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Investment Opportunities in the Nigerian Fishing Industry

Ayotunde M. Giwa
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INVESTMENT OPPORTUNITIES IN THE NIGERIAN FISHING INDUSTRY

AYOTUNDE M. GIWA

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF ARTS IN MARINE AFFAIRS

UNIVERSITY OF RHODE ISLAND
1986
MASTER OF ARTS THESIS
OF
AYOTUNDE MUGNIYU GIWA

APPROVED:

Thesis Committee

Major Professor

DEAN OF THE GRADUATE SCHOOL

UNIVERSITY OF RHODE ISLAND
1986
ABSTRACT

The major problem facing the Nigerian fishing industry is its inability to satisfy the demand for tasty yet inexpensive animal protein. Nigeria's marine biological resources are limited and the Gulf of Guinea is among the poorest in the whole of West Africa. Nigeria's population is estimated to have reached about 100 million and is growing at 3.09 per cent per annum.

Nigeria's fishing industry is multi sectoral and composed of the riverine, lake, coastal, estuarine, and culture fisheries. Together they constituted about 2.5 per cent of the GDP in 1976. Up to the present moment, the Nation has relied on the large scale importation of fishery products chiefly from East European countries. This level of importation is not possible in the current atmosphere. As a result of the current oil crisis, Nigeria stands to lose about $6 Billion or about 50 per cent of projected revenues in 1986 alone.

Significant increases in domestic fishery production are unlikely in all but culture fishery. This is currently hampered by amongst a host of factors, lack of familiarity with the benefits and techniques of aquaculture. There are also severe shortages of several important inputs.

The various expensive Government efforts to increase domestic fish production have been largely met by failure. In light of this, the encouragement of private sector participation should become a
stated goal of the Government.

The thesis identifies two major areas that could contribute to the alleviation of the afore stated problems. These are: 1. Increased regional cooperation under the aegis of Economic Community of West African States (ECOWAS) and 2. Added emphasis on projects that promote self-sufficiency. The study identifies two such projects: the Integrated Fishery Operation (IFO) and the Fresh Fish Marketing Operation (FFMO). They are described in some detail. The projects feature improved handling and marketing techniques. These features are expected to minimize waste—a problem identified as a major one afflicting the several fisheries in Nigeria.
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ACKNOWLEDGEMENTS

The successful completion of this thesis reflects the good graces of a number of people to whom I will be eternally grateful; these include first and foremost, the members of my thesis committee, Dennis Nixon, my major professor, Dr. Jon Sutinen and Dr. Lewis Alexander. Others, who in agreeing to take time out from their busy schedules to talk to me and in so doing fill in gaps in understanding of issues involved in the development of West African fisheries. These included George Everett and Mike Ansa of Committee for Eastern Central Atlantic Fisheries (CECAF) in Dakar, Dr. T.O. Alabi of the Nigerian Institute for Oceanography and Marine Research (NIOMR) in Lagos and Mr Femi Adebolu of the Federal Department of Fisheries (FDF) also in Lagos. Many of my colleagues, in class and personal discussions added to my understanding of aspects of planning for, managing and exploiting the resources of the marine environment. I am grateful.

Mary Jane Beardsley of the International Center for Marine Resource Development (ICMRD) played a major role in the unearthing of pertinent information. She at times knew what I was looking for even when I did not. I am grateful.
INTRODUCTION

1.1 THE PROBLEM: STATEMENT AND SETTING.

The major problem facing the Nigerian fishing industry today is its lack of a capacity to satisfy the demand for tasty yet inexpensive animal protein. The deficit that exists between domestic fish production and the quantity demanded is met by the importation of large quantities of mainly low quality, high priced fish paid for by increasingly scarcer foreign exchange. Other food production sectors such as agriculture are experiencing similar problems.

Fishery development has always been a priority of Nigerian governments, the stated objective being the attainment of self sufficiency in this sector of food production. Several million Naira* of public funds have been expended but the gap between expectation and reality continues to widen. Estimated 1984 fish demand was just short of 1 million metric tonnes. Domestic production in the same year might have been about 500,000 metric tonnes.

The government of Nigeria, as part of its effort towards increasing domestic fish production, set up both a distant water fishing company and an export-oriented shrimp fishing venture. Their operations have not been very successful. The Nigerian National Fishing Company (NNFC), as at the end of 1984, was bankrupt and a few of its vessels had been seized at Las Palmas, Canary Islands by creditors who had obtained court orders enabling *

1 Naira—Approximately 1 US $
During the past few years, a decline of mechanised harvesting activities has occurred. This is because some vessel owners have abandoned their harvesting operations as a result of the attraction of the higher profit margins of the fish importation business. About half of the Nigerian mechanised fishing fleet is laid up for reasons related to this.

In terms of catch volume, the artisanal sector has been and continues to be the most important subsector of the Nigerian fishing industry.

FIGURE 1. Domestic Fish Production by Sectors.

SOURCE: Federal Department of Fisheries, Lagos Nigeria.
With this realization, the Nigerian government has targeted the artisanal sector for development assistance. These fishermen number about 446,152 (full time and part time). About 44% of them receive subsidized inputs such as outboard motors, synthetic nets and extension services. Ajayi and Talabi, in their treatise of strategies of fisheries development in Nigeria, assert that exploitation in the inshore artisanal fishery is at or close to the maximum level. Many artisans have adopted the use of synthetic nets amongst other 'fruits' of 'modern' technology. This might be responsible for the observed steady increase in their (artisanal fishermen) reported catch over the years. These two pieces of information together seem to imply that further development effort in the sector can only bring about greater capture efficiency. The unemployment problem is already serious and a situation that entails fewer participants will only compound it.
1.2 IMPORTANCE OF THE STUDY

Nigeria's population has been estimated by some to have reached the 100 million mark and is growing at an annual rate of 3.09% per annum. This is a rapid rate of increase. By the year 2025, Nigeria's population will have surpassed that of the USA, making Nigeria, the 5th most populous country in the world.

Figure 2. Human Population 1960-2025, Nigeria and the USA.

Adapted from Time Chart by Nigel Holmes.

Nigeria has 9,238,000 square kilometers of land, the northernmost fringe of which has already begun to suffer encroachment from the Sahara desert. The southern tropical rainforest belt is infested by Tse Tse flies which rules it out for large scale animal rearing. The north itself is not free from pests as the recent outbreak of Rinderpest (cattle plague) disease
demonstrates. The disease decimated the size of the cattle herds. Nigeria's Sahelian belt has also felt the periodic ravages of drought. These indicators would seem to point to added reliance on fish as a major source of protein for the population at large.

The price of Nigeria's major foreign exchange earner, petroleum, has in 1986 in spite of various efforts, declined resulting in drastically reduced revenues. Several sectors of the Nigerian economy continue to make heavy demands on this increasingly smaller pot. Even a cursory analysis of Nigeria's economic situation would seem to point to the fact that the nation can no longer afford the large scale importation of food and its allied products. Various Nigerian governments seem to have had little difficulty in reaching this conclusion. Enormous amounts of public funds have been expended in the pursuance of the goal of self sufficiency in food production. The results have been spectacular only in the degree to which they have failed. With this realization, the priority of the Nigerian Government should be the encouragement of private sector, profit seeking food production along with greater emphasis on small holder or artisanal production. The lackluster performance, or in many cases outright failure of government incursions into a variety of large scale food production schemes provides evidence that such schemes represent a drain on Nigeria's resources with very little by way of concrete achievements to show for it. The cornerstone of
Nigeria's food production plans are the various River Basin Development projects set up around the country. These mega-bureaucratic bodies charged with increasing agricultural and fishery production invariably find themselves hobbled by inefficiency, waste and mis-management.

Any long term analysis of Nigeria's economic development reveals the daunting task of feeding a population that will double by the end of the century and then again in less than another quarter century. Given that Nigeria's petroleum reserves will only last about another 30 years, it is imperative that the country (re)achieves food self sufficiency before this century is out. Widespread famine could result if Nigeria finds itself caught on the one hand unable to feed itself and on the other unable to afford the current massive scale importation of food items.

In view of the limited nature of Nigeria's fishery resources, a first priority should be the encouragement of full utilization of the resources that are currently available. Losses due to spoilage have been reported to be up to 50% in some Nigerian fisheries. This situation must be corrected promptly. The two projects analysed in this study are specifically designed to help bring about full utilization of resources currently available. It must be borne in mind that dramatic increases in domestic production can only be achieved via aquaculture. Present government efforts are inadequate.
In 1984 the total demand for fish was estimated to be about one million MT. Ajayi & Talabi (1984) estimate the total maximum sustainable yield of all sectors of Nigerian fisheries under full exploitation to be about .756 million MT. Nigeria also imports a substantial quantity of canned fishery products. It is the largest market in Africa for canned fish. West Africa consumes more than 20% of total world trade volume in this product. These imports, not being too difficult to produce locally, represent a needless drain on Nigeria's meager foreign exchange earnings.

Until very recently, about 90% of Nigeria's revenues came from crude oil sales. With the current over supply of this commodity on the world market and the subsequent drop in prices, Nigeria has not met projected sales targets. Actual sales have been up to 50% off projections made years ago in more abundant times. Currently, about 65 per cent of total revenues come from crude oil sales. Long before the slump in crude oil sales, Nigeria had resorted to borrowing to help finance its grandiose and many times gaudy development projects. These debts have accumulated and servicing them is proving problematic. Total oil
revenues in 1984 were about N 8 Billion. The total external debt in 1985 stood at N 12.7 Billion. The application of 44 per cent of total revenues towards servicing the debt was deliberate government policy. The government has, in 1985, just released the latest in a series of 'austerity' budgets, in which expenditures will increase by 13 per cent. Since inflation is estimated to be about 30 per cent, in reality, expenditures have dropped 17 per cent. Nigeria recently refused a US$ 2 Billion loan from the International Monetary Fund (IMF) on grounds that the conditions were too strict. Nigeria however proceeded to unilaterally impose a majority of the key aspects of the IMF package that was refused.

In an environment such as the one being described, the need for self reliance and self sufficiency becomes evident.
1.3 OBJECTIVES OF THE STUDY

The major objective of this study is to assess the prospects for ordered and self reliant development of the Nigerian fishing industry. In pursuit of this goal, the study hopes to demonstrate the failure of the current government role in the development of the fishing industry. Two projects, which could contribute to the attainment of full utilization of currently available resources are identified and an analysis of their economic viability is performed. To place these issues in the proper perspective, certain background information about Nigeria will be provided. In addition, an assessment of the current state of the industry is carried out.

Impediments to added fishery development in Nigeria will be identified and recommendations on strategies for development enumerated.
DATA COLLECTION

Data collection for this study was done in three distinct phases over the period between October 1983 and June 1985. The first phase was a rather sedentary type involving researching documents at the International Center for Marine Resource Development (ICMRD) at the Kingston campus of the University of Rhode Island, the Pell library at the Graduate School of Oceanography URI, the World Bank library in Washington DC. During this phase, the goal was to find as much information about the Nigerian fishing industry as possible.

A second phase of the study involved a trip to Nigeria and Dakar, Senegal during which I was able to fill several gaps in my understanding of the subject. During this phase, the focus of the thesis was much clearer and the search for information was more specific.

The third phase of the study involved processing of the data that had been acquired in the previous two phases. Nigeria's already precarious economic situation continued to deteriorate as the study progressed. As a result, a number of revisions were required before the final version was ready.
In studying issues relating to Nigeria, one finds a startling degree of inconsistency in data describing the same thing but coming from different sources. An example of this can be found in domestic fish production figures. Nigeria's marine resources, though not yet fully surveyed, are thought by external observers not to exceed 114,000-140,000 MT per annum maximum sustainable yield. Against this, government sources quote production figures of over 350,000 MT.

As is the case with markets throughout the West African region, market conditions are highly variable and subject to wide fluctuations over short periods of time. Some variables such as the price of certain inputs such as fuel, insurance and maintenance cost are fairly stable as they increase steadily in a predictable manner. The price of various species of fish varies very widely even within the space of one day.
NIGERIA: SOME BACKGROUND INFORMATION

2.1 GEOGRAPHICAL CHARACTERISTICS

Nigeria is located on the Gulf of Guinea on the West coast of Africa. It has a land area of 923 million square kilometers and a coastline that is 669 km long. The continental shelf is narrow in most parts and has an area of 37.9 million square km. The country can be divided into four vegetational bands along a north-south direction. The coastal band consists of swampy forests which in certain areas extends up to 100 kilometers inland. The vegetation consists chiefly of mangrove trees (*Rhizophora* spp.).

North of the mangrove forest is the tropical rainforest which forms a 150 kilometer band. It provides the most valuable timber species such as mahogany (*Khaya ivorensis*), iroko (*Chlorophora excelsa*), African walnut (*Lovea klaineana*), sapele-wood (*Entandrophragma cylindricum*) and others. Further inland still is the savannah belt. This is essentially a wooded grassland with grasses and shrubs dominating and isolated trees scattered all over. The northernmost belt is the semi arid grassland or sub-Sahel region which is dry for extended stretches of the year. Periodic droughts are a feature of this region.
Figure 3. Nigeria Showing the Nineteen states.
2.2 OCEANOGRAPHIC CHARACTERISTICS

The richness of any body of water is determined by a variety of physical and oceanographic variables. On the eastern flank of the Atlantic Ocean bordering West Africa, two major cold currents occur. These are the Benguela Current that flows northwards along the West Coast of Namibia and Angola and the Canary Current flowing south along the coast of Morocco, Mauritania and Senegal. Between these two cold currents is the eastward-flowing warm Guinea current. Upwelling of subsurface waters, except in some isolated areas off Ghana, is absent in this part of the Atlantic. Nigeria's waters fall inside this relatively unproductive zone. The waters are however not totally without resources. Heavy rainfall along the coast transports riverine debris and organic materials into the ocean via the delta. The organic materials enhance the nutrient supply of the adjacent waters thereby supporting a modest shrimp population. Various other species of fish inhabit the waters providing a livelihood for whole communities that dot the coastline.
Figure 4. Nigeria: Coastline and Continental Shelf.

