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A PROGRAMME FOR THE DEVELOPMENT OF THE FISHERIES INDUSTRIAL SYSTEM IN THE REPUBLIC OF GUINEA

Working Papers in Industrial Planning
No.2

INDUSTRIAL PLANNING BRANCH
INDUSTRIAL INSTITUTIONS AND SERVICES DIVISION

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WORKING PAPERS IN INDUSTRIAL PLANNING

The papers presented in this series have been produced by the UNIDO secretariat or by outside experts in the course of the technical co-operation activities carried out by the Industrial Planning Branch. The series contains selected papers that are believed to be of interest to a wider audience. They are often of an exploratory and tentative nature, presenting issues for discussion, and do not necessarily reflect the official views of UNIDO.

Preface

As a response to the often less satisfactory results of the traditional project-by-project approach UNIDO has been trying to develop practical methods for a programme approach to project identification, formulation and execution. Much of this work has concentrated on fisheries industrial systems in West Africa.

In 1987 a major study entitled "Industrial development strategies for fisheries systems in developing countries", Sectoral Studies Series No. 32, PPD.30, was issued. In this study a typology of fisheries industrial systems for developing countries and a first approach to indicative programmes for country groups were elaborated. On this basis a detailed country/sector programming exercise for the Republic of Guinea was undertaken. This exercise was done through an application of a special method for assessing and programming integrated production/consumption systems (MEPS). This method originates from the Junta del Acuerdo de Cartagena (JUNAC) and has been further developed by UNIDO and JUNAC in co-operation to serve as a tool for integrated sectoral programming.

In collaboration with the World Bank, UNIDO applied MEPS to the fisheries industrial system in the Republic of Guinea in order to test its suitability to assess the status of an industrial system and to simulate the impact of pipeline projects in the fisheries industrial system.

The work undertaken together with the World Bank laid the basis for the present study. A joint mission with FAO was undertaken to the Republic of Guinea to hold discussions with the authorities in order to formulate government priorities and objectives. The information obtained was used to refine the preliminary assessment, to simulate the impact of the projects to be introduced by the Government and to assess their effect on the system. The level to which government objectives could be met with the planned projects was measured and problem areas that still would remain in the system were identified. On the basis of this analysis a development programme was elaborated and a package of UNIDO/FAO support activities is proposed to complement the government projects. These support activities aim at strengthening the industrial basis of the system and at ensuring that the positive impact of the fisheries projects can be maintained in the future. UNIDO would like to thank the World Bank and FAO for their support in this work.

The work on the present study was undertaken in the Sectoral Studies Branch and later in an informal working group on a programme approach to project identification and formulation. It has been prepared by Ms. B. Riezky as principal research officer.

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1. INTRODUCTION

1.1 Background

The importance of the fisheries sector's contribution to national economic, social and nutritional goals is now widely recognized and the extension of fishery zones to 200 miles has created new opportunities for some countries. Few countries, however, which have acquired large extended economic zones (EEZs) have benefitted immediately. This is due to a number of reasons such as inadequate domestic fleets to utilize the extended economic zones, lack of trained fishermen for deepsea fishing and, particularly important, the difficulties encountered in controlling such large areas.

The Republic of Guinea on the North-West coast of Africa with similar aquatic resources as its neighbouring countries, abundant manpower and large population groups requiring increased food supplies is seeking to make use of the economic benefits that could be derived from its EEZ. There are no medium or large scale industrial operations within the fisheries sector in the Republic of Guinea at present with the exception of the operations by the foreign fleet. No large-scale industrial processing facilities exist and all capital goods have to be imported due to the lack of industrialization.

In order to assist the Government of the Republic of Guinea in their development plans for the fisheries industrial system (FIS), UNIDO in collaboration with the World Bank has undertaken a study on the fisheries sector in the Republic of Guinea.

In this study UNIDO has applied a special method for assessing and programming integrated production/consumption systems. This method was applied in two phases.

In the first phase an assessment of the present system was carried out through desk research and limited field work. Available data from FAO, UNIDO, the World Bank and data obtained from consultancy work in the Republic of Guinea, supplemented by expert assumptions and proxy data from other West African countries were used for a preliminary assessment of the present system. This first phase of the application served to demonstrate the method available to UNIDO and its effectiveness to

- assess the present status of the fishing sector in the Republic of Guinea,
- identify bottlenecks and major constraints in the sector, and
- demonstrate the impact of a number of pipeline projects.

In the second phase a joint UNIDO/FAO mission to the Republic of Guinea held discussions with government authorities in order to define the government objectives more closely and to obtain further data to refine the preliminary assessment made. On the basis of the refined assessment and the bottlenecks identified in the present system it was possible to design a development programme with viable strategies and to assess their impact on the Fisheries Industrial System in the Republic of Guinea.

Chapter 2 of this study shows the present system, chapter 3 makes an assessment of the present system and identifies bottlenecks and constraints. Chapter 4 outlines the planned development projects and shows their impact on

the FIS and identifies further bottlenecks in the system. On the basis of the analysis made in chapter 4, chapter 5 proposes additional development strategies and presents UNIDO/FAO support activities. Annex 1 gives details on a comprehensive development programme and Annex 2 contains detailed concepts of the support projects.

1.2 The method used

In order to be able to identify properly required investments and actions to promote a balanced development of the fisheries sector and of the industrial sector in general, the application of a systems approach is called for. In this way, development of one part of the integrated system without the necessary upstream activities being in place or creating bottlenecks further downstream can be avoided. Furthermore, adequate policies to support sector development can be designed.

The systems approach provides a broad view of the sector. It recognizes the interdependence of economic and social components within and outside the sector and helps to provide the conceptual framework to analyze and evaluate these interrelationships. In the present context a Fisheries Industrial System or FIS has been defined. The concept of the FIS was developed within the framework of a typology study for the fisheries industries in which country clusters of development patterns were identified.[1/]

The FIS can be defined as a system where all the industrial resources and consumption components related to the fisheries activities as well as the institutions and policies that affect them interact in an integrated and interdependent manner, so that any change occurring in one of the components tends to modify the whole in a variety of ways and to a varying extent.

