research and Development Project;
- (ii) Integrated Development of Artisanal Fisheries (IDAF-Yeji) project;
- (iii) Fisheries Subsector Capacity Building Project (National Project).

VOLTA LAKE RESEARCH AND DEVELOPMENT PROJECT

At the formation of the Volta Lake, the Government of Ghana had assistance from the United Nations Development Programme (UNDP) to carry out research on the Lake since it was a new man made lake and the river conditions changed to lake conditions. Since it was artificially formed it swallowed mountains and valleys and that gave it different depths. It also passed through different geographical zones from north to south. On that basis the lake was divided into eight strata so that it would be easy to compare data collected in the different geographical zones of the lake. FAO was the Executing Agency for the UNDP project and sent down experts in the various fields of fisheries, Agronomy, Socio Economy and collaborated with World Health Organization (WHO) in health matters. The Volta River Authority (VRA) was the Executing Agency for Ghana Government. There was a team of Ghanaians who formed the counterpart staff to the FAO Experts. The team was formed from staff of VRA, Aquatic Biology of the Council for Scientific and Industrial Research (CSIR), Fisheries Department of Ministry of Agriculture, Volta Lake Basin Project of the University of Ghana, Ministry of Finance and Economic Planning, Department of Game and Wildlife and others. Each Department performed its functions as mandated under the laws of Ghana but in close collaboration with the others. After enough scientific and socio-economic data had been collected the Project moved into another phase and the name of the project was changed from Volta Lake Research Project to Volta Lake Research and Development Project. The project which started in 1968 finally closed in 1979.

The fisheries sector researched into stock assessment, gear technology, limnology, fisheries statistics and fish processing and marketing.

The Fish processing and Marketing Section of the project developed new fishery products, new and innovated fish processing equipment and made studies for the development of the lakeside markets. Kpandu Torkor was developed as a pilot improved lakeside market. Kpandu Torkor was chosen due to its nearness to the project headquarters at Akosombo and its size, which was neither too big nor too small. The pilot project was aimed at the improvement of the landing and marketing facilities at Kpandu Torkor market in order to make marketing commercially more attractive, technically easier and hygienically cleaner than it was. UNDP funded the construction of the Kpandu Torkor complex.

INTEGRATED DEVELOPMENT FOR ARTISANAL FISHERIES IN WEST AFRICA (IDAF) PROJECT, YEJI

Yeji lakeside market was the next to be developed. After a time lapse the UNDP again assisted the Government of Ghana in the development of Yeji in the northern sector of the lake. That was the IDAF project, which the FAO was the Executing Agency for UNDP and the Fisheries Department was the Executing Agency for Government of Ghana. The Project started January 1989 and ended March 2000.

The project engaged in fisheries studies in that part of the lake and the development of the Yeji lakeside market. UNDP funded the preparation of the ground for the construction of the lakeside landing and market. The Japanese Government assisted Government of Ghana to put up the market structures.

THE FISHERIES SUB-SECTOR CAPACITY BUILDING PROJECT

It was a World Bank assisted project, which started 1996 and ended 2002. It was a national project and funded activities on the lake. These included stock assessment, biological studies, a frame survey of the Volta Lake system to update the map of the lake and estimated the number and types of gear to assist updating the statistics of the lake.

3. METHODOLOGY OF NEEDS ASESMENT ALONG LAKE VOLTA

The main supply sites were identified during the first study on the Accra-based fish export units in June 2002. Abotoase, Dzemeni, Kpando Torkor, and Kumasi were the main locations mentioned by the exporters. The result of investigations with the Directorate of Fisheries which is the national institution in charge of monitoring the Lake fisheries showed that these locations were in fact landing sites of already processed fish and that marketing of fish and sometimes packaging of consignments took place there. The zonal members of the Ghana National Inland Canoe Fishermen Association confirmed this statement during the meeting held in November 2002 at Adabraka, their Headquarters in Accra. This meeting was an opportunity to select the primary production villages to be visited.

The two-week mission took place from 9 to 20 December 2002 in the four regions bordering the Volta Lake (Volta, Eastern, Brong Ahafo, Northern). Given the large number of villages along the Lake (about 1 230 villages), it was agreed to make the selection according to established indicators. The major criteria that enabled the selection were the size/population of the village, the importance of fishing activities and to a lesser extent, the availability of communication facilities. The representativity of the sites was cross-checked to prevent any biased selection by fishermen attempting to insert a given village to take advantage of the expected outcome of the study. The list was therefore validated with the assistance of fisheries field officers. Table 1 presents the list of the villages visited and their marketing connections.