A major factor that helps determine the small size of Nigeria's fishery resources is the narrow width of Nigeria's continental shelf. It ranges from a minimum of 8 miles to 30 miles. Since the size of the continental shelf is a determinant of the size of the demersal stocks, Nigeria's trawlable resources are correspondingly small.

<table>
<thead>
<tr>
<th>Surface area of Continental Shelf (sq. km)</th>
<th>Total Surface Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 m</td>
<td>10-50 m</td>
</tr>
<tr>
<td>5,100</td>
<td>21,600</td>
</tr>
</tbody>
</table>

Adapted from Fawunmi, Joel Sobalaje.
NIGERIAN FISHERIES: AN OVERVIEW.
3.1 SECTORAL STATUS SURVEY OF NIGERIAN FISHERIES.

The backbone of the Nigerian fishing industry is the artisanal fisherman. Though their equipment is described by many as being archaic, they have been able to exploit many fisheries to the maximum level by the sheer weight of their numbers.

3.1.1 RIVERINE FISHERIES

Nigeria is named for the river Niger which flows through a handful of West African countries, forms a confluence with the River Benue and empties into the Atlantic Ocean through an extensive delta network in Southern Nigeria. Ita and Sado estimated the bankful and flood plain areas of major Nigerian rivers to be 10,812,410 and 515,000 hectares respectively. A catch rate of 28.0-30.9 kg/ha is estimated by Wellcome in 1984 to be the maximum productivity of the rivers. A more conservative estimate of 20 kg/ha is probably more realistic and gives a potential of 226,548 metric tons for the river and 216,248 metric tons for the flood plains. The fishermen that exploit these resources utilize an assortment of gear. Commercially important species include several tilapia and catfish species.
3.1.2 LAKE FISHERIES

Kainji Lake.

Nigeria has two major lakes. One is Kainji Lake created in 1968 by the damming of the Niger river. The lake covers 127,000 ha (1270 square kilometers). It has a mean depth of 11 meters and is exploited exclusively by artisanal fishermen. It is estimated that Kainji Lake has a potential yield of 4,500 to 6,000 MT/annum. There is also the possibility of significant increases when good management practices are introduced. The fish families with the greatest commercial importance include the following: cichlids, bagrids, characids and cyprinids.

Table 2. Selected Data on Commercially Important Species in Kainji lake.

<table>
<thead>
<tr>
<th></th>
<th>ABUNDANCE (kg/ha)</th>
<th>MEAN WEIGHT * (in g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cichlids</td>
<td>105</td>
<td>146</td>
</tr>
<tr>
<td>Bagrids</td>
<td>36</td>
<td>359</td>
</tr>
<tr>
<td>Caracids</td>
<td>25</td>
<td>204</td>
</tr>
<tr>
<td>Cyprinids</td>
<td>13</td>
<td>240</td>
</tr>
</tbody>
</table>

* 1977. Mean weight has fluctuated widely in the years following impoundment.

After initial high rates of catch immediately following impoundment when catches reached up to 28,000 MT, the Lake is said to have attained a natural equilibrium at between 4,500 and 6,000 MT/yr.

Lake Chad.

The other major lake in Nigeria is the Lake Chad which is the largest natural lake in the country. Nigeria shares the lake with Chad and Cameroon and Niger. The total area covered by the lake has been fluctuating widely in recent years. This is in concert with fluctuating rainfall that characterizes the Sahelian belt which it occupies. The Nigerian portion covered only 550,000 ha (55,000 square kilometers) a couple of years ago but the area is now much less than this. A fishing village, Bagga that used to be on the edge of the lake is now reportedly about 80 Km from the present lake edge. Lake Chad is shallow, having a mean depth of 3.9 m. An estimate of 41,000 metric tonnes per annum appears to be the most accurate measure of Lake Chad production.

*Lates niloticus* and *Alestes* species are the most important commercially are the most important species. Exploitation is exclusively by artisanal fishermen and is considered to be at its maximum level. (See Table 3.)
Table 3. Lake Chad Production.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL DRIED WEIGHT (metric tons)</th>
<th>FRESH WEIGHT EQUIVALENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>12,326.4</td>
<td>36,979</td>
</tr>
<tr>
<td>1970</td>
<td>13,750.7</td>
<td>41,252</td>
</tr>
<tr>
<td>1971</td>
<td>23,535.6</td>
<td>70,608</td>
</tr>
<tr>
<td>1972</td>
<td>34,209.8</td>
<td>102,629</td>
</tr>
<tr>
<td>1973</td>
<td>38,895.2</td>
<td>116,685</td>
</tr>
<tr>
<td>1974</td>
<td>44,366.0</td>
<td>133,098</td>
</tr>
<tr>
<td>1975</td>
<td>25,837.8</td>
<td>77,513</td>
</tr>
<tr>
<td>1976</td>
<td>20,612.6</td>
<td>61,837</td>
</tr>
<tr>
<td>1977</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>20,391.0</td>
<td>61,173</td>
</tr>
<tr>
<td>1979</td>
<td>14,609.9</td>
<td>43,829</td>
</tr>
<tr>
<td>1980</td>
<td>29,500</td>
<td>88,500</td>
</tr>
</tbody>
</table>

SOURCE: Nigeria Fishery Sector Survey.

3.1.3 COASTAL AND ESTUARINE FISHERIES

This is the most productive sector of the Nigerian fishing industry. It employs about 67 per cent of all fishermen in the country. In 1983, this sector provided about 70 per cent of the total domestic fish production. This sector of the fishing industry relies to a large extent on traditional technology in terms of its capture techniques. The participants are largely resistant to change. These family run operations usually employ dugout canoes, and a wide variety of gear types ranging from nets to traps to long lines. The Federal as well as a number of state governments provide the fishermen with an assortment of inputs.
such as outboard motors, synthetic nets and extension services aimed at improving catch, processing and marketing. The 1983 catch of this sector was estimated by the Federal Dept. of Fisheries to be 376,943 mt targeting croakers (Pseudotolithus spp.) Catfish (Arius spp) soles (Cynoglossus spp) grunters (Pomadaya spp) snappers ((Lutjanus spp) and groupers ((Epinephelus spp.) Other important fish are Bonga ((Ethmalosa Fimbriata)). Also important are the sardines (Sardinella spp).

3.3.4 CULTURE FISHERY.

Nigeria has an estimated 1,010,000 and 741,509 hectares of perennial freshwater swamps and brackish water respectively. A large proportion of this is said to be suitable for aquaculture. In addition to this, the various irrigation projects embarked upon by the River Basin Authorities are also excellent for fish farming. Despite this potential, fish farming has not moved beyond the pilot plant / demonstration level.
3.2 FISHERIES IN NIGERIAN ECONOMIC DEVELOPMENT.

Nigeria's part of the Gulf of Guinea is among the poorest in West Africa. As a result of the limited nature of the resources, the contribution of fisheries to overall economic development has been limited. In 1972, agriculture made up 34 per cent of the gross domestic product (GDP). Fisheries represented only a small fraction of this. To illustrate this, in 1976, the fishery sector contributed 2.6 per cent to the GDP and 11 per cent to the agricultural GDP. By comparison, the 1976 figure represents a drop from 6.1 per cent in 1971. Between 1971 and 1973, fisheries contribution to the agricultural GDP increased from 13.5 per cent to 15 per cent and then declined to 11.7 per cent in 1976.

Even when considered in other terms, the Nigerian fishing industry is not very important. In terms of employment, only about 0.04 per cent of the Nigerian workforce is employed in fishing. As an earner of foreign exchange, there is a small (less than $5 million annually) shrimp export business based on the Panus duorarum stock harvested from the silt laden waters of the many tributaries that make up the Niger river delta. This is considered from various surveys to be small. Ajayi and Talabi (1984) estimate the MSY of the shrimp fishery to be 3,250-4,016 metric tons and capable of sustaining anywhere between 40 and 54 vessels at a catch rate of 300 kg/day/vessel/year.

Fishery development, despite the small size of the contribution it makes to the national economy, has always been a priority area in the various five year national plans. As a result
these plans have all included ambitious projects that were designed specifically for the fishing industry. They have all been characterized by mixed results. In the course of the 3rd National Development Plan (1975-1980) a number of projects carried forward through the fourth plan (1980-1985) have been implemented. They all aim at increasing fish production.


<table>
<thead>
<tr>
<th>Project Description</th>
<th>N (000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. National Accelerated Fishery Production Project NAFP (50% input subsidy programme)</td>
<td>12,000</td>
</tr>
<tr>
<td>2. Terminals (Lagos/Ebughu/Igbokoda)</td>
<td>35,000</td>
</tr>
<tr>
<td>3. 100 inshore gillnet open vessel 8/9M</td>
<td>60,000</td>
</tr>
<tr>
<td>40 decked shrimp vessels 9/12 M</td>
<td>10,000</td>
</tr>
<tr>
<td>40 shrimpers 12/13 M plus training in Poland</td>
<td>20,000</td>
</tr>
<tr>
<td>4. Fish storage, processing and marketing</td>
<td>5,000</td>
</tr>
<tr>
<td>40 cold stores/kilns, market halls</td>
<td>5,000</td>
</tr>
<tr>
<td>5. Seed multiplication</td>
<td>2,000</td>
</tr>
<tr>
<td>15 hatcheries</td>
<td>2,000</td>
</tr>
<tr>
<td>6. Headquarters Lagos + Zones</td>
<td>2,000</td>
</tr>
<tr>
<td>7/8. United Nations Development Programme/ Food and Agriculture Organization (UNDP/FAO)</td>
<td>2,200</td>
</tr>
<tr>
<td>9. Resettlement project</td>
<td>4,500</td>
</tr>
<tr>
<td>Rural development -4 locations</td>
<td>4,500</td>
</tr>
<tr>
<td>10. Management and shrimp terminal</td>
<td>2,000</td>
</tr>
<tr>
<td>11. Pilot fish farming in each state</td>
<td>6,000</td>
</tr>
<tr>
<td>12. Mechanised training</td>
<td>1,130</td>
</tr>
<tr>
<td>13. Fisheries inspectorate expenditure</td>
<td>2,500</td>
</tr>
</tbody>
</table>

**TOTAL** 87,330

SOURCE: Nigeria Fishery Sector Survey.

* Note: These figures represent planned and not actual expenditures.
Each of the nineteen state governments also plans, funds and executes a variety of fishery development projects. The states carry out this function essentially independent of the Federal government. Each state carries out projects based on its own version of the Fourth National Development Plan. Below is a summary of proposed state expenditures under the plan.

Table 5. Aggregate Proposed State Fishery Sector Expenditures under the Fourth National Development Plan. 1980-1985

<table>
<thead>
<tr>
<th>Item</th>
<th>Proposed Expenditures (000's N)</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aquaculture</td>
<td>54,190</td>
<td>64.75</td>
</tr>
<tr>
<td>2. Marketing and processing</td>
<td>3,280</td>
<td>3.9</td>
</tr>
<tr>
<td>3. Subsidised inputs</td>
<td>5,810</td>
<td>6.9</td>
</tr>
<tr>
<td>4. Vessel &amp; craft purchases</td>
<td>5,173</td>
<td>6.2</td>
</tr>
<tr>
<td>5. Fishing terminals</td>
<td>2,400</td>
<td>2.9</td>
</tr>
<tr>
<td>6. Training &amp; Investigation</td>
<td>5,828</td>
<td>6.9</td>
</tr>
<tr>
<td>7. Ice depots, cold stores and workshops</td>
<td>3,302</td>
<td>3.9</td>
</tr>
<tr>
<td>8. Errection of Official buildings</td>
<td>3,707</td>
<td>4.4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>83,690</strong></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Nigeria Fishery Sector Survey.

Nigeria's record on the execution of planned projects is not very good. As a result of this, these plans are in reality only a little more than a wish list. A fifty percent execution rate would be exceptionally good; for instance, three fishing terminal were planned under the Fourth Plan but only one has actually been built. A new five year development plan (1985-1990) was recently drawn up and it is essentially a scaled down version of projects carried over from the previous plan. Some of the projects in the fourth plan are discussed in the next few paragraphs.
The National Accelerated Fish Production Project (NAPP) was designed to "bring the advantages of modern technology to Nigerian fishermen". It is a subsidy program that provided inputs at about a 50 per cent subsidy to about 44 per cent of the Nigeria's fishermen in 1982. These inputs which include outboard motors, synthetic nets, hooks, etc. are provided on very favorable credit terms or in other cases are supplied as outright grants. Other programs aim at improving marketing, processing and distribution and involve the provision of smoking kilns and ice plants. These are reportedly underutilized as at this point in time.

Another major effort, the fishing terminal project, appeared to be a well conceived initiative. It was to help eradicate the problem of lack of adequate berthing space that continues to plague the Nigerian trawler fleet. In reality the execution of the project valued at US$160 million has not done a lot to alleviate the problem. The terminal's features include fish handling and processing equipment. Also available are repair and maintenance facilities for fishing vessels. The first of these terminals has been completed and is sited at Borokiri near Port Harcourt. Reports from Nigeria say the facility is underutilised because the bulk of the Nigerian fleet is stationed some distance away in Lagos. This is a perfect illustration of the way political considerations are allowed sometimes to play too important a role in the making of decisions that should have been
3.5 TRENDS IN DEMAND AND SUPPLY

The demand for fish and fishery products in Nigeria is strong and is expected to remain so if current conditions persist. Nigeria has historically relied on fish as a major source of animal protein. The past decade has witnessed a systematic growth in the consumption of fish and fishery products. The growth in consumption of imported products was most dramatic. Fish imports increased from 54,000 MT in 1971 to 220,000 MT in 1979. The 'explosion' started in 1979 and by 1980, 750,000 MT of frozen fish was imported. Other fishery products experienced this boom as well. In 1981, stockfish imports reached a record level of 47,000 MT valued at US$ 160 million. Canned fish imports were not excluded from this 'boom'. Imports peaked somewhat earlier than with the other products. It has been suggested that this was a response to the Sahelian drought which ravaged the Northern fringes of Nigeria in the early and mid seventies. In the period between 1974 and 1978, canned fish imports into Nigeria increased from 7,400 MT to 90,000 MT. It has declined ever since.