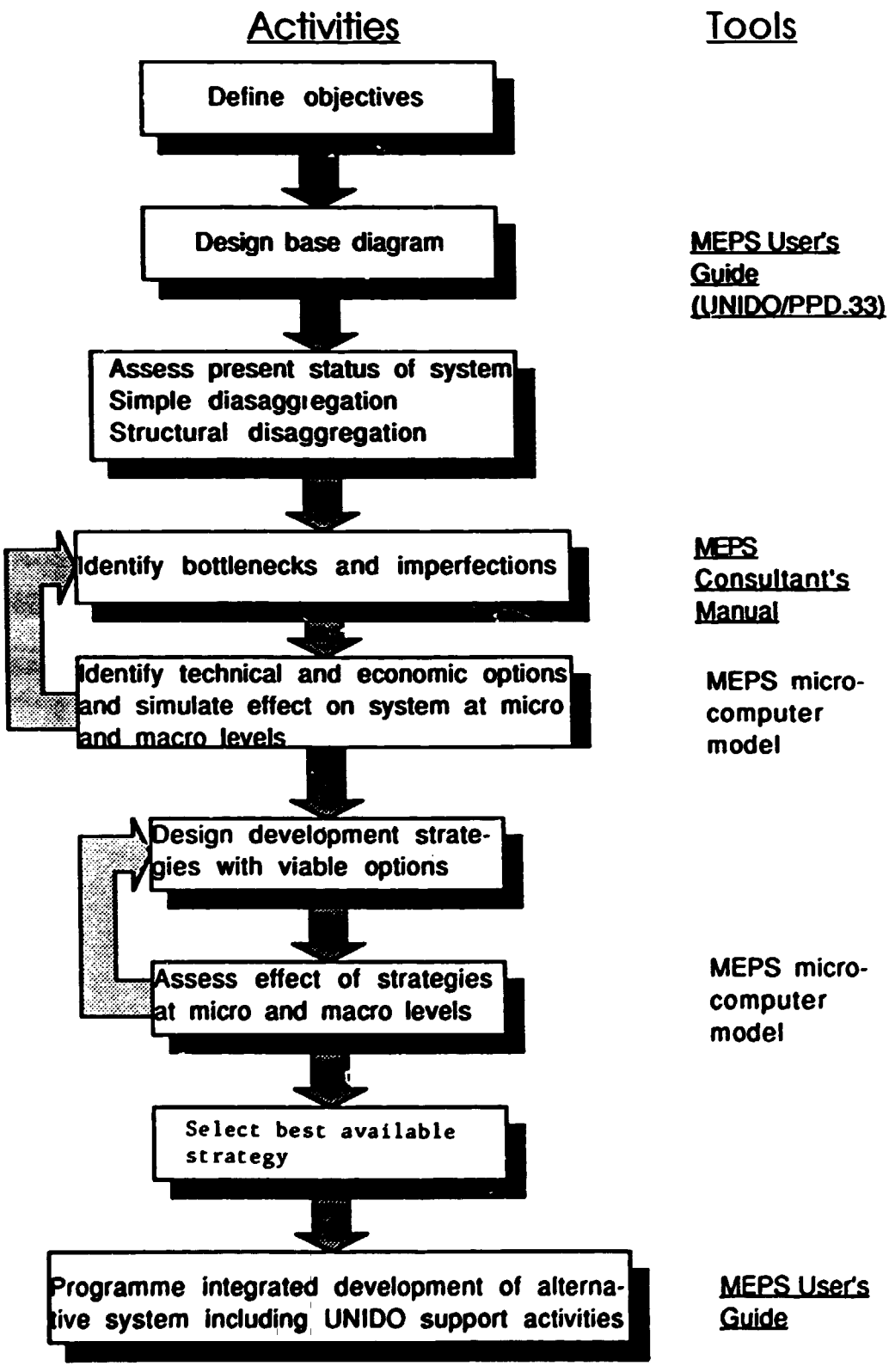
For this reason the method for the evaluation, programming and management of production and consumption systems (MEPS) was chosen.

MEPS was originally developed by the Junta del Acuerdo de Cartagena (JUNAC). JUNAC in co-operation with the United Nations Industrial Development Organization (UNIDO) has further developed this method. MEPS permits the practical assessment and programming of industrial production and consumption systems. It can consider all economic, technological and policy variables that affect a given system, the linkages between its components and the interdependence between micro and macro aspects as well as the relationship between economic policy instruments and the system and its components.

The principal tool of the method is an accounting and engineering simulation model, containing a great number of equations, in which the parameters determining production, inputs, investments, manpower, imports, etc. are estimated for each component and for the system as a whole. Exogenous data are fed into the model. Intermediate results are obtained from analysis at different stages of disaggregation and identification. The engineering/accounting character of the model must be borne in mind in the following. In the present version of the model no dynamic relationships or mechanisms for market clearance or optimization are included. A flow sheet of a MEPS application to an industrial system is shown in figure 1.

1/ "Industrial development strategies for fishery systems in developing countries", Volume 1, Sectoral Studies Series No. 32, PPD.30, 3 April 1987

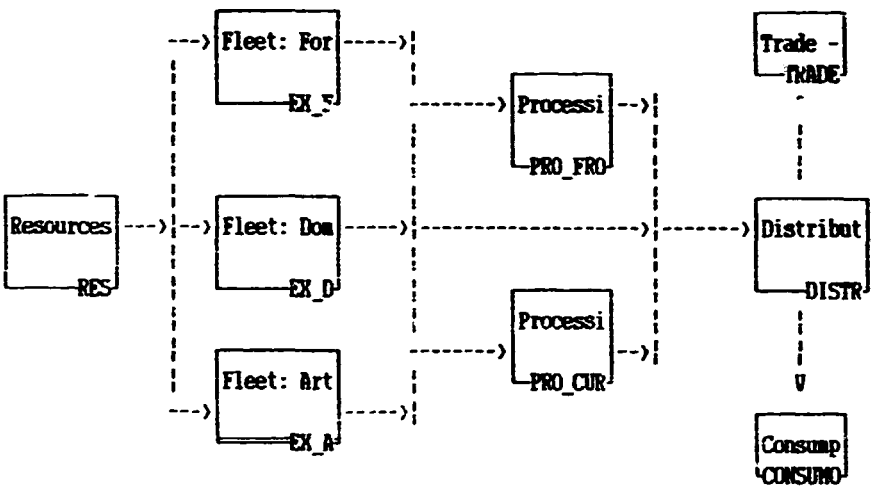
Figure 1. Application of MEPS to an industrial system



A production and consumption system can be defined within MEPS as the set of interrelated productive components within a particular institutional framework, which has as its objective the satisfaction of a particular consumption need.

For the FIS in the Republic of Guinea the flow of the computerized model is shown in figure 2. Each of the boxes represents a FIS component and contains the input data entered in a systemized way, the dat derived from these inputs and the results generated by the system. Since all components are linked within the model, any changes made to any of the components updates all related data within the whole system. This permits simulations of various strategies and the testing of assumptions in a consistent manner.

Figure 2. Flow of the computerized model of the fisheries industrial system in the Republic of Guinea



The above figure only illustrates one dimension, i.e. the flow from resources to distribution and consumption while the computer model includes all linkages and feedbacks for automatic updating of all components whenever a change is made in one component.

There are two overall objectives of MEPS. The first is to evaluate and assess in an efficient and consistent manner a current industrial production/consumption system. The second objective is the facilitation of the decision-making process. The integration of MEPS into the decision-making process of a country's policy-making bodies is a third step in which the transfer of the methodology to a developing country takes place. This latter step requires the establishment of a local multi-sectoral team within the government. The fulfilment of these objectives implies the training of a multi-sectoral team in the selection and systematization of specialized techno-economic information as well as in the use of the MEPS computer numerical model. The transfer of this method to the government of the Republic of Guinea may be envisaged in the future.

2. DESCRIPTION OF THE FIS IN THE REPUBLIC OF GUINEA

The system in 1987

Fishing activities in the Republic of Guinea at present contribute between one and two per cent to the total national GDP (two to four per cent of GDP in the agricultural sector). They account for only 0.35 per cent of employment in the agricultural sector and their current import requirement represents 1.9 per cent of total imports.