Table 1: General information on the fishing villages.

| Village | District | Estimated population | Estimated operators* | Main trade routes of processed fish |
|-----------------|-------------|----------------------|---------------------------------------|---|
| Accra Town | Atebubu | 2 000 | 430 fishermen | Yeji, Kumasi |
| Adakope | East Gonja | 994 | 200 fishermen 145 fish processors | Yeji |
| Bakpakope | Sene | Not available (NA) | | Transport launches to Akosombo-Accra Kwadjokrom-Atebubu-Kumasi |
| Budan | Kete Krachi | NA | | Krachi-kumasi-Accra |
| Dodi | Donkorkrom | NA | | |
| Dzaatakpo | Atebubu | 1 000 | 260 fishermen 120 fish processors | Yeji Accra Kumasi |
| Galikope/Basare | Kete Krachi | NA | | Kwamekrom-Accra |
| Jaklai 1 | Atebubu | NA | 70 fishermen 50 fish processors | Yeji-Accra |
| Jaklai 2 and 3 | Atebubu | >700 | >300 fishermen 360 fish processors | Yeji Accra |
| Kafaba 1 | East Gonja | NA | 90 fishermen 33 fish processors | Yeji-Kumasi-Accra |
| Kafaba 2 | East Gonja | 1 020 | 77 fish processors | Bupe-Yeji-Kumasi-Accra |
| Judorkope | Kete Krachi | NA | NA | Dumbai |
| Mannanyikpo | Sene | 230–300 | NA | Kwamikrom |
| Sabakope | Kete Krachi | >500 | 240 fishermen 120 fish processors | Transport launches to Kwamekrom-Akosombo-Accra |

A programme was drawn which was submitted to the zonal members, to convey the message to their respective areas of operations. They were also requested to make arrangements prior to the mission, establishing contacts for transportation, especially boat hiring, finalising the period of visit with the Chief fishermen or Heads of villages to ensure that the maximum number of people are gathered during the visit (market day excluded). The method adopted in the field can be outlined as follows:

- gathering the villagers;
- presenting the objectives of the mission;
- collecting background information on the village;
- discussing with the fishing communities on general data related to their fishing activities;
- interviewing 2 to 4 women known to supply fish to exporters who send the fish to overseas and visiting the landing and processing facilities.

3.1 Fishing and processing

Fishing along the Volta Lake is the activity of men, while women mostly process the catches. However, some women are indirectly involved in fishing as they supply fishing inputs (gears, outboard motors, etc.). At least 2/3 of the women in a given village is involved in processing and trade outside the village. They get involved in the business in their early age, sometimes helping their relatives (mother, aunt, cousin, etc.) in fish processing and marketing. The contribution of the activity to employment is remarkable. As described in Table 2, each woman is assisted with at least 2 persons. Those who

handle large quantities of fish and have an expanded business can employ up to 10 assistants.

The main types of gears reported are gillnet, cast net, beach seine, traps, hook and line, “winch net”, bamboo traps and "Nifa nifa". Though not widespread along the Lake, bamboo and “winch net” fishing known for their destructive effects on the resources were common practices in the Northern waters. The study noted that they were predominantly used in some villages located in that part of the lake.

Table 2: Information on the fish operators.

| Fishing village | Number of interviewed | Average age | Years of experience | Average number of assistants per operator |
|----------------------|-----------------------|-------------|---------------------|---|
| Accra Town | 2 | 52 | 28 | 4 |
| Adakope | 2 | 44 | 20 | 5 |
| Bakpakope | 2 | 52 | 25 | 3 |
| Budan | 1 | 32 | 10 | 1 |
| Dzaatakpo | 4 | 41 | 20 | 4 |
| Galikope/Basare* | 1 | 42 | 19 | 5 |
| Jaklai 1 | 1 | 33 | 15 | 1 |
| Jaklai 2/3 | 2 | | | |
| Kafaba 1 | 2 | 38 | 25 | 4 |
| Kafaba 2 | 2 | 49 | 25 | 4 |
| Judorkope | 5 | 37 | 19 | 4 |
| Mannanyikpo | 1 | 65 | 40 | 3 |
| Sabakope | 4 | 39 | 12 | 3 |
| Total/Average | 29 | 40 | 11.2 | 3 |

The set/gillnets were laid in the evening (around 4 to 6 pm) then removed early the following morning. This leads generally to loss in quality of fish caught in the early hours of setting the net. This post-harvest loss is intensified due to the lack of on-board preservation method. In effect, none of the fishermen met uses insulated box or ice to keep the fish fresh since ice is not available at most fishing villages due to lack of electricity. The sunny climate and the distance between the fishing ground and the village also contribute to fish spoilage. The promotion of insulated box by the former IDAF Project at Yeji area has not been successful, because it was not combined with an effective ice production component.