The quantity of fish and fishery products that is consumed is determined by a number of factors which act independently but simultaneously. They include the following:

- Population. Its size and growth rate.
- Traditional eating habits.
- Supply. Domestic production and importation.
- Alternative and competing products. Their availability and price.
- Incomes.
more geared towards economic/technical considerations.

The Nigerian authorities long ago realised the role that aquaculture could play towards the ultimate goal of self sufficiency in food production. In fact 64.75% of all state government expenditures on fishery related projects under the Fourth National Development Plan were earmarked for aquaculture. Despite the long (and on going) gestation period, aquaculture has yet to move past the demonstration / pilot production stage and start to contribute significantly to fish production figures. This is despite the fact that the objective of doubling production (as contained in the current development plan) is heavily dependent on aquaculture. The fish seed multiplication project is the largest of the aquacultural projects currently being pursued. This project is designed to use the waters created by the numerous irrigation schemes currently being executed to increase agricultural output. A recent FAO/World Bank survey mission to Nigeria pointed out several reasons the project is doomed to failure due to what they consider as faulty planning.

From the foregoing it is clear that the Nigerian authorities attach some measure of importance to the fishing industry and would like to see some improvement. Their efforts have not been met with success in most of the instances. Reappraisal of these projects is necessary in order to avoid wasteful expenditure of ever scarcer funds.

In addition to those projects that are funded by the Nigerian government, there are a few projects being funded by international
organizations. One such project is the Artisanal and Inshore Fisheries Development Project. This is designed to improve the traditional fish preservation and marketing practices of the artisanal fishermen. In this project, extension work as well as the provision of certain inputs is actively in progress in two or three locations in each state. These are much too few to have any lasting effects on the whole as the fishing settlements are numerous and widely distributed. The overall effect of these projects on the general efficiency of the fisheries is thus diluted.

The Nigerian private sector has also invested handsomely in the fishing industry. Several privately owned fishing enterprises exist and many of them operate profitably.

Table 6. Estimated Total Capital Investment and Returns on Projects from Various Fishery Sub-Sectors

<table>
<thead>
<tr>
<th>Sub-Sector</th>
<th>Capital Investment (Federal Government Sector)</th>
<th>Total (All in million Naira)</th>
<th>Estimated Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artisanal Fisheries</td>
<td>345.0</td>
<td>642.5</td>
<td>137.0</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>213.0</td>
<td>341.0</td>
<td>570.0</td>
</tr>
<tr>
<td>Industrial Fisheries</td>
<td>203.0</td>
<td>438.0</td>
<td>180.0</td>
</tr>
<tr>
<td>Marketing &amp; Distribution</td>
<td>70.5</td>
<td>70.5</td>
<td>-</td>
</tr>
<tr>
<td>Studies &amp; Contingencies</td>
<td>35.8</td>
<td>35.8</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>807.3</strong></td>
<td><strong>1,468.6</strong></td>
<td><strong>887.0</strong></td>
</tr>
</tbody>
</table>

SOURCE: Nigeria Fishery Sector Survey.
3.3 MARKETING, DISTRIBUTION AND PROCESSING

Marketing and distribution of fish and fishery products is an aspect of the country's fishing industry that functions efficiently on the criteria of being able to distribute products over an extensive area of the country. (See Fig 5 on P.32) A report by a 1982 joint survey mission of the FAO and World Bank said: "

"--- fish products, through many middlemen also acting as processors, are largely and effectively distributed all over the country, in a smoked form. The marketing structure is very efficient and well adapted to the socio economic environment" (1)

There are three principal sources of fish and fishery products in Nigeria. They are: 1) importation, 2) inland rivers and lakes, and 3) the coastal fishery. Products from the three sources traverse different routes to reach the consumer. Imported fishery products include canned pelagics such as mackerel packed in tomato sauce and sardines in oil. Other imported fish items are stockfish (sun dried codfish from Europe) and frozen fish (mainly mackerel) from a variety of sources.

Nigeria is a huge market for canned fish products receiving about 20 per cent of total world trade volume. 1 Ajayi and Talabi reported that N 97 million was spent on the importation of canned fish products in one year recently. 2 The popularity of this item stems partly from the fact that storage is very convenient as refrigeration is not needed and the product can be distributed to even the most remote areas.
Table 7.
Imports of canned small pelagic products to Nigeria 1974-79
(1000 MT reported weight)

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>7.4</td>
<td>22.6</td>
<td>46.4</td>
<td>68.4</td>
<td>90.0</td>
<td>69.7</td>
</tr>
<tr>
<td>Sardine</td>
<td>3.7</td>
<td>13.0</td>
<td>31.5</td>
<td>30.1</td>
<td>25.8</td>
<td>16.5</td>
</tr>
<tr>
<td>'Other' (mackerel)</td>
<td>3.6</td>
<td>9.6</td>
<td>14.9</td>
<td>38.3</td>
<td>65.1</td>
<td>53.2</td>
</tr>
</tbody>
</table>

* Data represents estimates by major exporters.

SOURCE: Lanier, B.V.

The frozen fish importation business is very lucrative. The participants are well organized and efficient. Frozen fish importers are in effect a small limited membership club, as to be able to import frozen fish, one needs a much coveted and highly sought after import license. The demand for frozen fish is strong and when priced right, turnovers are very rapid. Profit margins are at least 100 per cent. This is the major cause of the flight of capital from fish harvesting to fish importation.

The Nigerian market for fish and fishery products is characterized by multiple middlemen. In one transaction the author witnessed during October of 1984, a consignment of frozen fish had passed through five separate hands from the actual importer to the ultimate consumer. The frozen fish importation business is dominated by a handful of companies one of which, Ibru, accounts for nearly half of all imports. The large companies have cold storage depots all over the country. Transportation of frozen fish is by either insulated or refrigerated trucks. Since Nigeria has a fairly extensive network of all season roads, the trucks are able to reach all parts of the country all year round.
Figure 5.
Nigeria: Distribution Routes of Fish and Fishery Products.

The 'fishing' companies retain several factors that own their own small cold storage facilities. These factors sell to 'petty' traders, usually women who buy one or more cartons (frozen fish in Nigeria is packed in 20 or 30 kg cartons) and hawk them around on foot or perhaps sell the fish from stalls in established markets. The operations of these "mammies" as these female retailers are referred to are characterized by low overhead expenses, limited storage and processing capacity. The quality of the fish deteriorates with the passage of the day. At the end of the day, the fish that they are unable to sell, by this time thawed and very often spoilt or very nearly so, is smoked and brought to the market at a later time. If judged on its ability to deliver the product to most parts of the country, it can be said that the system works fairly well. There is a dearth of statistics that provide precise accounts of the exact amounts expended on frozen fish. Ajayi and Talabi estimate the value of frozen fish imports between 1980 and 1982 to have been N 849 million (about 6 1.2 billion US $).

Other important sources of fish are Nigeria's rivers and lakes. In 1983 this sector produced almost 25% of all locally harvested fish. Maembe estimates that 80% of the fish produced by this sector is smoked while the remainder is consumed fresh. The fish is smoked by traditional methods. Maembe describes these as being unhygienic. Possibly as a result of this, there is considerable loss due to spoilage either by bacteria, fungi
or insects. The fish that escapes spoilage by these agents is still vulnerable to some loss in value due to damage during transportation.

The major centers of production of this product are in the Northern part of the country centered around the Lakes Chad and Kainji. The rivers are also important sources of smoked fish. The processing facilities are found around the areas where the fish is harvested. From here it is transported overland in trucks to the major 'hub' markets from where distribution to other areas is made easier. (see Fig. 6.)

The third major source of fish is the coastal fishery, composed of the artisanal and industrial sectors which produce 97 per cent and 3 per cent of the total production of this sector respectively. Together in 1983 they contributed about 73 per cent of total domestic production. The coastal fishermen prefer to market their catch in the fresh 'wet' form. "Except in the case of small clupeids, fishermen would resort to smoking or drying when there is no possibility of marketing the fish in the wet form." It is estimated that about 50 per cent of this catch is smoked, or sun dried. The artisanal harvestor, very often a family operation, in most cases produces slightly above the subsistence level and as such there is some surplus production that is marketed via the "fish mammies". These are the
retailers that buy entire catches from the canoe operators at prices that fluctuate widely over short periods of time. These women then either hawk the fish or sell them from stalls in markets or even from roadside stalls. Fresh fish usually sells at a higher price than frozen fish and as such the clientele is usually more upscale as fresh fish is considered a luxury item in Nigeria today.
POPULATION

This is a very important determinant of the demand for fish. If other factors stayed constant and there was an absence of artificial stimuli such as unrealistic prices, population size alone would seem to indicate that the demand for fish and fishery products should experience steady growth. Nigeria's population is estimated to be about 100 million and is growing at an annual rate of 3.09%. This means the size doubles in a little over one generation. To keep up with even the present level of contribution to nutrition, the supply of fish has to grow at at least the same rate as the population.

FISH AND THE NIGERIAN DIET

Fish has traditionally been an important component of the average Nigerian diet. In 1980 it contributed 51.5% of the total animal protein intake making it more important than all other meats combined. Fish also contributed 11.8% of the total protein intake. Nigerians consume almost 15 kilograms of fish per person per year. This represents about a median level of consumption in comparison to other West African countries.

Table 8. Fish and Diet in selected West African Countries.

<table>
<thead>
<tr>
<th></th>
<th>Annual Per capita Intake</th>
<th>Fish Contribution To Animal Protein Intake</th>
<th>Fish Contribution To Total Protein Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHANA</td>
<td>18.3</td>
<td>68.2</td>
<td>22.3</td>
</tr>
<tr>
<td>IVORY COAST</td>
<td>18.3</td>
<td>44.4</td>
<td>12.6</td>
</tr>
<tr>
<td>NIGERIA</td>
<td>14.7</td>
<td>51.5</td>
<td>11.8</td>
</tr>
<tr>
<td>SENEGAL</td>
<td>27.8</td>
<td>53.4</td>
<td>14.3</td>
</tr>
</tbody>
</table>

There exists in Nigeria, regional preferences in the way the fish is prepared. Those communities that live near the ocean or lakes and rivers consume more of the product in the fresh form while those living far removed from the water consume more of the smoked product. Fish is an important condiment in the preparation of sauces, soups and stews. The Nigerian meal normally centers around these. In the past decade, the influx of inexpensive frozen fish into the country has expanded popular access to fish. Low income Nigerian families that cannot afford beef or poultry (in Nigeria, poultry is more expensive than beef) can prepare mackerel stew several times a week. This has led to added popularity of fish consumption.

In other countries, including many in the developed world, governments or other interested parties such as industry groups sometimes have to carry out generic advertising campaigns in order to increase public acceptance and thus consumption of fish. Hence there are the "eat fish" campaigns. This is not needed in Nigeria where fish especially fresh fish is considered a delicacy. There are very few Nigerians that need to be convinced about the tastiness and nutritional value of fish. Thus barring any major attitudinal upheaval, fish should continue to play an important role in the diet of a majority of Nigerians.
SUPPLY

An important factor that helps determine the quantity of fish demanded is the amount of fish that is available to consumers. There are ultimately only two sources of fish in Nigeria, domestic production and imported products. The bulk of domestic production comes from artisanal exploitation of the country's coastal ocean, lakes and rivers. Aquacultural production is negligible. Domestic production from all indications is approaching its safe upper limit. In 1983, the FDF claimed it was about 500,000 MT. Prior to that time when 'other' sources will contribute to the local production, it appears that maximum domestic production, if it continues to grow at the rate it is now, will or should flatten out at about 756,400 MT/annum in about a decade. Present demand, estimated at 1 million MT in 1984 has already outstripped this 'future' production capacity and the gap is widening. The deficit is made up by importation. Robinson and Crispoldi contend that "imports into Nigeria probably exceeded production by a factor of 3 or 4". Official figures are at variance with this.

Fish importation reached its peak in 1980 when about 750,000 MT of frozen fish was imported. This level of importation was aided by deliberate government policies that made import licenses available during the Presidency of Alhaji Shehu Shagari. With the onset of the economic downturn of 1981, a halt was put to this.
By 1982 a more restrictive import was put into force and the level of imports dropped. Robinson and Crispoldi reported that in 1983, fish imports dropped more dramatically to "only half the already lower 1982 level". The present administration from all their utterings are dedicated to 'austerity'. This means they intend to exercise restraint in the expenditure of national resources. In the absence of a self destruction motive, it does not appear they have too many other choices given the lackluster performance of the main foreign exchange earner, petroleum.

The government also has another important consideration. Imported frozen fish is not a luxury item. It feeds members of low and lower middle income groups who together form the majority of Nigerians. While everyone recognises that some belt tightening is needed, the low income group families cannot be required to do all of it. Inexpensive imported food plays a crucial role in the survival of millions of urban families in Nigeria. No government would deliberately alienate this constituency.