In spite of the present relatively low contribution of the fisheries sector to the national economy, its potential contribution to economic development has been recognized by the government, and it has been selected as one of the most dynamic sectors for economic expansion.

The Republic of Guinea has a continental shelf of 56,000 km^2 and a coastline of 300 km with, in common with other West African countries, large resources with a great variety of species, although exact data on the maximum sustainable yields (MSY) are not available. Surveys are at present being undertaken to establish the MSY; for the purpose of this report the estimated yearly catch potentials are used.

Although the Republic of Guinea does not fall into the group of low fish consumers (less than 5 kg per capita), per capita consumption of fish is much lower than in neighbouring West African countries, viz. 7.4 kg in 1987 as compared to the average figures for 1982-1984 for Senegal with 20.3, Côte d'Ivoire with 17.1 and Sierra Leone with 17.9.[2/] Furthermore, the distribution of fish consumption versus population distribution in the Republic of Guinea shows a heavy imbalance with the inland regions having a very low per capita consumption as can be seen from table 1.

Table 1. Per capita consumption and distribution of population and consumption, 1987

Zone	Region	Per capita consumption (kg) Rural	Urban	Average	Percentage share of Consumption Region	Zone	Population Region	Zone
Coastal	Conakry	-	30.80	30.80	53.0	95.1	12.7	28.2
	Coastal Region (except Conkary)	21.19	19.13	20.87	42.1		15.5	
Inland	Fouta Djallon	0.40	0.36	0.39	1.6	4.9	31.6	71.8
	Niger Plain	0.64	0.58	0.63	1.7		20.6	
	Forest Region	0.64	0.58	0.63	1.6		19.6	
Average		4.02	16.57	7.41				

2/ FAO Yearbook of Fisheries Commodities, Volume 61, 1987

Fish consumption only contributes 2.8 grams of animal protein daily to the diet of the people in the Republic of Guinea, however, its importance is demonstrated by the fact that this constitutes 40 per cent of all animal protein consumed.[3/]

A large foreign fleet is active within the EEZ of the Republic of Guinea and a total of 152 licences were issued during 1987, payable in cash or kind. According to recommendations made[4/] the value per licence is $US 150,000 in cash or 300 t of fish landed in the Republic of Guinea, valued at $US 500 per ton.

A domestic industrial fleet as such was in 1987 not operational, a number of industrial boats (Norwegian trawlers) are not being used and only seven semi-industrial boats received from Spain in lieu of licence fees are operating. These boats are operated by private enterprises, they fish partly in the industrial and partly in the artisanal zone. They are not all operating economically partly due to management difficulties and partly due to the unsatisfactory design of the vessels.

The artisanal marine sector comprises over 2,000 boats from simple small pirogues to motorized boats, suitable for net and line-fishing. These boats are either privately owned or owned by groups of fishermen, using primarily natural bays along the coast line of the Republic of Guinea as landing places.

Fresh water catches are made in the major rivers, mainly with small boats of which only a small portion is motorized.

An almost complete lack of infrastructure for landing catches, unavailability of storage facilities and distribution channels to processing sites not only hinders full capacity utilization but also results in handling losses.

Processing of fish is primarily done by smoking and accounts for 80-85 per cent of fresh fish caught. This is done in cottage industries, no industrial plants are operational for either curing by smoking or freezing.

Exact trade data are not available, however, it appears that there is no export of fish and imports were approximately 2,000 tons of canned fish and the landings from the foreign fleet which were 11,741 tons of frozen fish in 1987, a decline from approx. 18,000 t in 1986.

The distribution and marketing sector is underdeveloped lacking the infrastructure for storage, transport and communication systems.

Apart from climatic conditions which do not permit the transportation of fresh fish over any distance, the lack of transportation networks makes it difficult to transport fish, even in processed form, and makes the inland regions mainly dependent on fresh water catches. No aquaculture stations were operational in 1987.

The government of the Republic of Guinea has in the last few years tried to reduce government involvement in the fisheries industrial system and is in favour of promoting the private sector.

3/ Kaczynski, Vlad. "Development strategy of the Guinean Industrial Fisheries Sector", part I, p.20

4/ ibid, page 30

3. ASSESSMENT OF THE PRESENT STATUS OF THE SYSTEM

Base diagram 1 shows the present system in a concise form. As can be seen the total fish catches are high but only a small portion goes into the FIS of the Republic of Guinea, accounting for the low per capita consumption in relation to available resources. Modelling the resource situation, based on FAO data and other available data on boat types and numbers and taking into account the capacities of the foreign fleet, table 2 shows the considerable overexploitation of some demersal and all shrimp resources in the industrial zone as well as an underexploitation of trigger fish. The artisanal zone shows an underexploitation of all species at present.

Table 2. Resource situation - marine stocks, 1987

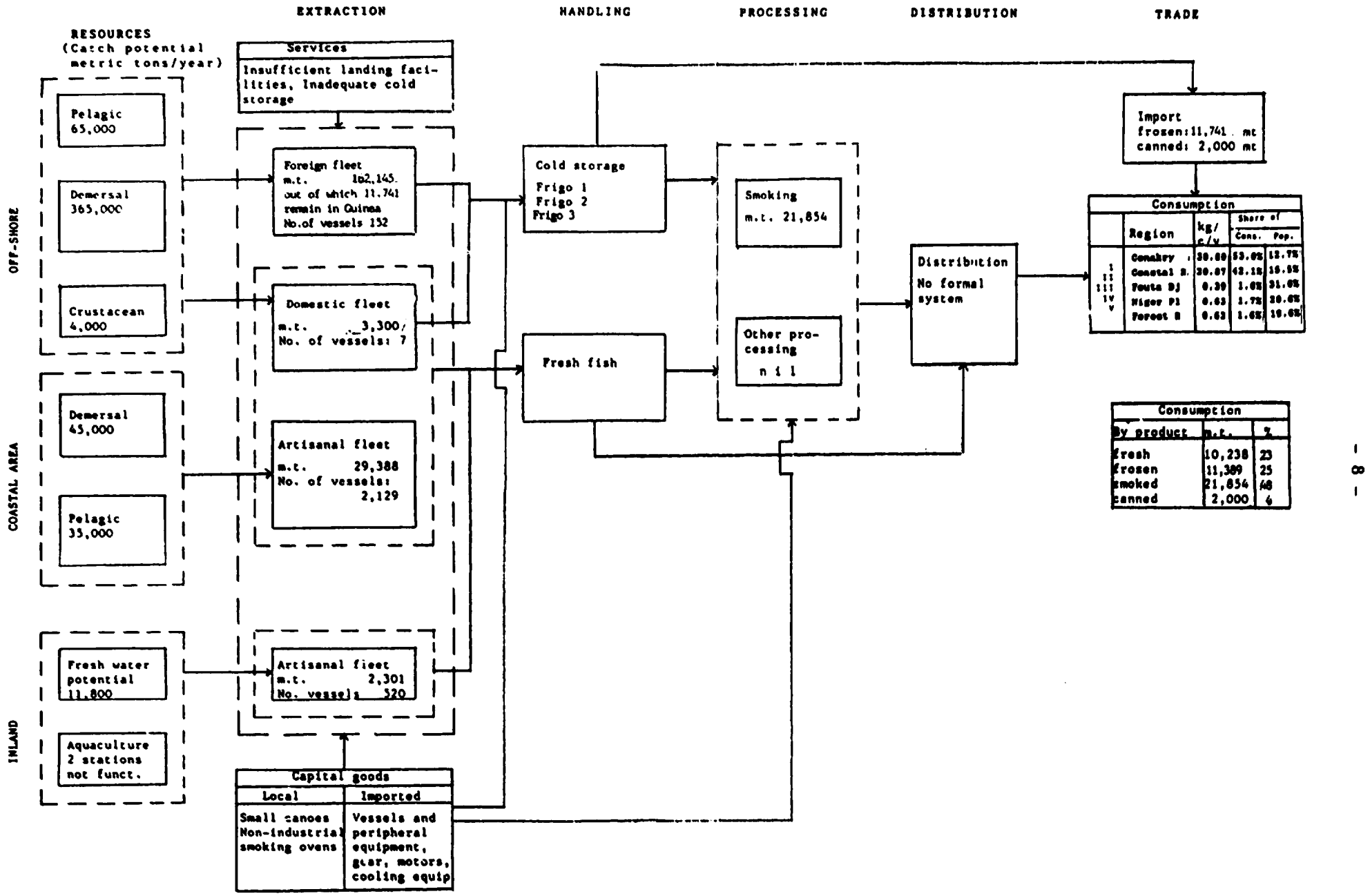
Species	Type	Zone	Estimated catch potential (mt/yr)	Catch Total	Catch Domestic	Catch Foreign	Per cent Exploited
Pelagic	Industrial	15m-400m	65000	32862	2517	30345	51%
Demersal			365000	124089	747	123342	34%
- Trigger fish			300000	8401	0	8401	3%
- other			35000	98640	747	97893	282%
- Cephalopods			30000	17048	0	17048	57%
Penaeid shrimp and other crustaceans			4000	8494	36	8458	212%
Pelagic	Artisanal	0m-15m	35000	13750	13750	0	39%
Demersal and cephal.			45000	15578	15578	0	35%