The main species reported during the study are presented in Table 3. The order was established based on the frequency the specie was cited by people interviewed.

Table 3: Main fish species used for processing.

| Species | Local name in | | |
|---|------------------|--------------------------|-------------|
| | Ada | Ewe | Akan |
| <i>Synodontis schall/ocellifer</i> | Kpor/Sesekpor | Tsetsedze/Tsetsengrooe | Chichipa |
| <i>Labeo coubie/senegalensis</i> | Agbonwo/Degbloku | Abgongboyibor/abgongboyi | Agongo |
| <i>Tilapia zilli</i> | Sila | Akpasila | Kpalabi |
| <i>Bagrus bayad</i> | Yalefo | Yalifor | Yalefo |
| <i>Chrysichthys auratus</i> , <i>C. nigrodigitatus</i> | Kportoe | Blolovi/Blolo | Brovi |
| <i>Clarias anguillarus</i> | | Adewuyie | Adwen |
| <i>Lates niloticus</i> | Dzo | Lesi | Akoabiakobi |
| <i>Mormyrus rume</i> | Menyugordor | Liwoegordorgor | Ablor |
| <i>Citharinus citharus</i> | Mleke | Va/Vavi | Takra |
| <i>Distichodus rostratus</i> | Gbasra | Agbasra | Brasa |
| <i>Heterotis niloticus</i> | Kwa | Efa/Azikipaku | Supaku |
| <i>Hydrocynus forskalii/vittatus</i> | Akpogbe/Akao | Ayuwu/Lixe | Ankow |
| <i>Alestes baremose</i> | Tewe gaga | Agenti | |
| <i>Hydrocyon</i> | | | |

Fish caught is landed from the canoes in aluminium pans. None of the primary fish landing sites are equipped with adequate facilities and the landing is done in the open, muddy or sandy beaches.

The purchases of fish along the Lake follow several schemes.

- Fresh fish
 - Women buying fish from their husbands
 - Women buying fish from other fishermen
 - Women buying fish from middlemen
 - Women buying fish from fishmongers

All the combinations are possible, but the first three are more common. The quantity purchased varies according to the financial capacity of the buyer and availability of the fish due to the season (major fishing season or the lean fishing season). The average purchase of fresh fish, per working day and per woman ranges from half a pan (off-season) to 20 pans (in season).

- Fish landed in the head pan is brought home for preparation before processing, which includes:
 - sorting and grading, according to the size and quality of fish (spoilt fish is generally put aside to be salted-dried for domestic markets);
 - de-scaling (if needed);
 - degutting;
 - cutting into chunks, depending on the destination of the fish products. This operation is necessary since bigger chunks are preferred in Kumasi and smaller chunks are sent to overseas markets;
 - cleaning with Lake water, using shore water is common practice. In all villages visited there was no provision for potable water and no treatment was done to the shore water, which was used. The same water was used for drinking and food preparation;
 - slight salting is done on fish meant for overseas export.

This additional treatment measure is done on special request from the purchasers themselves. It improves the taste and quality especially the appearance of the fish. Species like *Hydrocyon* are curved soon after they are sorted/graded and cleaned with water.

It could be noted that these operations take place within the vicinity of the household together with food preparation hence the materials (knives, containers, chopping boards) are used in both cases. Fish processing is done at a place not far from their living premises.

Three types of smoking ovens were in use; the most widespread were the round and rectangular clay or mud ovens. These are known for their high fuelwood consumption, their low-holding capacity and difficult fire control, leading to non-uniform end-product quality. The Chorkor oven, which is one of the most effective ovens promoted in the past decades by extension agencies and FAO is not widespread in the Lake area. Whatever the type of ovens in use they were in most cases placed in thatched houses. The unsafe situation was a serious threat for the village, especially with a combination of factors like wind, inadequate oven design and performing other activities (preparing food or caring for kids) when fish was being smoked. Reports of a whole village burnt were made during the study. The study team witnessed even a case of smoke house's fire during a meeting in one village.