The USSR is the largest single supplier of fish to Nigeria. Other West and Eastern European countries also have a substantial amount of fish trade with Nigeria. All fish imports are paid for in Dollars. This represents an important source of hard currency for Nigeria's East-Block trading partners.
The official exchange rate of the Naira encourages imports. Importers and consumers pay a price that does not reflect the true price of the commodities they purchase. The fact that the official rate is lower than the black market rate by about a factor of about 3 bears testimony to the extent of the overvaluation. There are however other political considerations for the government in instituting a correction of the stated overvaluation. Many Nigerians take a very dim view of appearing to 'bend' to IMF and by extension 'imperialistic' pressure. This is an issue a lot of Nigerians are looking at very carefully and as such the government is going to have to tread very cautiously.

Aquaculture

Aquaculture holds the key to large increases in local fish production. Despite its promise however, it is still in the pilot/demonstration scale of operation at the present time. This is despite the fact that Nigeria "... has an estimated 1,010,000 and 741,509 hectares of perennial freshwater swamps and brackish waters respectively... a considerable proportion of these meet the requirements for aquaculture with respect to topography, elevation tides and others". Greater aquacultural production is presently hampered by the following: shortage of fingerlings, feed production, shortage of technical manpower. In terms of the effect these obstacles will have on the demand for fish and fishery products, it is predicted that one or more of the following events will occur at some time in the future:

1) Nigerian institutions. (educational, research and profit seeking)
will at some point in the foreseeable future develop a capacity to supply the nation's fish fry needs.

2) Feed production is presently reported to be operating below its maximum production capacity due to restrictions on the importation of vital components. The main aim of import restricting regulations is to reduce the level of importation. The sensible way to do this is to eliminate non essential imports. The problem in Nigeria is that the regulations have not been very selective and as such those goods for which reasonably good arguments exist for their importation are not recognized and shortages occur. It is predicted that the present regime, when it is able to deal with present problems such as revenue stabilization, will pay greater attention to the problems being faced by genuine industrialists amongst which feed producers are a part.

3) Technical manpower shortages for aquacultural development, if it follows the path of other fields will improve with time. As previously stated, the country has a large number of educational institutions which could literally become 'factories' mass producing graduates with the skills that are required for achieving food self reliance.
ALTERNATIVE AND COMPETING PRODUCTS

Other products including beef, poultry, pork and to a lesser extent, venison (e.g. deer and grasscutter) compete for the consumers' Naira. There are estimated to be 25.6 million goats, 7 million sheep and 1 million pigs in the country. Frozen fish enjoys a certain advantage over these particular competitors. Each of these sectors of the animal protein production industry is faced with its own unique problems that limit 'dramatic' breakthroughs in production capacity. Fish will as such continue to be a major competitor in the meat and fish market.

Figure 6. Consumer Price Index (Food). 1975- 1982


Apart from a brief period when chilled beef imports were allowed into the country, beef production has been a forte of the nomadic Fulani tribesmen of Northern Nigeria. The total number of cows in Nigeria is estimated at 10 million head. The National Food Company of Nigeria currently imports 35 tonnes of beef per week.
from the Niger Republic. The southern half of Nigeria (the mangrove and tropical rainforest belts) is unsuitable for animal rearing due to the Tse Tse fly infestation. These insects serve as vectors for the cattle disease known as trypanosomiasis. Other natural phenomena have contributed to the difficulties faced by the animal rearing industry; these natural events include the drought of 1972-1974 that affected the West African Sahelian belt. Many herdsmen lost large numbers of their cattle. Even more recently, there was an outbreak of Rinderpest disease (cattle plague) that further decimated the size of the cattle herds thereby raising the price of beef. There are ongoing government efforts (such as Gongola state’s recent innoculation of 2.729 million heads of cattle against rinderpest disease) to provide extension and veterinary services to the herdsmen but there is unlikely to be any dramatic expansion in the supply of beef as the bulk of the measures being taken are largely crisis containment ones.

Poultry farmers also face difficult operational problems. There were an estimated 133.5 million chicken in Nigeria in 1984. However, many problems persist for poultry operators especially in feed supply. Modern large scale poultry farming requires a number of inputs that have to be imported. With the current import restrictions in place, shortages of vital components of feed production have resulted in the reduction of output. Many feed plants are currently operating at below their full capacity. The obvious effect being that chicken egg and meat production has
lagged. Government efforts aimed at increased production unless they focus on vertically integrated operations having a capacity to produce all the required inputs are bound to continue to face difficulties.

INCOMES.

About 70 percent of the Nigerian population reside in rural communities and are employed in subsistence or near subsistence agriculture. Nigeria's per capita income in 1980 was US $ 770. This is only a very rough estimate of the income due to the gross social inequities that characterize Nigerian society. However, this statistic is able to give a highly generalized indication of the relative level of incomes. Due to the recent economic slowdown, several employers including the federal and state governments have had to resort to retrenchment of workers. This has greatly magnified the unemployment problem with a corresponding drop in incomes.

Sutinen, Pollnac and Josserand in 1980 estimated that the income elasticity of demand for fish in Nigeria was 1. This means that increases in incomes are accompanied by a corresponding increase in the quantity demanded and vice versa.
3.5 THE LEGAL ENVIRONMENT

Having described aspects of the supply side and the demand side of Nigerian fisheries what follows is an examination of the type of legal environment under which fisheries operate in Nigeria as well as an assessment of current management practices.

Nigeria by and large regulates activities in its marine environment according to the dictates of international law and practice. Decree number 28 of 2nd October 1978 declared a 200 mile Exclusive Economic Zone (EEZ) in a document that has generated some controversy.

William Burke contends that with the 'loose' nature of the wording in Nigeria's EEZ declaration, Nigeria "fails to mention protection of the freedom of navigation and actually provides for possible interference with it". There are other points of view. B. Obinna Okere in 1984 argued that Burke's interpretation of the legislation was 'literal' and 'restrictive' and does not do justice to the true meaning and spirit of the Nigerian Legislation. The debate arises from section 31 and the explanatory note attached to the legislation. Section 31 establishes the absolute and exclusive right of the country to regulate all aspects of erection and operation of artificial islands and installations or structures within the EEZ. Section 32 goes on to empower the authorities to 'prohibit' ships from entry or at least to establish a consent regime. This is clearly in excess of UNCLOS III rights but as with other cases of
international lawlessness, there is very little anyone can do about it. In the explanatory notes, Nigeria declares its "right to regulate by law the establishment of artificial structures and installations and marine scientific research, amongst other things." The last phrase, included without any form of explanation of what these other things are, is in the view of some international law experts an instrument that can at some point in the future be used to interfere with the freedom of navigation. One thing remains unclear and this is: Was this obviously loose terminology a calculated attempt to provide for future disruption of the popularly accepted notion of freedom of navigation? Or does it represent shoddy workmanship on the part of the person or persons that drafted the legislation?

At the Federal level, the Federal Department of Fisheries has overall responsibility for the management and development of Nigerian fisheries. Each State Government also maintains a State Department of fisheries. The two have overlapping functions.

By and large, one finds an absence of the heavy government intervention that characterizes the fisheries of other countries. Regulation of the industry is minimal once one gets through the cumbersome licensing procedure.
3.5.1 FISHERY REGULATION IN NIGERIA.

Some of the restrictions which apply to the operation of a commercial fishing vessel in Nigeria include the following:

Fish and shrimp trawling and processing fall under Schedule 2 of the Nigerian Enterprises Promotion Act of 1977. This means that any such venture in Nigeria must be at least 40% owned by Nigerian Investors.

Another applicable regulation is the Sea Fisheries Decree of 1971. Some of the major features of this legislation are:
- The first two miles of the continental shelf are reserved for the canoe fishery.
- Section 2 of the decree states that trawlers may not use a cod-end with stretch mesh-size of 76mm when trawling for fish in inshore waters or less than 44mm when trawling for shrimps.
- Trawlers fishing Nigeria's territorial waters "may not dump edible and marketable sea products at sea." This appears to require vessels to land everything and anything they catch. Enforcement is lax or nonexistent.
- Fish must constitute at least 75 per cent of the catch of shrimpers.
- All catches must be landed in Nigeria. Also, all and any processing must be shore based.
4. REGIONAL COOPERATION AS A VEHICLE FOR WEST AFRICAN FISHERIES DEVELOPMENT.

It has already been established that Nigeria's fishery resources are limited when compared to the size of the Nigerian population. Similarly, we established that demand for fish is strong and likely to remain so for some time to come. Aspects of marketing distribution and processing have also been discussed. The difficulties Nigeria is having in paying her large fish importation bill have also been discussed. This chapter examines the prospects of added regional cooperation as a vehicle for fisheries development. In this chapter, the historical background, current situation and prospects for regional arrangements in West Africa are highlighted. The most important regional body at this time is ECOWAS and it shall be the focus of this chapter.

4.1 ECONOMIC COMMUNITY OF WEST AFRICAN STATES (ECOWAS)

The countries of West Africa have a wide range of cultural backgrounds and colonial experiences. Different parts of West Africa, as a result of the now infamous partition of Africa at the Berlin Conference of 1885, were arbitrarily 'given' to European imperialists. As a result of this and subsequent events, the countries of West Africa now face similar development problems which Adebayo Adedeji, former President of the African Development Bank describes as the 'seven D's of the African development problematique: debt, destabilisation, disequilibrium, drought and desertification, demographics and dependency. Many economists
(and also common sense) tell us that one way to deal with these problems would be regional economic cooperation. These were probably some of the sentiments that spurred the formation of the Economic Community of West African States (ECOWAS) in the May 1975 meeting of West African leaders held in Lagos. It was formed with many lofty ideals in mind. One decade has elapsed and an inventory of events reveals that there have been very few concrete achievements despite the enormous theoretical potential this regional grouping has. ECOWAS was formed with the intention of achieving several objectives important amongst which were:

- The establishment of a common market over a fifteen year period with import duties abolished.
- Free movement of people, services and capital.
- Harmonization of agricultural policies.
- Promotion of common projects.
- Elimination of the disparities in levels of development.
- Establishment of common monetary practices.
Figure 7. West Africa; ECOWAS member nations.

1. Mauritania
2. Mali
3. Senegal
4. Gambia
5. Guinea Bissau
6. Guinea
7. Sierra Leone
8. Liberia
9. Ivory Coast
10. Upper Volta
11. Benin
12. Ghana
13. Niger
14. Nigeria
15. Togo

SOURCE: West Africa Magazine.
Toku Agyapon reported that soon after its formation, ECOWAS expressed an interest in fisheries development and management. It does not appear as if ECOWAS has made progress in the agricultural sector as a whole. Statements made by ECOWAS refer to 'studies on siting' for seed multiplication projects. There are also very vague references to the 'attainment of food self sufficiency by the year 2000. The author interprets these to mean that ECOWAS is just now gearing up to involve itself in developmental work in the food production sector.

The laudable ideals with which ECOWAS was founded have not been matched by corresponding actions. Despite the fact that several important and far reaching protocols have been signed, concrete action in the form of actual changes in the way things are done coupled with discernable benefits to the citizens of the Sub-Region is still largely lacking. Edem Kodjo, the former Secretary General of the Organisation of African Unity (OAU) in 1985 stated:

One can see that the progress of ECOWAS is not a heroic march. It is very hesitant. The different dispositions taken by ECOWAS are not always applied, domains of harmonization are rare. Studies of some importance have been carried out, and there are plans for telecommunication and communication in general but beyond these, ECOWAS has not lived up to the expectations of 1975. Others have described ECOWAS as 'making progress slowly'. There remains a large number of political obstacles to overcome before the union begins to make realistic contributions to development in the Sub Region. Some of the problems being faced by ECOWAS
include:
- Reluctance or hesitancy on the part of member Nations to ratify and or implement policies or programs already agreed upon.
- Existence of several inter-governmental organizations. The West African subregion has about 32 functioning intergovernmental organisations. Many ECOWAS member states as such belong to more than a handful of organisations that have similar and many times competing aims as ECOWAS. The existence of certain other organizations such as the Communaute Economique d'Afrique Occidentale CEAO which is the Francophone Union, have been cited by some as being responsible for the lack of concrete achievements in the sub regional organization.
- Shortage of funds. ECOWAS member countries have remained very tardy in the payment of their contributions to the secretariat and the Fund. This is one of the problems that the ECOWAS bureaucracy has cited as hinderance to its more effective functioning.
- Coordination between the Secretariat and member States. The ECOWAS Secretariat has stated that it usually lacks knowledge of what the various Member states are doing in terms of development. Where such knowledge is lacking, effective coordination is lost.

A three phase Freedom of Movement Convention already signed by the member states and supposed to come into full effect in 1985 is mortally sick and may never fly. Some member states are unhappy with Nigeria's ill-advised expulsion of about 2 million nationals of other West African countries from within her borders in 1983.
Many West African nations have criticized Nigeria's handling of this thorny issue. The current Nigerian government within the past few months ago gave about 700,000 West African nationals until May 10th, 1985 to regularize their status or leave the country. The expulsions have been marred by charges of violence and repeated diplomatic incidents between Nigeria and her neighbors. These would make the attainment of economic cooperation amongst West African Nations harder than it already is.

In spite of these obstacles, some encouraging, though minimal, progress has been made. Member nations, in a meeting this year, reaffirmed their commitment to ECOWAS. More concrete achievements include:

- Customs regulations harmonization. This will ultimately facilitate intra-regional trade.
- Insurance agreement. The 'brown card' regulation means that vehicles insured in one country remain covered everywhere in the ECOWAS zone. This has some minor advantages for trade as it facilitates road transportation.
- Communication. This is probably the area where there has been the most visible progress. This includes participation in the Economic Commission for Africa's (ECA) Pan African Telephone (PANAFTEL) project. The proponents of this project claim it will facilitate telecommunications between West African capital cities and secondary towns via microwave links. The project is valued at US$12.5 million and work has already commenced on it.
- Road transportation. There are advanced plans for two Trans West African highways. One is a coastal road which will run from
Nouakchott to Lagos and the other is a Sahelian road which will also originate from Nouakchott and run to N'djamena with a branch to Lagos. Certain sections of the highways are already being built.