This overexploitation of certain resources would lead to diminishing resources and consequently lower catches because of the increasing scarcity of the resource. Research so far undertaken has not decisively established that the occurrence of trigger fish in such large quantities has an adverse effect on other species in the area, however, the possibility exists that it may lead to a disturbance of the ecological balance.

With 155 licences issued during 1987, 152 of which to the foreign fleet, the fishing by the foreign fleet, at the suggested rate of $US 150,000 per licenced boat, should generate a total of $US 22.8 million in cash or kind. A special agreement with the EEC for fishing rights for the period 1986/87 to 1988/89 does, however, exist. In 1987 payments by the EEC included a flat rate of approximately $US 3.15 million, additional fees for increased fishing effort in the amount of $US 0.8 million, licence fees in cash of $US 0.8 million, in kind (landings of fish) to the value of $US 0.44 million and research funds and fellowships valued at $US 0.24 million. Payments in foreign exchange by other countries included licence fees of $US 0.35 million and fish landings valued at $US 1.9 million. The total receipts by the Government of the Republic of Guinea in 1987 were, therefore $US 7.7 million. Thus, the Government of Guinea receives only about 33 per cent of the full economic return expected from the foreign fleet operations.

The present catch operations by the foreign fleet thus have a twofold impact on the FIS in the Republic of Guinea, on the one hand overexploitation of some resources occurs and at the same time inadequate compensation to the government is made for the amount of fish caught.

Base Diagram The Fisheries Industrial System in the Republic of Guinea, PRESENT SYSTEM, 1987



The semi-industrial fleet with boats of 14m length only contributes 7.5 per cent to total fish landings in the Republic of Guinea and takes 1.2 per cent of resources in the industrial zone, other than trigger fish, and 2 per cent of resources in the artisanal zone.

The artisanal fleet is the biggest contributor to fish landings, approximately 66 per cent of total landings, however, it has an inadequate supply of spare parts, new equipment and lacks repair and maintenance facilities in order to reach its full potential. Furthermore, due to a lack of additional boats, the present catches only reach 36 per cent of the estimated catch potential in the artisanal zone.

Fresh water fishing is presently only reaching approximately 20 per cent of its potential, mainly due to lack of fishing equipment and boats and insufficient training of fishermen in more effective fishing techniques. The aquaculture potential is not exploited at all at present, the only existing aquaculture station not being operational.

Efficient handling is hindered by inadequate cold storage facilities. Two cold stores built earlier are no longer operational, due to inadequate maintenance, a third cold store, built in 1987, is working satisfactorily. Services, such as port facilities with wharves, repair centres and supply stores are lacking, not only for the industrial fleet but also for the artisanal sector.

The processing done, i.e. traditional smoking, is situated close to the landing sites, relying on locally available, non-industrial equipment. The equipment used ranges from adapted oil drums as ovens and metal netting as grills to more recently introduced Chorkor-type ovens, however, the bulk of processing is done in traditional smoking centres with clay ovens. The traditional smoking process takes much longer than with the use of Chorkor-type ovens, the quality of the product varies and hygiene conditions are poor. Moreover it is highly fuel-intensive and with wood the major fuel used, may present the problem of deforestation in the long run.

With regard to capital goods, all vessels, apart from some locally built pirogues, and all fishing gear, equipment, machinery, motors and spare parts have to be imported.

The external trade component, although reliable data are not available, appears to consist solely of imports of frozen fish from the foreign fleet landings and some canned fish. The foreign fleet landings are made in lieu of licence fee payments and are as such treated as an import since the government of the Republic of Guinea foregoes foreign exchange earnings from licence fees.[5/]

Smoked fish has the highest share in consumption by product type, partly because of food habits but also because of the low level of technology needed in this process to convert fresh fish into a more durable product close to the landing sites.

5/ op. cit., page 60

If no changes are made to the system, per capita consumption will drop to approximately 6.62 kg per year after 5 years because of the population increase, calculated at an average yearly growth rate of 2.3 per cent, as can be seen from table 3.

Table 3. Comparison of per capita consumption present system vs projected system

Region	Present system 1987 per capita consumption (kg) rural	urban	average	Projected system 1992 per capita consumption (kg) rural	urban	average
Conakry	-	30.80	30.80	-	23.01	23.01
Coastal Region	21.19	19.13	20.87	19.47	17.58	19.18
Fouta Djallon	0.40	0.36	0.39	0.36	0.33	0.36
Niger Plain	0.64	0.58	0.63	0.59	0.53	0.58
Forest Region	0.64	0.58	0.63	0.59	0.53	0.58
Average	4.02	16.57	7.41	3.70	13.74	6.62

The economy of the Republic of Guinea is still suffering from the economic policies of the first republic which among other things played down the role of private enterprises and gave excessive importance to state control of the economy. During this period the basic institutional structures were neglected and foreign dominance of the fisheries sector including exploitation of the offshore resources was allowed to develop. In the absence of adequate control and surveillance this has led to serious overexploitation of the more valuable commercial species.