Depending on the desired texture, fish smoking can take 1 to 3 days. The longer the smoking the lower the moisture content of the end product and the longer the shelf life. Overseas fish is normally smoked-dried. In general fish loses 60 to 80 percent of its moisture content at the end of the process. The smoked fish is stored on other ovens for re-smoking (every 2 to 3 days) until the necessary quantity for the market is gathered.

The processed fish is packed in three types of baskets weighing respectively 140 pounds (64 kg), 125 pounds (57 kg), and 90 pounds (41 kg) full flat.

Women normally overload the big basket with a quantity equivalent to at least 3 small or medium size baskets for an easy handling of the product to the market. The women interviewed stated that they normally sent an average of 2 to 4 baskets once a week (Yeji market) or 4 to 10 baskets twice a month (Kumasi and Accra markets). The quantity however depends on the season.

A little part of fresh fish is salted and sun-dried. This is mainly for the Tilapia, and to a lesser extent, *Heterotis niloticus*. Fish on the verge of spoilage or of lower quality is salted and sundried as a fermented product exclusively for the local market.

3.2 Processed fish

Through some marketing arrangements some women collect already processed fish from other processors. In this case fish is bought from the processors at a lower price than in the main cities but the transaction has the advantage of saving them time and energy as they do not need to transport their goods to the market.

Fresh or processed fish can be purchased either in the same village or in adjacent villages, by feet or by canoe.

3.3 Transportation and trade routes of processed fish

Fish processing and marketing is a dynamic activity that takes place beyond the lakeside. Fish processed in villages is collected by transport launches or ferry to the landing sites.

Few of the consignments is either bartered (mainly noted in Abotoase), or sent by cars to the larger market centres (Yeji, Kumasi, Accra). In the case of barter, fish is exchanged with cassava, maize or sweet potatoes. The fish traders based in the main cities go down the lakeside marketing centres to purchase the fish. It was noted that the majority of the processed fish brought from the fishing villages is sent to the cities because of the high purchasing power there. Transportation to the final destination follows different schemes; the key channels were seen in Map 1.

Once in the market, women either hire a stall from a local seller, or let their customers (women traders) sell the products in their presence. Each woman has between one to four customers in each city, seven is the maximum recorded. Their customers can sell fish more than the price agreed upon with the lake processors. The profit belongs to her in addition to her share for selling the consignment of fish.

3.4 Fish exports

Freshwater fish is a delicacy in Ghana. High quality fish are, however, expensive and out of reach of the average Ghanaian when the price is compared to marine fish. The main customers of this type of fish are therefore the higher strata of the population and the export units based in Accra.

According to the fishing communities met, the return is higher when transporting and marketing fish in the main cities, such as Yeji, Kumasi and Accra, than in the village or at the landing sites (Abotoase, Dumbai, Kpandu, Dzemeni, Yeji, Buipe, etc.), unless the processor has an arrangement with the buyer for a supply at these places. Different pricing patterns are applied between fish meant for local consumption and fish meant for export. The women interviewed are unanimous in stating that it is more profitable to sell fish to exporters than on the local markets. They confirmed the statement made by the private exporters that fish is purchased at a price 30 to 50 percent more than the wholesale market's price for domestic consumption.

The pricing of export fish (Abrotsiri fish) is determined by the quality of the product, the size of the chunk and the type of fish species.

The following are the indicators for the women to notice that the product is being purchased for export market:

- The purchaser informs them of the intended use or the destination of the product. Some of the women interviewed cited London, America and Holland as some of the overseas destinations of their products.
- Purchasers request for special treatment of the fish: good quality raw material, slight salting before smoking, cutting into chunks, big sizes of the salted sundried Tilapia ("Koobi") are preferred.
- Type of packaging: some of the purchasers bring their packaging materials to the market and proceed to package the fish once the sale transaction is over.

There seems to be no limitation to the quantity purchased for export. The important factor is to have the suitable products according to the specifications above. Some women stated that provided the purchaser's requirement is met they could sell as many baskets of fishery products brought to the city markets as they could. Owing to the selection of products pieces in a given basket and the variety of species loaded, most of the women interviewed were unable to estimate the quantity of fish sold to the said overseas buyers, however, few asserted that they could sell at least two full baskets per market day.