- Trade liberalization. Negotiations such as these require a lot of time. ECOWAS has been involved in them for a few years and this work will go a long way in assuring the longed for West African Common Market.

- There are advanced plans for a community computer center to be sited in Lome, Togo. The project, valued at US$3.8 million is being funded by external and internal sources. Its function will be to collect technical data for the region.
Calls have been made for the establishment of a West African Fisheries Commission (WAFC). This is to be established as an agency of ECOWAS and would have "regulatory and enforcement authority over the utilization of the resources in the region". The Commission will also conserve and manage migratory stocks and "encourage development of domestic and other commercial fisheries by individual states under sound conservation and management principles". Put concisely, its functions are development and management of the resources of the region. Would this not duplicate the efforts of the various national bodies charged with this function? The answer is clearly yes but some compelling reasons exist for the setting up of this organization including the following:

Fish stocks know no national boundaries. Several of the stocks, partly due to the narrowness of the continental shelves off the West African coast, migrate up and down the coastline crossing national borders. These stocks include *Sardinella aurita* found in the cooler northern upwelling areas and shared by Mauritania and Senegal. Horse mackerel (*Trachurus trachurus*) and *T. treca* form 'dense concentrations' between latitudes 20° and 140° N and are shared by Mauritania, Senegal and Gambia. Bonga (*Ethmalosa fimbriata*) occurs in shallow waters and lagoons from Senegal to Sierra Leone and from Nigeria to the Congo River. Other species that range in the Gulf of Guinea are tuna (several
species) and anchovy (*Anchoa guineensis*). Management efforts aimed at stabilizing the size of these stocks at some high and sustainable level are meaningless unless the individual actions of the nations that exploit the resource could be in some way coordinated. Continued economic benefits from these marine resources is an issue all the countries could agree on without much difficulty. Shared stocks are thus the most compelling single reason that exists for regional fisheries cooperation.

There is also an economic argument. Proponents of WAFC say that the newly acquired ocean spaces that came with the EEZ declarations of West African nations amount to very little as illegal foreign fishing activities continue unabated. Monitoring, control and surveillance (MCS), a crucial element in the potency of any piece of fishery legislation, is absent here because of the lack of a capacity to enforce regulations. This has and continues to be, beyond the reach of many individual West African countries. Joint action through WAFC is seen as a way of reducing enforcement costs to individual countries. Joint action may also eliminate (or at least reduce) waste due to duplicated efforts. Research needs to be streamlined. A more rational system of allocation of scarce inputs such as expertise, funds and equipment will go a long way in solving some of the fishery development problems faced by countries in the region. Proponents of WAFC also point out the economies of scale possible under a regional effort in the collection and analysis of data required for sound regional management of marine fisheries. This is a reflection of the high
cost of inputs such as ships, staff training and instruments. The wide geographic expanse and diverse nature of the region mean that even under a regional framework, a closely connected network of local laboratories will be needed. The foundation for these already exists in the various national oceanographic/fisheries institutes that are now operational.

4.2 COMITTEE FOR EASTERN CENTRAL ATLANTIC FISHERIES (CECAF)

This is the United Nations Food and Agricultural Organization project set up in 1967 to oversee the international management and development of fisheries in West Africa. The terms of its charter include: the promotion of research and development, assistance of member countries in establishing the scientific basis for management, assistance of member countries in the training of personnel; assistance in the collection, interchange, dissemination and analysis of statistical, biological and environmental data and the promotion of cooperative efforts. It has since moved to achieve these objectives: The then head of CECAF, George Everett stated in personal communications that he considered the most important achievement of CECAF after its first ten years of existence to be data collection.

Other accomplishments of CECAF have included its success in getting West African countries to accept a uniform mesh size regulation of 76 mm (stretched codend). CECAF also regularly provides a forum where, in theory, fisheries officials from the different countries that comprise the region can meet and exchange
ideas and information.

CECAP, like many UN agencies is facing a financial crisis. The project has been experiencing increased difficulties in getting their activities funded. The project recently received funding from the UNDP to carry out another year of activities.
4.3 INTRA REGIONAL TRADE.

West African intraregional trade has in the modern era been very small compared to the total level of trade the region carries out. Such trade in 1973 came to 2.9 per cent of total trade and amounted to US$ 242 million. In recent years, the amount has increased in value substantially. However, it still only accounts for less than four per cent. About 80 per cent of the exports are primary goods for which there is little demand within the region. Similarly, most of the imports are of manufactured goods for which there are few suppliers in the region. At thirty per cent, the proportion of intraregional to extraregional trade in fish represents a significantly better situation than the 2.9 per cent for aggregate trade.

An important feature of West African trade is that there is a very large amount of trade that goes unrecorded. This is termed the underground trade. It is estimated to be several times the size of the official trade. The fuels that keep it running are the ECOWAS protocol guaranteeing freedom of movement and the disparities (or anomalies) that exist in the exchange policies of the different countries. The items involved in this trade are numerous and include diamonds, gold, non durable consumer goods as well as cocoa and groundnuts. The disparities in exchange rate arise largely as a result of the existence of the CFA (Communaute Francaise Afrique) This is a monetary union linking seven former French colonies together, all of which have a common currency, the CFA Franc. The countries include: Benin, Bourkina, Ivory Coast.
Mali, Niger, Togo and Senegal. The CFA franc is freely convertible to the French Franc at a fixed rate of 50:1. Thus even though the vast majority of people cannot afford them, a wide assortment of goods are available for sale in CFA countries. Other ECOWAS countries have exchange restrictions of varying strictness. Their currencies are not freely convertible and very vibrant black markets exist on which international currencies can be bought or sold. Since the CFA and non CFA countries share common borders, the fact that there is a lot of currency trafficking is not at all suprising. Nigeria for example shares borders with both Benin and Niger.
As stated earlier, the ultimate plan ECOWAS has, is the establishment of a free trade zone. A first step towards this is the abolition of all duties and taxes on unprocessed goods. All non-tariff barriers will also be abolished. Since these duties constitute an important source of revenue for some countries, plans have been made to reimburse the lost revenues. To this end, ECOWAS member nations have been divided into three groups:

<table>
<thead>
<tr>
<th>Country G</th>
<th>Priority Industrial products (P1)</th>
<th>Non Priority Industrial products (P2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cape Verde</td>
<td>8 years, on the basis of a 12.5% reduction per annum</td>
<td>10 years, on the basis of a 10% reduction per annum</td>
</tr>
<tr>
<td>The Gambia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guinea Bissau</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borkina Faso</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mali</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mauritania</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Niger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benin</td>
<td>6 years, on the basis of a 16.66% reduction per annum</td>
<td>8 years, on the basis of a 12.5% reduction per annum</td>
</tr>
<tr>
<td>Guinea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sierra Leone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Togo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ivory Coast</td>
<td>4 years, on the basis of 25% reduction per annum</td>
<td>6 years, on the basis of a 16.66% reduction per annum</td>
</tr>
<tr>
<td>Ghana</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nigeria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4 WEST AFRICAN FISH TRADE.

There exists enough fish in ECOWAS waters to satisfy total regional demand. In spite of this however, other factors such as 'historical ties' dictate the actual pattern of trade. Over sixty per cent of all exports of fish by countries in the West African region is destined for extra-regional markets. A similar percentage of the imports also come from outside the region.

Table 9. 1980 Exports of Fish and Fishery Products in Selected West African Countries.

<table>
<thead>
<tr>
<th>EXPORTER</th>
<th>TOTAL CECAF (In 000,000 CFA Francs)</th>
<th>DESTINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MOROCCO</td>
<td>CANARY IS.</td>
</tr>
<tr>
<td>NIGERIA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.478</td>
<td>4.320</td>
</tr>
<tr>
<td>FRANCE</td>
<td>3.685</td>
<td>5.708</td>
</tr>
<tr>
<td>USSR</td>
<td>7.509</td>
<td>19.390</td>
</tr>
<tr>
<td>OTHER</td>
<td>899</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9.774</td>
<td>22.809</td>
</tr>
<tr>
<td>DEVELOPED</td>
<td>25.168</td>
<td>33.061</td>
</tr>
</tbody>
</table>

FIGURE 8.
AFRICA: Fishery Resource Distribution and Exploitation

Average annual development assistance.

Estimated annual catch potential.

Annual catch.

SOURCE: Josupeit, Helga.
Table 10. 1980 Imports of Fish and Fishery Products in Selected West African Countries.

<table>
<thead>
<tr>
<th>IMPORTER</th>
<th>CANARY ISLAND</th>
<th>SENEGAL</th>
<th>TOTAL</th>
<th>FRANCE</th>
<th>USSR</th>
<th>OTHER</th>
<th>TOTAL CECAF</th>
<th>DEVELOPED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SENEGAL</td>
<td>-</td>
<td>224</td>
<td>3,264</td>
<td>-</td>
<td>84</td>
<td>3,377</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV.COAST</td>
<td>400</td>
<td>6,006</td>
<td>6,678</td>
<td>3,658</td>
<td>2,191</td>
<td>2,077</td>
<td>16,360</td>
<td></td>
</tr>
<tr>
<td>GHANA</td>
<td>450</td>
<td>-</td>
<td>452</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>452</td>
<td></td>
</tr>
<tr>
<td>NIGERIA</td>
<td>4,500</td>
<td>11</td>
<td>6,180</td>
<td>-</td>
<td>16,801</td>
<td>76,313</td>
<td>115,430</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Robinson and Crispoldi. 1984

Under an atmosphere of greater (read freer) intraregional trade, with possibly a common currency, fish imports need not be paid for in foreign currencies as is the case now in the high population, limited resource countries of West Africa such as Nigeria.

Table 11. Fishery Resources in Selected West African Countries.

<table>
<thead>
<tr>
<th>Shelf Area</th>
<th>Population Size</th>
<th>Catch Potential</th>
<th>Per Capita Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>('000sq km.)</td>
<td>(millions)</td>
<td>(000tons/yr)</td>
<td>(tons/man/yr)</td>
</tr>
<tr>
<td>SENEAGL</td>
<td>23.8</td>
<td>5.5</td>
<td>400</td>
</tr>
<tr>
<td>MAURITANIA</td>
<td>33.9</td>
<td>1.6</td>
<td>600</td>
</tr>
<tr>
<td>MOROCCO</td>
<td>115.1</td>
<td>19.9</td>
<td>3000</td>
</tr>
<tr>
<td>NIGERIA</td>
<td>37.9</td>
<td>90.0</td>
<td>200</td>
</tr>
<tr>
<td>GHANA</td>
<td>23.7</td>
<td>11.2</td>
<td>220</td>
</tr>
</tbody>
</table>

SOURCE: Robinson and Crispoldi. 1984
FAO Fishery Country Profile.
5. PROPOSED FISHERY DEVELOPMENT PROJECTS.

Various aspects of the Nigerian fishing industry have been described and in accordance with the objectives set out in the first chapter. The next step is the identification of specific small scale (requiring investments less than N250,000) projects that can contribute to the self-reliant development of the Nigerian fishing industry. From a pool of several projects, two were chosen and analyzed in depth. The projects that were considered but left out included:

a. Fishing vessel construction and repair facility. This is conceived of as a small, profit-seeking enterprise that would offer repair and construction services for small to medium sized steel fishing vessels in Nigeria. There is at present no facility of this type in Nigeria. However a recent report stated that Almarine, a division of John Holt Nigeria Ltd has announced plans to start such a venture.

b. Fishmeal production. This commodity, despite its importance as a constituent of poultry and fish feed, is not produced on a commercial scale in Nigeria. The quantities that are used presently are imported. The envisaged project is a small, commercial fishmeal production plant.

c. Canned fish production. Nigeria is one of the world's largest markets for canned fish products and despite the availability of
several fish species that could be suitable for canning, there is at present no domestic Nigerian fish canning concern. The proposed small scale cannery will, utilizing locally harvested fish, produce canned fishery products such as cooked fish in oil and in tomato sauce.

The Integrated Fishery Operation (IFO) and the Fresh Fish Marketing Operation (FFMO) were chosen over the others for a number of reasons including the availability of information. This was more readily available for these projects than the others. This was a very important consideration. Another reason why the IFO and FFMO were chosen above the rest was that there was also a time constraint element which precluded making the study more exhaustive.
5.1 INTEGRATED FISHERY OPERATION (IFO)

The best available estimates of the size of the inshore fishery resources available for exploitation by the Nigerian demersal trawl fleet seem to indicate that the fishery is not yet fully exploited. Ajayi and Talabi state that the level of exploitation in this fishery is about 60 per cent of its estimated potential as they have calculated it. This assertion would seem to indicate that based on an estimated 100 vessels currently engaged in the fishery, another 30 or so vessels could enter the fishery and not significantly damage the fish stocks. The IFO is thus designed to take advantage of this window of opportunity by operating a harvesting and marketing operation out of Lagos. Greater Lagos with its huge population will be the primary market for the products. The population of Lagos and surrounding suburbs is estimated to be in the neighborhood of 5 million. The IFO is designed to limit the number of middle men between the harvester and final consumer. This has benefits that include: less handling, higher quality and thus a premium price.

The Lagos based mechanized fleet consists of about ninety vessels of which about half are currently not operating. The majority of these vessels operate profitably. However, there is a major upheaval afflicting the mechanized fishing sector and this is the abandoning of harvesting activities for the higher profit margins of fish importation.

Marketing activities by small fishing vessel operators are at present limited to selling to the middlemen (more appropriately, middlewomen) who buy the catches in units of twenty or thirty
kilograms packed in plastic bags. The IFO marketing plan represents a novel approach to marketing operations for a Nigerian small vessel operation.