The new government, however, has seen growing Guinean interest in the fisheries although lack of management capabilities and problems of obtaining foreign exchange by private entrepreneurs continue to be serious obstacles to an expansion of the sector. As economic activity expands a growing number of people who have had no or little previous contact with the banking systems are likely to need to purchase equipment overseas, however, the present methods of obtaining foreign exchange are very complicated. The government is attempting to simplify the system but until this is done, delays in obtaining foreign exchange are likely to be long. The present system may in fact be an unofficial rationing device and it remains to be seen if a simplified system will lead to a shortage and the need for more formal allocation arrangements.

Although the government with the aid of various foreign lending institutions and donors has embarked on a major programme of re-development it has inherited a situation with the following characteristics and bottlenecks:

Characteristics	Bottlenecks
Only a small portion (44,000 t or 23%) of fish caught in the EEZ of the Republic of Guinea stays in the country.	Absence of an industrial fleet; insufficient capacity of the semi-industrial fleet; moreover, support facilities such as cold stores and ice plants are lacking.
The artisanal fleet reaches only 36% (29,000 t) of the catch potential in the artisanal zone.	An almost total absence of support services, such as landing sites, equipment, repair centres, etc.
The fresh water fishing only reaches about 20% of its potential.	Insufficient boats, lack of equipment, repair services, spare part supply, etc.
There is no aquaculture at present.	The necessary know-how and technical support is lacking.
No industrial processing facilities exist.	The only processing done is smoking in cottage industries.
No local supply of fishing equipment, gear and parts.	No manufacturing capabilities exist or have been identified locally for this type of equipment, with the exception of a planned net and rope manufacturing plant.[6]
Overexploitation of some resources occurs.	Insufficient knowledge of resource potential;[7] lack of control of licences issued as well as inadequate selection of boat types to be licenced.
The Government is not receiving the full economic return for licences issued to the foreign fleet.	No mechanisms for enforcement of payment of licence fees.
Trigger fish is underexploited.	There is at present no market for this type of fish.
Consumption is concentrated mainly in Conakry and the coastal region.	General lack of infrastructure, transport, communications and marketing facilities.

6/ A project has been prepared with the help of the FAO Investment Centre.

7/ To partly eliminate this bottleneck a research cruise to determine, in a preliminary and static way, the MSY for demersal fish and shrimp resources in the industrial fishing zone will be undertaken in April/May 1989.

However, conditions for attaining the development potential are generally favourable, since

- a large internal market potential exists,
- the necessary fish resources for capture fishing (fluvial and marine) to supply this market are available, as well as suitable soils and waters for fish culture in the inland regions,
- there is a potential for export, since high-value species are at present being fished by the foreign fleet and marketed on the world market.

The following objectives of the Government with respect to the FIS development have been identified. They are to:

- increase per capita consumption to 15 kg by 1995;
- attain sea-food self-sufficiency;
- improve distribution of fish consumption;
- increase employment in the system;
- increase value added in the system;
- decrease foreign exchange requirements of the system;
- establish a proper marine resource management system, including surveillance and data collection capabilities;
- attract foreign technology, know-how and capital as key development factors of the national industrial fisheries sector;
- create a proper economic environment for the development of national harvesting/processing capacities.

4. PLANNED DEVELOPMENT OF THE SECTOR

4.1 Description of planned projects

The Government of the Republic of Guinea has elaborated a comprehensive development plan for the fisheries sector, comprising a number of projects for the development of the different components of the fisheries industrial system. A summary of these projects, giving the external financing requirements and the status of financing secured by September 1987, is given below:

Summary of pipeline projects
External financing $US
Status - September 1987

Project	Total cost in foreign exchange	Amount obtained	Amount negotiated	Amount sought
1. Laboratory and research station	1,664,000	1,664,000		
2. Monitoring, control and surveillance	6,515,000			6,515,000
3. Distribution and marketing organization	6,310,000		6,310,000	
4. Private national fleet	27,475,000	27,475,000		
5. Industrial fishing port	9,280,000			9,280,000
6. Development of artisanal fisheries	38,757,500	37,547,500		1,210,000
7. Institutional support	7,723,660			7,723,660
Total	97,725,160	66,686,500	6,310,000	24,728,660

Source: Le développement du secteur pêche en Guinée, Politique de développement, stratégie, plan d'action, projets, Ministère du développement rural, Sécretariat d'état à la pêche, September 1987.

The most salient points of the planned projects are summarized below:

Project 1 - Research station

Establishment of a research station at Boussoura, equipped with a research vessel and laboratory on land, for gathering detailed information on existing resources, their movements and exploitation rates.

Project 2 - Monitoring, control and surveillance

Introduction of surveillance vessels and plane training and organizing action programme for observers on board and fisheries inspectors, in order to monitor catches by the foreign fleet, its composition and to exercise the necessary control that foreign vessels are duly licensed and do not contravene licensing agreements, as well as to produce basic statistical data for monitoring the status of resources and its exploitation. These will be used as a basis for the elaboration of resource management practices.

Project 3 - Distribution and marketing

Selection and implementation of efficient marketing and distribtution with storage facilities, cold stores, freezer trucks and maintenance and repair facilities.

Project 4 - Establishment of a Guinean national fishing fleet

Purchase of 3 freezer trawlers of 38.5m lengths of which the first one arrived in Conakry in December 1988 and 20 ice-trawlers of 14m, the latter for sale on hire-purchase to private operators. Conservation facilities on land are included in this project.

Project 5 - Industrial fishing port in Conakry or another location

Building of a fishing port with landing facilities for industrial vessels and slipways for smaller vessels.

Project 6 - Integrated development of artisanal fishing

Building and/or provision of:

136 new pirogues,
600 outboard motors for existing pirogues,
20 new seiners,
1 shipyard and 4 repair centres, as well as
landing sites for the artisanal fleet,
establishment of centres for fish smoking, and
other infrastructural components necessary for an increased catch
will be established in 4 artisanal fishing ports, of which 3 will be
located in Conakry.
establishment of 4 artisanal fishing bases along the coast,
rehabilitation of an existing aquaculture station,
3 cold stores for the markets in Conakry,

Project 7 - Institutional support to the fisheries sector

High-level training of local personnel for the surveillance project, industrial and artisanal fishing and fisheries administration.

4.2 Status of financing for planned projects

By September 1987 external financing had been secured for projects 1 and 4 and 6.

According to information received in April 1988 from the Ministry of Fisheries and from the World Bank in the Republic of Guinea, financing has now also been secured for projects 2, 5 and 7. It must be pointed out, however, that financing will not cover all three projects in their planned form but may cover the main aspects of these projects if they are reformulated and revised. A decision on such a reformulation rests with the Government. The implementation of these projects is of considerable importance, since for any development of national fishing capacities it will be necessary not only to keep statistics on catches but also to implement a programme of monitoring control and surveillance if the resource is to continue to provide a basis for economically viable fisheries and the government is to derive an economic return from the resources of its EEZ, either through licensing of foreign vessels or the development of the local fleet. Even if the resources are still sufficient at present to provide profitable fishing for foreign vessels, the low returns per unit of effort with declining resources provide an unfavourable economic environment for the launching of new local enterprises. It is, therefore, essential that the total catch be selectively reduced and this implies the introduction of an effective scheme of monitoring control and surveillance that will not only enforce the regulation but also provide the data on which the effects of such a scheme can be assessed.