The frequency of purchase by the exporters was assessed to be once a month to once every 2 to 3 months. The women have however experienced cases where the purchasers had failed to come back as promised. The study team interpreted that it might be a result of a bankruptcy on the part of the Exporter. One reason could be the failure of the Exporter to deliver the products at its destination because of detention or rejection by overseas health authorities at the entry points. Export of fish to overseas countries is governed by rules and sanitary regulations, that the exporter has no control but only to comply from production to sending off the consignment. His export products are therefore subject to rule and regulations in force.

On the issue of the use of their incomes, the women stated that part is used to buy the raw material (fish purchased from their husbands or any other fisherman). The rest is used for household and family expenses.

4. WEAKNESSES AND NEEDS FOR IMPROVEMENTS

It should be noted that the traditional fish processors along the Volta Lake are indirectly involved in international trade. This trade provides substantial revenues and sustains employment within the sub-sector. The return of 30 to 50 percent more than that on the local market is an indication of the importance of this activity for the small-scale fishers.

In the previous study conducted by the authors on Accra-based traditional fish exporters, a note was made of the involvement of these fish processors in the supply chain. A statement made by some exporters that they pay higher prices than the local customers were confirmed in the present study.

The regular exporters to the EU and some occasional exporters also send their products to North America, mainly to the United States and Canada.

Owing to the involvement of small-scale fish processors in the international trade market, it is necessary to screen and improve the operations of this fishery sub-sector if the objective of sustaining it is to be met. This needs to be done because the framework of the prevailing international rules and regulations established the mandatory principle of monitoring the conditions of production from harvesting to marketing and to the distribution of products. It places the liability for quality and safety on the producer and stresses that fishing and aquaculture are compatible with sustainable development. As far as the evaluation made during these studies is concerned, number of factors threatens the effectiveness and the sustainability of this marketing channel. Fishing activities,

production facilities and fish handling practices as were noted were definitely out of compliance to the provisions, which favour the industrial sector. The issues, which needed attention, were:

- irresponsible fishing practices: bamboo traps and “winch” fishing well-known for their destructive effect on the resources have been noted on many parts of the lake. Some villages are known for these practices. This justifies their conflicting relations with the fisheries field officers and their sabotage of any programme aiming at discouraging this illegal fishing. The use of these gears was noted especially in the northern waters, and it is said to be intensified during lean fishing season. Small size fish are not allowed in the export systems under current circumstances (demands for chunks from big specimen), but the resource depletion effect of these illegal fishing methods affect the sustainability of the whole fisheries sector;
- inadequate on board fish handling: fishermen do not use insulated fish box or container, and fish is laid bare in the wooden canoe;
- lack of fresh fish preservation facilities;
- fresh and processed fish landing sites are not equipped for the purpose;
- lack of potable water: no treated shore water is used for fish processing;
- inadequate design and layout of the fish preparation and processing premises;
- no partition between household, processing facilities and materials;
- inefficient smoking ovens;
- inadequate refuse facilities and waste disposal facilities;
- almost all the processing villages do not have access to electricity and basic health facilities except very few who are near some large towns;
- no provisions for record keeping and quality management.

These are indeed weaknesses in many artisanal fisheries within the region.

There should be a scheme or project to address the assessed needs of the subsector to upgrade its performance from production to marketing to avoid the worse from happening which might collapse the fish trade and affect the Inland Fisheries which a number of fishing communities depend upon for their living. There is a need for a stepwise approach based on the development of cluster production. Key villages selected according to the volume of production and other relevant criteria can be used as pilot sites to upgrade the facilities. Products obtained from these improved sites, as a result of good hygiene and manufacturing practices adopted by the fishermen and processors through educating them in improved handling practices would be registered for official export. These products would be promoted through an agreement with the Accra-based exporters.

5. CONCLUSION

Lake fisheries plays a major role in employment and income for large fishing communities most of whom are within the poor and the disadvantaged section of the population. The fact that inland fishery products are a delicacy and relatively expensive, places them out of reach of the average Ghanaian hence they are valued mainly in export channels. There are great potentials to develop these market outlets and keep them up on a sustainable basis. Achieving this objective requires that illegal fishing and the non-compliance to sanitary requirements raised be effectively addressed. Since the number of villages involved is over 1 200 and the level of investment required is high, it would be cautious to adopt a stepwise approach in a programme for upgrading the situation. There is a need to mobilise donor agencies for such assistance.

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