In the harvesting component of the IFO, the vessel must be operated with the maximum amount of flexibility on the part of the skipper. The appropriate vessel would have the ability to change gear with the utmost of ease and fish whatever species might be available at that particular season including the skipjack tuna that are reported to migrate in large numbers through Nigerian waters. At the present time, these are an unexploited resource as far as Nigeria is concerned.
PROJET RATIONALE - GOAL, PURPOSE, STRATEGY

The most basic goal of the IFO is to encourage the full utilization of Nigeria's relatively meager fishery resources in a manner that takes full cognizance of the need to maintain a stable resource base. In addition to this basic goal, there are other important goals. They include the provision of adequate financial returns to the investor and the provision of additional fishery products to feed an ever increasing population. Another goal of the IFO is to help curb the massive outlays of scarce foreign exchange on imported fishery products.

The most important purpose of the IFO is to contribute to the overall goal of food self sufficiency. This is probably Nigeria's most urgent national objective. The purpose of seeking a goal of adequate financial returns for the investor is to seek to attract private sector know-how and capital in the development of the nation's food production sector. The failure of government run efforts has already been demonstrated. The purpose of the goal of reducing outlay of hard currencies currently being expended on fish importation is to enable it to be diverted to other needier sectors.
PROJECT DESCRIPTION

The IFO consists of four interlocking components. (1) production, (2) processing, (3) marketing, and (4) administration. Each is examined in some detail here.

1. Production. The waters around Lagos support a moderately sized fleet of trawlers. The fishery is based on the demersal stocks available. The catches are comprised mainly of croakers, catfish, bonga and sardines. Several other species are also common. The production capacity of the IFO depends entirely on the successful operation of its single 12-15 m vessel. The results of the analysis here seem to indicate that of two possible configurations of the IFO (i.e., one or two day trips) the two day trip configuration appears to be the more profitable one. This can only be confirmed by actual fishing trials. Based on the performance of similarly sized vessels currently operating in Nigeria's coastal waters, average daily production is estimated to be 450 kg.

A major criterion that determined the dimensions of the IFO operation was the requirement that it scale remain small. (Small scale here is defined as requiring an investment of less than N250,000). Discussions with various experts* helped determine the optimal type and size of the vessel required in the IFO. The other inputs represent the author's view on what such an operation in Nigeria will require.

* See appendix A for details.
Physical Requirements for the Integrated Fishery Operation (IFO)

1) 1 # 13 – 15 m steel vessel.
2) 1 # 500 kg / 24 hr flake ice making machine.
3) 1 # 1.5 kva electricity generating plant.
4) 1 # 500 kg capacity delivery van.
5) 1 # 500 gallon water tank.
6) Office and storage/ preparation premises.
7) Management equipment.
8) Sales equipment.
9) Spare parts for 1, 2, and 3 above.

2. Processing. The IFO involves very little processing. Apart from ensuring the highest standard of cleanliness and thus quality, the catch will be disposed of whole and uncut. At a later date, the IFO might want to introduce a smoked product.

3. Marketing. The IFO plan represents a new approach to fishery marketing for a small vessel in Nigeria. The various components of the plan discussed here are (1) supply, (2) demand, (3) product analysis, (4) pricing policy, (5) physical distribution (6) product promotion.

1. Supply- It is estimated that the vessel, based on average catch data from similar sized vessels should on the average catch about 450 Kg of fish per day. As gathered from vessel operators in Nigeria, seasonal variations in the species mix are more important than the variations in catch volume.

2. Demand- It was not possible to carry out an in depth market survey. From all available indications however, the demand for fish in Nigeria is strong and growing.
The projected market for IFO products has three main segments:
(a) Neighborhood retail outlets.
(b) Institutional Buyers- hotels, restaurants and supermarkets.
(c) Direct retail sales.
The neighborhood retail outlets are preexisting entities with which the IFO will enter a contractual agreement. At inception, four units of these are required. As a qualifying criterion, each one needs to be located in a strategic position around metropolitan Lagos. In addition, each of the outlets need have other important amenities. In the first phase, it is estimated that about 60 per cent of the catch will be sold through via this segment. It is further estimated that institutional buyers will account for about another 30 per cent. Direct sales to the public from the premises of the IFO will, also by estimation, dispose of the remaining 10 per cent of the catch.

3. Product analysis.
   - As observed during a tour of Lagos fish markets, there is very little product differentiation in the typical fish market. The main form in which fish is sold is, whole. With very large fish, it it is not uncommon for the fish to be cut into chunks. The major form of differentiation is by species, certain ones being more desirable than others. In the future, the IFO might want to consider introducing a high quality smoked fish product. This might prove popular amongst the more upscale portion of the market.
5. Product Promotion- In light of the fact that the demand for fish in Nigeria is strong, extensive campaigns to get people to eat more fish is not required. The major task of the IFO is to supply as high a quality of fish as possible. The IFO will strive to insure a very high level of cleanliness in its operations and in that of the its affiliated neighborhood stores.

4. Administration- The realization of the goals of the IFO is hinged to the ability of the human element of the system to function successfully under severe conditions. The success of the operation thus depends on the quality of the administration. The process of recruiting the staff is thus a most crucial one and should be done with this fact in mind. Table 12 shows the staff requirements at the inception phase.

Table 12. Staff requirements and compensation- IFO.

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
<th>Duties</th>
<th>Basic salary (Naira/annum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skipper</td>
<td>1</td>
<td>- Safe and profitable operation of the fishing vessel.</td>
<td>6,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Responsibility for monitoring and overseeing of a maintenance program for the vessel.</td>
<td></td>
</tr>
<tr>
<td>Mate</td>
<td>3</td>
<td>- Assist in the operation of the fishing vessel.</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Assist in the execution of the maintenance program.</td>
<td></td>
</tr>
<tr>
<td>Sales assistant I</td>
<td>1</td>
<td>- Operate delivery van.</td>
<td>2,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Keep records of deliveries.</td>
<td></td>
</tr>
<tr>
<td>Production assistant</td>
<td>1</td>
<td>- Operate ice making machine.</td>
<td>1,440</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Assist in the packing of the product.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- General cleaning .</td>
<td></td>
</tr>
<tr>
<td>Sales/ Administrative</td>
<td>1</td>
<td>- Total responsibility for sales and administration.</td>
<td>3,000</td>
</tr>
<tr>
<td>Supervisor</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 12 represents the author's own judgment of what the staff requirements for this project will be. It is derived from the observations made of the operation in the United States of vessels of similar size and design. The administrative cadre requirements are derived from familiarity with Nigerian business practices and conditions.

**SUMMARY OF FINANCIAL ANALYSES (In June 1985 US $)**

**I. INVESTMENT COST**

**Major Assumption:** 1 US$ = 1 Nig. N

(Official rate July 29th 1985: 1US$ = 0.895 Nig.N)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hull and engine (100 HP)</td>
<td>80,000</td>
</tr>
<tr>
<td>On board installations (inc. fishing gear)</td>
<td>20,000</td>
</tr>
<tr>
<td>Ice making machine</td>
<td>4,500</td>
</tr>
<tr>
<td>Electricity generator</td>
<td>1,000</td>
</tr>
<tr>
<td>Delivery van</td>
<td>10,000</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5,500</td>
</tr>
<tr>
<td><strong>Total Investment Cost</strong></td>
<td><strong>121,000</strong></td>
</tr>
</tbody>
</table>

**II. ANNUAL FIXED COSTS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation (straight line, 5 years)</td>
<td>24,200</td>
</tr>
<tr>
<td>Insurance (7% of 1(g))</td>
<td>8,250</td>
</tr>
<tr>
<td>Maintenance (inc. vessel, machinery and vehicle)</td>
<td>8,250</td>
</tr>
<tr>
<td>Wages (See table 12 page 84)</td>
<td>15,840</td>
</tr>
<tr>
<td>Management cost (10% of 1(g))</td>
<td>12,100</td>
</tr>
<tr>
<td>Premises rental (Estimate)</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>Total Annual Fixed Costs</strong></td>
<td><strong>78,640</strong></td>
</tr>
</tbody>
</table>

SEE page 113 for sources.
III. ANNUAL VARIABLE COSTS (Daily trips)

a. Fuel ((hp*180 g/hour)/ (830g/l * 200 days *0.25/l)) 16,300
b. Lubricants (10 % of fuel cost) 1,630
c. Electricity (Estimate ) 1,200
d. Engine overhaul and repair (6 % of engine cost) 1,200
e. Ice maker overhaul and repair (10 % of l (c)) 450
f. Hull repair (4 % of hull cost) 2,300
g. Gear repair and replacement (35 % of l (b)) 7,000
h. Miscellaneous costs (inc. taxes (estimate)) 10,500
i. Performance incentive expenditures (inc. bonus) 8,080

Total Annual variable Costs 48,660

IV. TOTAL ANNUAL COSTS 127,300

Table 13. APPROXIMATE CATCH COMPOSITION OF A RECENT COMMERCIAL FISHING TRIP IN NIGERIAN WATERS.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>PER CENT COMPOSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Croakers</td>
<td></td>
</tr>
<tr>
<td>- Large</td>
<td>6.60</td>
</tr>
<tr>
<td>- Medium</td>
<td>7.02</td>
</tr>
<tr>
<td>- Small</td>
<td>68.70</td>
</tr>
<tr>
<td>2. Soles</td>
<td></td>
</tr>
<tr>
<td>- Small</td>
<td>7.30</td>
</tr>
<tr>
<td>- Large</td>
<td>2.00</td>
</tr>
<tr>
<td>- Black</td>
<td>0.35</td>
</tr>
<tr>
<td>3. Sea Catfish</td>
<td>2.20</td>
</tr>
<tr>
<td>4. Mixed fish</td>
<td>2.70</td>
</tr>
<tr>
<td>5. Snapper/ Barracuda/ Shinynose</td>
<td>0.90</td>
</tr>
<tr>
<td>6. Shark</td>
<td>0.80</td>
</tr>
<tr>
<td>7. Others including Shrimp</td>
<td>2.91</td>
</tr>
</tbody>
</table>

SOURCE: Nigeria Fishery Sector Survey.
V. ANNUAL REVENUES (Daily fishery)

a. Average daily catch............................................. 450 kg.
b. Annual catch ......................................................... 90,000 kg.
c. Average Ex-vessel price of fish per kg........... N 1.75

NOTE: The catch estimates used here are derived from information gathered from the operation of Nigeria's 'Green revolution' vessels which are similar in size, range and equipment to the proposed NO vessel. In addition, the estimate is based on 6 hours fishing daily and 200 fishing days a year. The number of fishing days per year is derived from the FAO journal titled Fishing Boat Designs:3 and is consistent with the observed frequency of the above mentioned 'Green revolution' vessels. The 1.75 /kg price was the average being paid for mixed fish at the Ijora terminal during the month of September 1984.

Total Annual Revenues. N 157,500
VI. V - IV = Net Profit (Daily trips) N 30,800

There are a number of tools available to the investor with which (s)he can analyse the viability of a project. The two major ones used here are the accounting rate of return (ARR) and the internal rate of return (IRR). The ARR is a percentage ratio of the average annual net profit to the investment cost. The major drawback of this method is that it does not take the time value of money into consideration. Thus 100 units of money earned in year one is valued equal to 100 units earned in year ten.
The internal rate of return (IRR) is more sophisticated. The IRR is calculated from the net cash flow of the project, expenses being regarded as negative items and revenues as positive. There is some unique rate of interest at which the algebraic sum of the discounted value is zero, this is the internal rate of return.

Table 14 IPO- Calculation of Internal Rate of Return.

<table>
<thead>
<tr>
<th>Year</th>
<th>Net cash flow</th>
<th>Present Value factors 6%</th>
<th>Present Value factors 8%</th>
<th>Present value 6%</th>
<th>Present value 8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0</td>
<td>-121,000</td>
<td>1.0</td>
<td>1.0</td>
<td>-121,000</td>
<td>-121,000</td>
</tr>
<tr>
<td>Year 1</td>
<td>30,200</td>
<td>.9434</td>
<td>.9259</td>
<td>28.490</td>
<td>27.962</td>
</tr>
<tr>
<td>Year 2</td>
<td>30,200</td>
<td>.8900</td>
<td>.8573</td>
<td>26.873</td>
<td>25.890</td>
</tr>
<tr>
<td>Year 3</td>
<td>30,200</td>
<td>.8396</td>
<td>.7938</td>
<td>25.356</td>
<td>23.973</td>
</tr>
<tr>
<td>Year 4</td>
<td>30,200</td>
<td>.7921</td>
<td>.7350</td>
<td>23.921</td>
<td>22.197</td>
</tr>
<tr>
<td>Year 5</td>
<td>30,200</td>
<td>.7473</td>
<td>.6800</td>
<td>22.569</td>
<td>20.536</td>
</tr>
</tbody>
</table>

By Interpolation: IRR = $6 + \frac{2 \times 6214}{6656} = 7.87$ per cent.

VII. Internal Rate of Return (IRR) .......... 7.87%

VIII. VI/I x 100 = Accounting rate of Return (ARR) ....... 26.61%
III. ANNUAL VARIABLE COSTS (Two day trips)

a. Fuel (4.750 hours/year) \( \times 25.800 \)  

b. Lubricants (10% of fuel cost) 2,600  
c. Electricity (Estimate) 1,200  
d. Engine overhaul and repair (6% of cost/4,000 hours operation) 1,416  
e. Ice maker overhaul and repair (10% of l(c)) 450  
f. Hull repair (4% of hull cost) 2,300  
g. Gear repair and replacement (35% of l(b)) 7,000  
h. Miscellaneous costs (inc. taxes etc) 10,000  
i. Performance incentive expenditures (inc. bonuses) 8,080  

* Aprox. 47 hrs engine operation per trip and 100 trips a year.