The creation of a national domestic fleet with industrial and semi-industrial vessels requires adequate port facilities to support the operations of these vessels.

The conceptual framework for the fisheries sector development as planned by the Government of the Republic of Guinea is shown in figure 4.

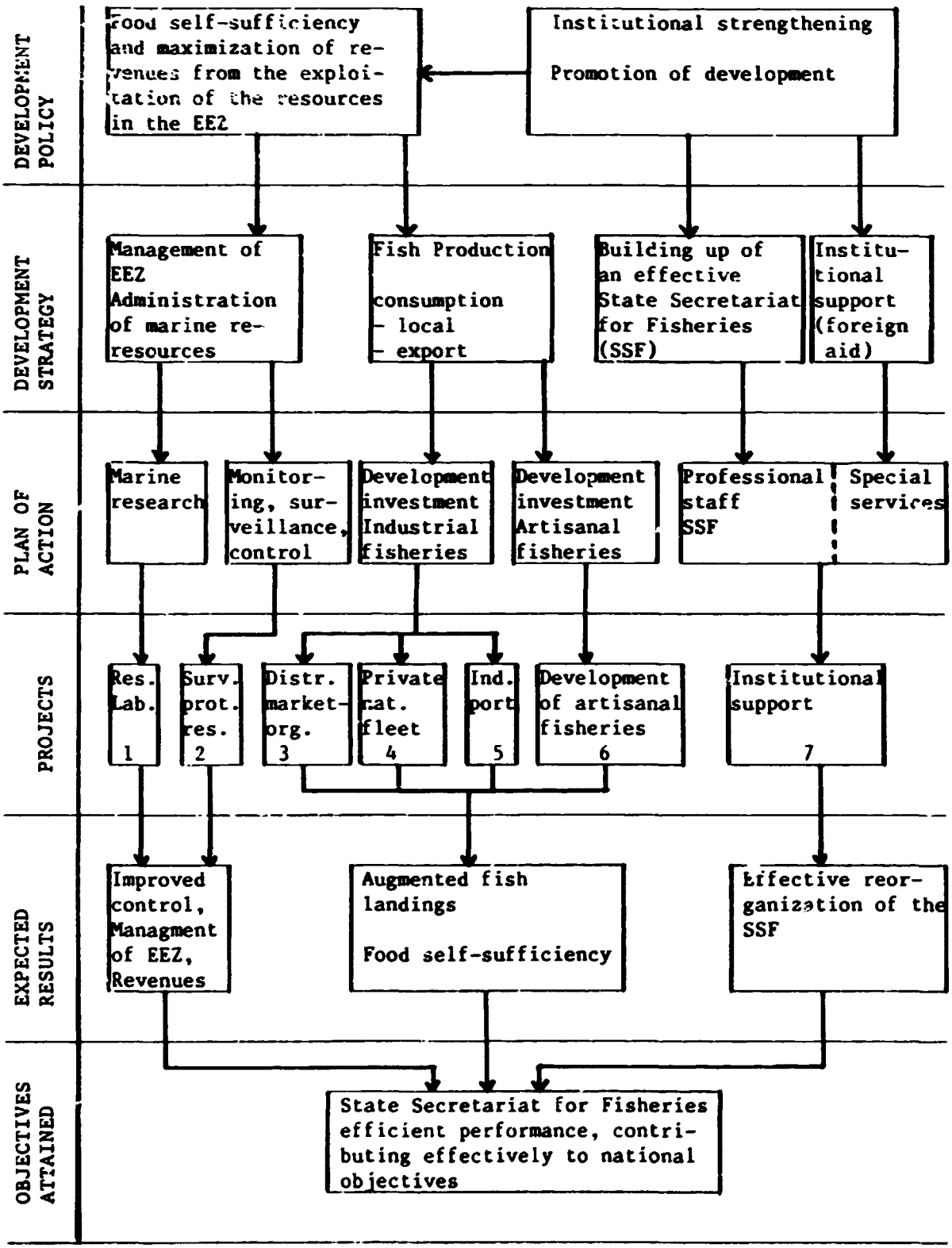
The present study has attempted an analysis of the impact that those projects planned by the Government of the Republic of Guinea will have on the fisheries industrial system. This has been done through computer simulations in order to show the impact in quantitative terms.

4.3 Impact of planned projects

Project 1, the research laboratory, constitutes a necessary support function for the resource management system envisaged in project 2 and as such its priority is high, however, its impact on the system is at present impossible to quantify. The situation for project 5, the industrial fishing port, is similar. Without port facilities an extension of the national industrial fleet would be impossible but the information available to UNIDO at present is insufficient to quantify its benefits for the system.

For this reason, the impact on the system of projects 2 (surveillance), 4 (creation of industrial fleet) and 6 (strengthening of artisanal fleet) only have been measured. Since the surveillance project's main impact will be on resources in the industrial zone, it has been simulated separately to show to what extent overexploitation can be controlled. A reduction in foreign licences to 80 has been simulated and the resource situation after implementation of the surveillance project to control this reduction, leaving the rest of the system unchanged, is shown in table 4.

Figure 4. Schematic illustration of the development of the fisheries sector in Guinea



Source: Le développement du secteur pêche en Guinée, Politique de développement, stratégie, plan d'action, projets, Ministère du développement rural, Sécretariat d'état à la pêche, Septembre 1987.

Table 4. Resource situation 1987 as compared to controlled licencing

			1987				after implementation of surveillance project only			
Species	Type	Estimated catch potential (mt/yr)	Catch Total	Domestic	Foreign	Per cent Exploited	Catch Total	Domestic	Foreign	Per cent Exploited
Pelagic	Industrial	65000	32962	2517	30345	51%	49425	2517	46906	76%
Demersal		365000	124089	747	123342	34%	44813	747	44066	12%
- Trigger fish		300000	8401	0	8401	3%	2935	0	2935	1%
- other		35000	93640	747	97893	282%	32122	747	31375	92%
- Cephalopods		30000	17048	0	17048	57%	9757	0	9757	33%
Penaeid shrimp and other crustaceans		4000	8494	36	8458	212%	3922	36	3886	98%
Pelagic	Artisanal	35000	13750	13750	0	39%	13750	13750	0	39%
Demersal and cephal.		45000	15578	15578	0	35%	15578	15578	0	35%

The controlled resource situation as shown above is a basis for the following calculations of the impact of additional fishing capacities to be introduced with projects 4 and 6.

For the simulation of these projects the following assumptions were made:

(a) The surveillance project will limit the foreign fleet operations to 80 vessels and generate $US 12 million in licence fees, i.e. $US 150,000 per vessel.

(b) Foreign exchange earnings from observer salaries in the amount of $US 114,000 will be kept constant.

(c) Landings by the foreign fleet of 11,700 t and imports of 2,000 t of canned fish remain constant.

(d) A population growth rate of 2.3 per cent.

(e) All projects will be implemented and fully operational by 1992.

The addition of three freezer-trawlers and 20 ice-trawlers in the domestic fleet will increase the total domestic catch in the industrial fishing zone to 18,600 t, with 60 per cent of the freezer-trawler catch destined for export. The addition of 136 new pirogues and 20 seiners in the artisanal fleet will increase the catches in the artisanal fishing zone to 61,000 t. The figures given are those envisaged by the projects. The resource situation after introduction of the planned projects is shown in table 5.

Table 5. Resource situation after introduction of planned projects

Species	Type	Estimated catch potential (mt/yr)	1987 Catch Total	1987 Catch Domestic	1987 Catch Foreign	1987 Per cent Exploited	1992 Catch Total	1992 Catch Domestic	1992 Catch Foreign	1992 Per cent Exploited
Pelagic	Industrial	65000	49425	2517	30345	51%	53013	6105	46908	82%
Demersal		365000	44813	747	123342	34%	56065	11998	44066	15%
- Trigger fish		300000	2935	0	8401	3%	2935	0	2935	1%
- other		35000	32122	747	97893	282%	43373	11998	31375	124%
- Cephalopods		30000	9757	0	17048	57%	9757	0	9757	33%
Penaeid shrimp and other crustaceans		4000	3922	36	8458	212%	4442	557	3886	111%
Pelagic	Artisanal	35000	13750	13750	0	39%	32653	32653	0	93%
Demersal and cephal.		45000	15578	15578	0	35%	29127	29127	0	65%

The above table shows that the resource situation in the industrial zone, with an allocation to the foreign fleet of 80 vessels and the introduction of new boats in the domestic national fleet, as planned, leads once again to overexploitation of shrimps and demersal species, although the rates of overexploitation would be smaller than in the present system.

Per capita consumption after the introduction of the new vessels, taking into account a population growth rate of 2.3 per cent over the 5-year period it will take for the projects to become fully operational, will be as shown in table 6.

Table 6. Per capita consumption 1987 and after introduction of projects

REGION	1987 Per Capita Consumption Rural	1987 Urban	1987 Average	REGION	1992 Per Capita Consumption Rural	1992 Urban	1992 Average
Conakry	0.00	30.80	30.80	Conakry	0.00	50.64	50.64
Coastal Region	21.19	19.13	20.87	Coastal Region	26.88	24.26	26.46
Fouta Djallon	0.40	0.36	0.39	Fouta Djallon	3.00	2.71	2.95
Niger Plain	0.64	0.58	0.63	Niger Plain	2.41	2.18	2.36
Forest Region	0.64	0.58	0.63	Forest Region	2.11	1.91	2.09
Average	4.02	16.57	7.41	Average	6.59	29.59	13.29

Table 6 takes into account that in the absence of expanded marketing facilities, distribution by private operators will increase. Therefore, although the landings of the domestic industrial fleet and a considerable portion of the artisanal fleet landings will be concentrated in Conakry, this distribution will lead also to an increase in per capita consumption in the inland regions, provided the private distribution expands as expected.

Table 7 shows the distribution of consumption and population in 1992 as compared to 1987.

Table 7. Distribution of population and consumption, 1987 and after introduction of projects

1987			1992		
REGION	SHARE OF		REGION	SHARE OF	
	Cons.	Pop.		Consumpt.	Population
Conakry	53.0%	12.7%	Conakry	58.1%	15.2%
Coastal Region	42.1%	15.5%	Coastal Region	28.9%	15.0%
Fouta Djallon	1.6%	31.6%	Fouta Djallon	6.6%	30.6%
Niger Plain	1.7%	20.6%	Niger Plain	3.5%	20.0%
Forest Region	1.6%	19.6%	Forest Region	2.9%	19.1%
Total	100.0%	100.0%	Total	100.0%	100.0%

Although there are not sufficient data for a numerical estimation of the likely path of development between the present and ultimate situation, it can be said that the increase of catch capacities in the artisanal and domestic fleets will lead to a gradual increase in per capita consumption, since the artisanal boats will be introduced gradually and the industrial vessels, which will be introduced over 2 to 3 years, will require training of crews before they can reach their full catch potential.

With the considerable increase in fish landings, smoking facilities must be expanded and table 8 shows the additional fish available (in fresh fish equivalent) by location, which would require additional smoking capacities.

Table 8. Quantities of fish available for smoking

Region	Tonnage available for smoking 1987	Tonnage available for smoking 1992	Additional tonnage for smoking
Conakry	7,189	33,892	26,703
Coastal region	10,854	16,869	6,015

The above figures are based on the assumption that processing takes mainly place close to the landing sites, since distribution facilities are inadequate to transport fresh or frozen fish over any distance. It has, however, been taken into account that some frozen fish is transported inland by private operators and that any immediately unsold quantities are then smoked inland. The installation of additional smoking centres are included in project 6 and it is assumed that these will be mainly of the improved artisanal type, i.e. equipped with Chorkor-type ovens, which have a much higher capacity, give a better quality product and are less fuel-intensive than the traditional ovens.

The implementation of the planned projects addresses most of the bottlenecks identified in the present system and the level to which the government objectives can be attained have been quantified as shown in table 9 which gives a comparison of the system in 1987 with that in 1992 after the projects have become operational.

Table 9. Comparison of some system variables between 1987 and after the planned projects

	System 1987		System 1992 after implementation of projects	
Per capita consumption	7.41		13.29	
Distribution in per cent of	rural	urban	rural	urban
population	73	27	71	29
consumption	44	56	36	64
Level of sea-food self-sufficiency	74% of 1987 level 33% of desired level for 1995		86% of 1992 level 74% of desired level for 1995	
Employment (person-years)	8,560		12,864	
Value added ($US million)	6.3		12.5	
Foreign exchange requirements ($US million)				
Investment	-		82.5 over the period 1987 to 1992	
Import of fish	7.8		7.8	
Import of inputs	2.8		8.4	
Foreign exchange earnings ($US million)				
Licence fees	7.7		12.0	
Observer salaries	0.114		0.114	
Exports	-		3.9	

Table 9 shows that the planned projects, Nos. 1, 2, 4, 5 and 6, will achieve considerable improvements in the fisheries industrial system and that they succeed to some degree in achieving the goals set by the Government. The simulation exercise does, however, also show that these objectives cannot in all instances be met. The desired per capita consumption cannot be reached, although considerable improvements would occur. Seafood self-sufficiency would increase markedly but could still be improved. The increase in employment and value added are very satisfactory.

The foreign exchange requirements for the planned investments are, however, considerable. The increase in fishing capacity will require a higher import of inputs which will practically triple the foreign exchange expenditure for this item alone. While the export of fish from the expansion of the national fleet with freezer trawlers can partly offset this increased import, the additional investments result in interest charges and repayments, details of which are given below.

Project 1 is donor financed, no interest or repayments are required.

The investment for project 2 is estimated at $US 4 million, with an assumed interest rate of 6 per cent and repayment to be made within 10 years. For this project the foreign exchange requirements in 1992 would be $US 0.52 million, plus operating costs.