Total Variable Cost (Two day trips) 58,846

IV. TOTAL ANNUAL COST (two Day trips) 133,446

V. ANNUAL REVENUES (two day trips)

a. Average catch per trip ........................ 1050 kg*  
b. Average annual catch .......................... 105,000 kg  
c. Estimated average price per kg. ............. N 1.75  

* 20 hrs fishing time /trip and a catch rate of 52.5 kg/hr.

Total annual revenues 183,750

VI. NET PROFIT = V - IV = 46,264

Calculation of Internal Rate of Return.

<table>
<thead>
<tr>
<th>Net cash flow</th>
<th>Present Value factors 25%</th>
<th>Present Value factors 30%</th>
<th>Present value 25%</th>
<th>Present value 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0</td>
<td>-121,000</td>
<td>1.0</td>
<td>1.0</td>
<td>-121,000</td>
</tr>
<tr>
<td>Year 1</td>
<td>46,264</td>
<td>.8000</td>
<td>.7692</td>
<td>37,011</td>
</tr>
<tr>
<td>Year 2</td>
<td>46,264</td>
<td>.6400</td>
<td>.5917</td>
<td>29,609</td>
</tr>
<tr>
<td>Year 3</td>
<td>46,264</td>
<td>.5120</td>
<td>.4552</td>
<td>23,687</td>
</tr>
<tr>
<td>Year 4</td>
<td>46,264</td>
<td>.4096</td>
<td>.3501</td>
<td>18,950</td>
</tr>
<tr>
<td>Year 5</td>
<td>46,264</td>
<td>.3277</td>
<td>.2693</td>
<td>15,161</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,418</strong></td>
<td></td>
<td></td>
<td><strong>-8,325</strong></td>
</tr>
</tbody>
</table>

By Interpolation: IRR = 25 + 5 \( \times \frac{3418}{11743} \) = 26.45%

VII. Internal rate of Return (IRR) = 26.45%

VIII. VI/ I \( \times \) 100 = Accounting Rate of return (ARR) = 38.23%
The stated objective of the IFO is to promote full utilization of Nigeria's fisheries resources while paying the investor an attractive rate of return over their investment. Two separate operational modes of the project, the daily and two day fishery are examined here in detail. From the summary of financial analysis, it can be seen that both are profitable, covering costs and providing the investor with some return on their investment. The two day fishery outperforms the daily fishery by a margin of 3.4 to 1 in terms of IRR and by 1.4 to 1 in terms of ARR. Nigerian savings accounts currently yield about 5% annually and as such the rate of return is relatively substantial.

With wider public dissemination of the opportunities in the fishery sector such as the IFO, the result should be an increase in investment the outcome of which should be increased utilization of Nigeria's fisheries resources.
5.2 FRESH FISH MARKETING OPERATION (FFMO)

High quality, chilled, freshwater fish is a product for which a ready market exists in Southern Nigerian urban centers. The fresh fish trade in Lagos is currently limited to locally harvested fresh or smoked marine species, imported frozen fish and smoked freshwater species. Nigeria’s artisanal fishermen have a demonstrated ability to harvest small to moderate volumes (0.95 tons/man/year). The problems many of these harvesters have encountered in many instances have been more in the areas of preservation, marketing and distribution than actual harvesting. The FFMO as such represents a ‘new partnership’ between artisanal harvesting capabilities and modern techniques of preservation, marketing and project management.

The FFMO is designed to market the artisanal catch of Kainji lake in the highly populated urban centers of Southern Nigeria such as Ilorin, Ibadan and Lagos. (see Fig. 6 p. 41)
Kainji lake was formed in 1968 by the damming of the River Niger for a hydro-electric power plant. Kainji dam fish production has apparently stabilized at between 4,500 and 6,000 MT. 1 After initial highs of up to 28,000 MT in 1970. There are several commercially important species harvested in the lake. One of the most important is the tilapia-like fish including Sarotherodon galilieus. S. niloticus and Tilapia zilli. Others are the bagrid catfish including Bagrus bayad. Chrysichthys auratus. Auchenoglands occidentalis. Lates niloticus and Labeo senegalensis. Other important species are Alestes and Clarias.

At this time, over 80 percent of the catch is smoked and the remainder is sold fresh. Smoking is the only form of processing practised here. Losses due to spoilage have been reported to be up to 40 percent. Assuming even a 15 percent loss due to spoilage means that 900 MT of fish is lost annually.

The participating artisans are expected to benefit from the association by gaining access to the advantages of presently available technology.

These advantages include: access to new markets, less loss due to spoilage and higher incomes. Except for a Niger River Basin Development Authority (NRBD) small scale project, there has been little by way of innovation in the processing, marketing or distribution of fish. The NRBD project utilized the catch of twenty artisanal fishermen and handled an average of 120kg of fish a month.
PROJECT RATIONALE- Goal, Purpose, Strategy

The FFMO shares many goals with the IFO and in addition has others that are unique to it. Its main goal like that of the IFO is to bring about the maximum utilization of Nigeria’s limited fishery resources while contributing to the attainment of food self sufficiency and providing an adequate rate of return for the investor. The FFMO also seeks to help reduce the current massive scale expenditure of scarce foreign exchange on food items. In addition, the FFMO seeks to provide a higher income for the fishermen associated with it. Since the FFMO share many goals with the IFO, it also shares its purposes.

PROJECT DESCRIPTION

The FFMO consists of four components. These are (1) Production, (2) Processing, (3) Marketing, (4) Administration. A brief description of each of them follows;

1. Production. At its inception stage, the FFMO will utilize the catch of 35 Kainji area artisanal fishermen. The mean daily catch of these fishermen is about 10 Kg/man/day. The FFMO will enter into a contractual agreement with the fishermen who are to agree to sell their catch exclusively to the FFMO.

The agreement will also stipulate that certain inputs which will be provided free of charge to the fishermen (polyethylene bags and ice) and a premium price will be paid for that part of their catch that
meets certain size and species specifications. The fishermen should ideally all come from the same village and if not, should live within a few miles. FFMO employees will visit at once a day to: 1) deliver ice 2) weigh and record size, species by harvester. 3) collect gutted, iced and bagged fish and deliver to New Bussa. The FFMO provides the polyethelene bags and ice free of charge. The fish is then transported to New Bussa where it is cleaned and boxed immediately to await transportation to Lagos. Each consignment should contain about 250 - 500 kg of fish (five to ten boxes). The journey takes 9 to 10 hours and passes through Jebba, Ilorin, Ogbomosho, Oyo and Ibadan on its way to the Lagos operational base. The major functions of the Lagos base are:

1) Ice production  
2) Retailing- operation of retailing/delivery van.  
3) Storage.  
4) Washing insulated boxes.  
5) Smoked fish production.  

An important assumption in the whole project is that the boxes can and will keep the fish fresh for up to four days. Investigations by FAO researchers indicate that well constructed boxes should keep fish for up to 14 days even in high ambient temperatures similar to those of Nigeria. A twenty-four hour allowance is made for getting the fish to the market. A further seventy two hours is allocated to marketing. At the end of a ninety six hour period, any fish that are left unsold will be smoked. The smoked product will be marketed through the same channels as the fresh product.
The following represents the author’s assessment of the items essentially required for the initiation and running of the FFMO of the FFMO under Nigerian conditions. The list is by no means exhaustive and a generous allowance is made for miscellaneous items.

1) 1 # 1,000 kg/24 hr capacity flake ice maker.
2) 1 # 1.5 kva electricity generating plant.
3) 1 # 1,000 kg capacity cargo van.
4) 15 *(100 kg capacity) insulated boxes.
5) 1 # retailing delivery van
6) 1 # 500 kg delivery van.
7) 1 # 500 gallon water tank.
9) Management equipment. (Office equipment, stationary etc)
10) Sales equipment. (Scales, retailing counters, wrapping etc)
11) 5,000 # 95 x 50 cm polyethylene bags.
12) Spare parts for 1, 2 and 3 (above)
13) 6 # insulated 44 gallon drums.
14) 1 # locally constructed smoking oven.

The 1,000 kg/24 hour capacity flake ice maker will be situated in New Bussa, Kwara State. This site offers certain advantages which include:

1) Location. Proximity to harvesting site. New Bussa is situated within 1 1/2 hours from many fishing villages.

2) Energy. New Bussa is on the National grid and as such there is access to NEPA electricity. (when available)

3) Water. New Bussa township has pipe borne, potable water.

4) Transportation. Ready access to the Nigerian all-season road network which connects all parts of the country.
5) Banking services. Commercial banks operate out of New Bussa. There is thus access to banking services.

6) Telecommunication services. New Bussa is on the domestic direct dialing system.

A building such as a three bedroom bungalow meeting certain specifications will be rented in New Bussa and will serve as the operational base. The New Bussa base will serve the following functions:

1) Ice production.
2) Ice delivery to fishing village.
3) Packing fish in insulated boxes.
4) Storage of 2 and 3 (above).
5) Loading of long distance cargo van.

2. PROCESSING. As a means of ensuring the highest standard of quality, the FFMO project involves some rudimentary processing. The fish have to be gutted and packed in ice as soon after capture as possible. The harvesters are thus required to have gutted and iced their catch to await pick up by FFMO officers. The final stage of the preparation takes place in the premises of the FFMO and involves the cleaning and package of the fish in insulated fish boxes.

3. MARKETING. This is the central component in this project. The earliest task of the sales force is to build up the machinery needed to market about 1,600 kg of chilled fish per week. The principal distinguishing factor of the FFMO shall be a dedication to the attainment of as high a standard of quality as possible.

There are two principal channels through which the FFMO will market its products. The first is by direct retail sales...
using the specially outfitted retailing van. This van is designed to be a mobile sales unit. It should ideally be neat, clean and easily operable by one driver/salesperson. It is expected that this segment will be responsible for the majority proportion of sales. The other segment of the market is the institutional buyer such as restaurants, beer parlours and hotels around Lagos. The high quality characteristics of the FFMO product is expected to make it particularly attractive to such buyers. A major objective of the FFMO is thus to build up a loyal corp of institutional buyers. Restaurants, beer parlours and hotels are expected to account for 40 per cent of the sales.

The pricing policy of the FFMO will be simply to ask a price that is competitive with what the current market price is. It is not expected that there will be a need for any expensive product campaign. However, attractive well conceived posters that reflect the high quality characteristics of the FFMO product might be a worthwhile investment.

4. Administration. Like the IPO, the success of the entire operation depends on the quality of the administration. There is a need for the actions of operatives in locations that are about 500 kilometers apart to be coordinated. The entire operation has very little tolerance for deviations from the operational plans. As a direct result of this, the staff recruitment phase is a most
crucial one. Important traits to look for will be intelligence and an ability to function effectively under stress. An ability to make high quality decisions under an atmosphere of uncertainty is an utmost necessity to the supervisory positions. The following Table is based on an assessment by the author of the precise manpower requirements for an operation such as the FFMO.

**TABLE 16 Staff Requirements and compensation-FFMO**

**Location:** New Bussa.

<table>
<thead>
<tr>
<th>Position</th>
<th>Duties</th>
<th>Basic annual salary (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Production assistant I</td>
<td>- Ice delivery to fishing village.</td>
<td>1,800</td>
</tr>
<tr>
<td></td>
<td>- Cleaning and packaging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Miscellaneous duties.</td>
<td></td>
</tr>
<tr>
<td>b. Production assistant II</td>
<td>- General clerical duties.</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>- Operation of ice making machine.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Fish packing.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Miscellaneous duties.</td>
<td></td>
</tr>
</tbody>
</table>

**Location:** Lagos.

<table>
<thead>
<tr>
<th>Position</th>
<th>Duties</th>
<th>Basic annual salary (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Production assistant I</td>
<td>- General clerical duties.</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td>- Smoking kiln operation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Miscellaneous duties.</td>
<td></td>
</tr>
<tr>
<td>b. Long distance driver.</td>
<td>- Operation of long distance van.</td>
<td>2,400</td>
</tr>
<tr>
<td>c. Sales assistant.</td>
<td>- Operation of retailing van.</td>
<td>1,800</td>
</tr>
<tr>
<td>d. Operations supervisor.</td>
<td>- Overall responsibility for smooth operation of all facets of the operation.</td>
<td>3,000</td>
</tr>
</tbody>
</table>
SUMMARY OF FINANCIAL ANALYSIS.

I. INVESTMENT COST

a. Ice making machine. 4,500 (7)
b. 75 sq.m 0.5mm Aluminium sheet 740 (8)
c. Gaskets, latches etc for fish boxes. 500 (9)
d. 2.5 kva electricity generating plant. 1,000 (10)
e. New mid sized delivery van 15,000 (11)
f. Reconditioned retailing/delivery van. 8,000 (12)
g. Reconditioned delivery van. 8,000 (13)
h. Smoking oven. (construction+ materials) 400 (14)
i. Construction of fish boxes. 1,000 (15)
j. Miscellaneous 1,500 (16)

j. Total investment cost 40,640

II. ANNUAL FIXED COSTS

a. Depreciation (straight line, 4 years) 7,160
b. Staff salaries (See table 13) 12,000
c. Management cost (10% of I (j)) 3,000
d. Premises rental 5,400 (17)
e. Insurance (5% of I (j)) 1,500

f. Total annual fixed cost 29,060

III. ANNUAL VARIABLE COSTS

a. Fuel (combined mileage of 200,000 km/year @ 20 km per 4.5 l and N 0.25/l) 10,000
b. Water (estimate) 300
c. Equipment overhaul and repair (7% of I (j)) 2,000
d. Vehicle overhaul and repair (13% of cost) 2,500
e. Electricity (estimate) 1,000
f. Cost of goods sold at 5.00/kg 440,000
g. Miscellaneous costs (estimate) 1,000

h. Total annual variable cost 456,800

IV. Total annual cost 485,860

SEE page 116 for sources.
V. ANNUAL REVENUES

a. Average volume per consignment .......... 400 kg.
b. Average price per kg ...................... N 5.80.
c. Average number of consignments per year .... 200

d. Total Annual Revenues 464,000

VI. Net Profit.

18,140

VI/I x 100 = Accounting rate of return (ARR) 44.63%

Table 17. FFMO - Calculation of the IRR

<table>
<thead>
<tr>
<th>Year</th>
<th>Net cash flow</th>
<th>Present value factors 25%</th>
<th>Present value factors 30%</th>
<th>Present value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 0</td>
<td>-40,640</td>
<td>1.0</td>
<td>1.0</td>
<td>-40,640</td>
</tr>
<tr>
<td>Year 1</td>
<td>18,140</td>
<td>.8000</td>
<td>.7692</td>
<td>14,512</td>
</tr>
<tr>
<td>Year 2</td>
<td>18,140</td>
<td>.6400</td>
<td>.5917</td>
<td>11,610</td>
</tr>
<tr>
<td>Year 3</td>
<td>18,140</td>
<td>.5120</td>
<td>.4552</td>
<td>9,288</td>
</tr>
<tr>
<td>Year 4</td>
<td>18,140</td>
<td>.4096</td>
<td>.3501</td>
<td>7,430</td>
</tr>
</tbody>
</table>

By interpolation; IRR = 25 + 5 x 2200 = 28.10%
DISCUSSION

Factors affecting profitability

A number of factors influence the profitability of these projects. The management needs to be aware of them so as to have adequate contingency plans to mitigate their potential adverse effects. These factors include the following:

- Seasonal variation in demand and supply.
- Seasonal variation in quantity and in yields of edible flesh.
- Fluctuations in demand or in availability of supplies at times of holidays, national festivals etc.; also the effect of holidays and rest days on the state of spoilage of unsold fish in stock when normal business resumes.
- Losses during transportation.
- Losses due to spoilage before receipt, and failure to sell all the fish before it has reached the limits of acceptability.
- Breakdown of vehicle or of ice making capacity.
- Cost of additional spare parts or consumables to meet local supply difficulties, stand by vehicle and equipment.

The estimates on which these analyses were made are as accurate as was possible under the circumstances in which the study was carried out. The major assumption that 1 US $ = 1 Nig.N is still valid. In December of 1985, the Nigerian Government announced that it was not going to accept the IMF imposed sanctions which included the devaluation of the Naira. A attempt was made to make the estimate represent Nigerian conditions as closely as
possible. For example, as recognition of the fact that spare parts are usually in short supply, in Nigeria, provision is made for stockpile. In addition, the service life of the machinery is made shorter than would be considered normal in the United States. Also, certain expenditures are made as preparation for contingency situations. These expenditures include those for a water tank and for a standby electricity generating plant.

Under the assumed conditions, the results show that both the IFO and FFMO pay the investor a reasonable rate of return on their investment. The internal rate of return (IRR) obtained from the cost and earnings estimate for the IFO indicates that it pays in the vicinity of 8.00 per cent when in the daily fishery configuration. The two day trip configuration has an IRR of 26.45 per cent. The latter configuration is clearly more profitable and as such the investor would probably be more interested in this. The FFMO, is by estimation, a slightly more profitable venture than the IFO. In addition it is much less capital intensive. The IFO will, according to estimates, require an initial capital outlay of about US$121,000. The FFMO on the other hand requires about US$ 40,640 as its set up cost.

One major drawback remains unresolved. The Nigerian currency, the Naira, remains over valued. This means that harvesting, compared
to fish importation will remain much less profitable and it may be difficult to be able to attract investors to the relatively modest returns of the IFO or FMMO. Cheap foreign fish will thus continue to continue to be a two edged sword; solving the immediate problem of feeding a hungry mass now but creating another one – the inability to control one's destiny that a lack of food self sufficiency brings.
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In review, it will be found that this study has touched on the major aspects of Nigeria’s fishing industry. The first chapter dealt with a definition of what the major problem facing industry is. The second chapter gave some basic information about Nigeria; it is intended to be of interest to those who know very little about the country. The third chapter contained an analysis of specific aspects of Nigeria’s fishery sector vis its place in national economic development, the current state of marketing, distribution and processing. Also examined in this chapter are trends in demand and supply. The legal environment of fisheries is also examined. The fourth chapter closely examines the possible contributions of regional arrangements in the attainment of the food self sufficiency goal. The fifth chapter represents the central portion of the thesis. In this chapter, two projects, the IFO (Integrated Fishery Operation) and the FFMO (Fresh Fish Marketing Operation) which could possibly contribute to the stated goals are described and analyzed in detail. In concluding this thesis, and based on information contained in the previous five chapters, the following are the obstacles to fishery development in Nigeria that the author has identified. Following the list are specific policy recommendations that the author feels may be instrumental in the attainment of the stated goals.
Much has been written on why Nigeria's fishing industry does not produce nearly enough fish to satisfy the demand in the country. Some of the reasons that are usually cited include the following:
- Small size of resource base.
- Lack of skilled manpower.
- Lack of funds.
- Lack of maintenance, infrastructural or other support facilities.

A brief analysis of each of these problems as they apply to Nigeria follows.

SMALL SIZE OF RESOURCE BASE.
Nigeria's fishery resources are not yet fully surveyed. However, the information available now indicates that the resources are not sufficient to satisfy the total quantity demanded. The most optimistic appraisal of Nigeria's fishery resources puts the total at over 700,000 metric tons per year (maximum sustainable yield). This estimate is disputed by several parties. Current demand for fish and fishery products in Nigeria has already surpassed one million metric tons.
SHORTAGE OF SKILLED MANPOWER

The lack of skilled, dedicated and honest leadership is a serious problem in many developing countries. Nigeria is not an exception. Nigeria is still in the early stages of its economic and national development. There is still a shortage of many crucial skills. However, it seems that currently available manpower is not being taken advantage of to the fullest degree possible. There appears to be a lack of incentive to do this. Commentators who speak about a lack of skilled manpower in many instances fail to take cognizance of local ingenuity and resourcefulness. There are numerous cases where local know-how and technology have been applied successfully to the solution of a wide assortment of problems.

Manpower availability does not appear to be a major hindrance to additional development of the Nigerian fishing industry. Nigeria is blessed with a large number of quality educational institutions that produce a large number of graduates annually. The Federal fisheries school in Victoria Island, Lagos, was set up by the Nigerian government with assistance from the UN/FAO and UNDP and trains workers in various aspects of modern fishing. It trains engineers, capable of repairing an assortment of marine engines and ancillary systems. It also trains fishermen in all
aspects of modern fishing including navigation, seamanship, fishing utilizing an assortment of gear. I was able to speak with a handful of students and graduates and came away very impressed with the material they appeared to know. Furthermore the Federal Department of Fisheries has sent several Nigerians abroad to study various aspects of fishing.

LACK (or SHORTAGE) OF FUNDS

The lack of foreign currencies is truly a genuine problem. With the more rational allocation of these scarce resources being instituted by the new military government, the situation could improve. Most developing economies are unfortunately built around one or two products, usually a raw material. When the price of this product drops on the world market, as it usually does given enough time, national revenues take a nose dive. In the case of Nigeria, total revenues dropped from 22 billion Naira to 8 billion Naira in 3 years. The government has responded by erecting a daunting maze of regulations designed at restricting imports. Many of the inputs of modern fishery development, ranging from vessels to consultants, have to be imported and paid for in foreign currency.

This situation might turn out to be a blessing in disguise if it leads to greater reliance on local inputs. Thus if the current economic downturn can lead people to consider building a vessel locally instead of importing one from Norway, a valuable lesson will have been learnt.
SHORTAGE OF SUPPORT FACILITIES

This has been a major impediment to all aspects of Nigerian national development. Infrastructural facilities that can be taken for granted elsewhere represent major obstacles to the smooth running of ventures in Nigeria. The development of basic infrastructural facilities has been a priority of the country for years. As such, very generous portions of the various national development plans have been earmarked for the improvement of such things as the electricity service, water supply, telecommunications and the postal service. The improvements have not startled anyone. These can translate into problems for the fishing fleet. Irregular electricity and water supply can mean a shortage of ice. The lack (or shortage) of ice means more spoilage, shorter fishing trips and for the country as a whole, less locally produced fish. Frustrations such as these tend to make fish importation a more attractive option than the actual harvesting.

Any fish mechanized harvesting operation in Nigeria can expect to face some combination of the following problems:
- Difficulty in finding an appropriate docking space. Most of the modern fishing vessels that operate in Nigeria fish out of Lagos. The big fishing companies own their own jetty spaces and as such are immune from this problem other than the expense they went into to acquire such private jetties. There is some limited space shared by a number of vessels at Ijora, Lagos. Thus any vessel should expect to wait for some time to offload its catch.
here. The Government allocated 160 million Naira for the erection of new modern fishing terminals complete with an array of capabilities including storage, processing, vessel repair etc. But where was the first one sited? At Borokiri near Port Harcourt only a few hundred miles away from the the bulk of the fleet for whom the problem is immediate. There are plans to build another in Lagos but in the current 'austerity' climate this is probably not going to materialize for some time to come.

- Difficulty in obtaining a regular supply of ice at reasonable cost. It has been reported that some trawler operators have to go as far away as Ibadan about 120 km from Lagos to buy ice at as much as US$140/ton. To get around this, a prospective vessel operator has to look into either manufacturing his own ice or using alternative methods of catch preservation such as on board freezing or a refrigerated seawater system.

- Difficulty in obtaining spare parts for machinery when it breaks down. In an attempt to cut down on the expenditure of its foreign currency reserves, Nigeria has put in place, import control measures that would daunt all but the most determined of people. While these measures are aimed at economic saboteurs, they have the unintended effect of making things very difficult for the genuine investor. The application process including Central Bank approval, pre-shipment inspection and obtaining a confirmed letter of credit can take up to one year. To avoid getting into a situation where a vessel would be tied up waiting for Central Bank approval to purchase a spare part, it would be much more prudent...
if at the time of purchase of a vessel and other equipment care
and thought is given to what is purchased. Simple, new equipment
appears to make the most sense. The savings that might be possible
on the short run using second hand equipment could very easily
turn out to lead to long run losses. A good supply of the most
likely to be needed spares should be included in the initial
purchase of the vessel.

- Difficulty in obtaining dry dock facilities. These are required
periodically during the life of the vessel. Nigerian vessels have
in the past been known to go as far away as Spain to gain access
to such facilities. The new fishing terminal in Borokiri is
supposed to have these facilities. It has been reported by some
observers that the new fishing terminal at Borokiri is
underutilized.
Recommendations.

Having identified specific impediments to fishery development the remaining part of this chapter deals with specific policy recommendations that could lead to added fishery development. It is important, at this juncture to point out that the Nigerian fishing industry is to a large extent afflicted by the same shortcomings that afflict Nigerian society as a whole. Until these larger ills, are remedied or somehow attenuated, those problems that include a behavioural component will continue to impede real progress well into the foreseeable future.

The recommendations that are offered here center on broad policy considerations. This is because Nigeria's problems are many-pronged and thus monumental. Being of such a variety, it does not lend itself to easy solutions.

1. Comprehensive resource survey.

The basis for any sound and realistic development plan is the reliability and accuracy of the statistical information available. This is clearly lacking in the Nigerian fishery sector. The most urgent need of the industry is therefore a new, thorough and above all, accurate assessment of the true extent of Nigeria's fishery resources. Also to be included in this census must be an accurate inventory of those areas that could be used for fish culture.
2. Improvement of planning capabilities.

The fishery department has demonstrated its capacity to make the occasional unrealistic plan. The planning capability of the FDF needs to be improved. There are a number of ways this could be achieved and they include a new recruitment drive targeted at a young, intelligent, energetic cadre of professionals. Another way the quality of the planning may be improved is to increase the use of outside (objective?) consultants.


The government of Nigeria needs to enter into a new partnership with genuine entreprenuers wishing to invest in food production including fishing. The governmental obstacles that face these genuine investors once they have been successfully identified must be removed. This group must be given special access to foreign exchange and import licenses. The FDF needs to carry out a study to examine the possible uses and effects of a severe curtailment of fish importation. The Federal Government might want to enact this measure as a way of encouraging added local production.

4. Acceleration of action on regional economic and political integration.

One of the the most basic problems the Nigerian fishing industry faces is the relative poorness of our waters in terms of fishery resources. Even with maximum utilization of domestic resources, a huge supply gap
would still exist. Other West African countries have fishery resources far in excess of their domestic requirements. Nigeria has certain resources such as oil which are relatively scarce in some of these countries. Under an atmosphere of real regional economic integration, fish imports need not be paid for in hard currency as is the case now.
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APPENDIX A

The determination of the specific dimensions of the IFO was achieved in large part from formal and informal discussions with a number of individuals having a wide range of fishery related experience. They included Hiroaki Yonesaka, a fisheries development expert from the Japanese Agency for International Cooperation and Daven Joseph, a fisheries officer with the Government of Antigua and Barbuda. Another person whose expertise and judgement is reflected in the determinations described above was Conrad Recksiek, Associate Professor, Dept. of Fisheries and Marine Technology, University of Rhode Island. Kenneth Proudfoot, formerly of Rhode Island Marine Services now a consultant was very helpful in the determination of the approximate prices of vessels.
Details for the construction of insulated fishboxes.

Plywood and wood to be primed with an oil based primer. Container painted outside with white water resistant paint.

Wooden framework possibly from champ wood (Medilia champaca)
Figure 10: Insulated container for fresh fish transportation.
Details of rectangular plywood.

Plywood and wooden framework joined with a suitable water resistant glue and aluminium screws.
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