Project 4 is partly donor financed and partly financed from the fishing agreement between the Government of the Republic of Guinea and the EEC in which payment of ECU 800,000 for a period of three years is made in compensation for fishing rights, however, for FF 80.1 million, equivalent to approximately $US 13 million, an interest rate of 4.5 per cent applies and repayment will be effected within 10 years starting in 1990. A further loan of approximately $US 2.2 million has an interest rate of 2 per cent with repayments over 40 years starting in year 11. Foreign exchange requirements for project 4 will thus be $US1.812 million in 1992.

Project 5 is assumed at an interest rate of 5 per cent and repayment over 20 years, thus it would in 1992 require approximately $US 0.95 million in foreign exchange.

For project 6 commission and interest payments, once the loans have been fully disbursed, amount to $US 1.85 million per year. This figure does not include repayments of the loan due to start only in year 6, in which yearly repayments of $US 680,000 must be made. From year 11 to year 20 an additional amount of $US 155,000 becomes payable yearly, i.e. a total of $US 835,000 per year. This amount would reduce to $US 465,000 per year from year 21 to year 50, since repayment of one of the loans would have been made by year 20.

The effect of the foreign exchange requirement for projects 2, 4, 5 and 6 alone on the balance of trade and balance of current account in 1992 is shown in table 9a.

Table 9a. Comparison of balance of trade and balance of current account between 1987 and after implementation of the planned projects

	System 1987	System 1992 after implementation of projects
Foreign exchange account		
Trade:		
Imports		
of fish	7.8	7.8
of inputs	2.8	8.4
Exports		
of fish	-	3.9
Balance of trade	-10.6	-12.3
Transfers:		
Receipts		
Licence fees	7.7	12.0
Observer salaries	0.114	0.114
Expenditure		
(for projects 1,2,4,5 and 6)		
Interest and repayments	-	5.13
Operating costs (project 2)	-	0.95
Balance on current account	-2.786	-6.266

The increases in employment (50%) and value added (98%) are considerable, however, no benchmarks have been set by the government against which the level of attainment can be measured.

The relative contributions made to value added and employment by the different components of the fisheries system are shown in table 10.

Table 10. Contribution to value added and employment, 1987 and after introduction of projects

	Value added		Employment	
	1987	1992	1987	1992
	per cent		per cent	
Extraction				
domestic fleet	3.1	23.2	1.3	3.6
artisanal fleet (marine)	63.1	56.1	63.2	71.4
artisanal fleet (fresh water)	8.7	5.1	12.2	8.1
Processing				
traditional	19.3	10.3	18.6	13.1
improved artisanal	0.3	2.5	0.1	1.4
Trade and services	5.5	2.8	4.6	2.4
Total	100	100	100	100

Productivity indicators for the extraction and processing components are shown in table 11.

Table 11. Productivity indicators for the extraction and processing components ($US per work year)

Component	value added / work year
Extraction	
Domestic fleet:	
seiners	2,300
ice-trawlers	1,493
freezer-trawlers	34,065
Artisanal fleet (marine):	
pirogue with motor, type 1, with rotating seine	591
pirogue with motor, type 2, with lines	701
pirogue with motor, type 3, with mesh nets	996

Table 11. Productivity indicators for the extraction and processing components ($US per work year) (cont'd)

Component	value added work year
Extraction	
Artisanal fleet (marine):	
pirogue without motor, type 1, with lines	624
pirogue without motor, type 2, with mesh nets	920
pirogue without motor, type 3, other	690
Artisanal fleet (fresh water):	
canoe, type 1, with mesh nets	642
canoe, type 2, other	485
Processing	
traditional	767
improved artisanal	1,737

The semi-industrial and improved artisanal operations in extraction and processing show a higher productivity than traditional smoking and artisanal fishing and it is particularly high for the industrial fishing by freezer-trawlers.

The difference in productivity between motorized and non-motorized boats is not significant. This is due to the fact that, although the value added per boat is higher for motorized boats, the hauling of the catch because of the boat design is manually done requiring large crews.

4.3.1 Level of attainment of Government objectives

The simulation exercise undertaken shows to what extent the government objectives can be met.

- There are insufficient landings of fish to reach the consumption goal of 15 kg per capita in 1995. Fish landings in the Republic of Guinea will have to be further increased by approximately 30,000 t for this goal to be fully reached.

- Sea-food self-sufficiency, although markedly improved, cannot be reached by the planned projects.

- The imbalance between population and consumption distribution of fish remains after the introduction of the projects.

- Employment increases from 8,560 to 12,864 work-years

- Value added in the system increases from $US 6.3 million to $US 12.5 million.

- The external financing component for the investment in the planned projects is considerable.

- The resource situation in the industrial fishing zone will require a reallocation of licences which could result in lower earnings from licence fees.

- The goals relating to the foreign technology, know-how and capital as well as towards creating an economic environment for the development of national capacities are difficult to quantify, but the planned joint venture undertaking with respect to freezer-trawlers and the plan to privatize the ice-trawler operations constitute a step towards fulfilment of these goals.

4.3.2 Remaining problem areas identified

Problem areas that remain after the implementation of the projects are:

(a) Lack of adequate capacity and capability in statistical data collection and analysis as well as insufficient capacity for project planning, monitoring and co-ordination based on a systemic approach to the sector and programme approach to projects.

(b) Overexploitation of industrial resources;[8/]

(c) Underexploitation of trigger fish;

(d) Non-optimal use of resources in the artisanal zone;

(e) Underexploitation of fresh water fish;

(f) High requirement of foreign exchange;

(g) Insufficient knowledge about the development of the market when considerable additional quantities of fish become available after implementation of the projects; and lack of knowledge about the effect on prices of increased supply;

(h) Insufficient knowledge about support service requirements for increased landings in the industrial and artisanal fleet.

To eliminate remaining problem areas and to increase the level of attainment of objectives, with emphasis on increasing the per capita consumption of fish and attaining sea-food self-sufficiency, additional development of the FIS would be required.

8/ A first, preliminary and static, determination of the MSY of demersal and shrimp resources will be undertaken in April/May 1989, funded by CIDA (Canadian International Development Agency).

5. DEVELOPMENT STRATEGIES

For the outline of development strategies 1995 has been chosen as a reference year, since the per capita consumption goal of 15 kg, as formulated by the government, should be reached in that year.

If per capita consumption is kept at the level attainable with the implementation of the projects that were described in chapter 4, then in 1995, because of an increase in population, the per capita consumption would fall to 12.41 kg and would diminish every year from then on.

In order to reach the goal of a per capita consumption of 15 kg in 1995 and to attain the highest possible level of sea-food self-sufficiency, local extraction would have to be increased by approximately 30,000 t by 1995. This can be achieved in more than one way.

5.1 Outline of development strategies

Strategy 1

A substantial increase in per capita consumption could be achieved by doubling the number of boats in the national industrial fleet. This would increase per capita consumption to 15.51 kg as can be seen from table 12.

Table 12. Per capita consumption 1995 after increased landings of national fleet

REGION	Per Capita Consumption		
	Rural	Urban	Average
Conakry	0.00	57.77	57.77
Coastal Region	28.40	25.64	27.97
Fouta Djallon	4.27	3.86	4.20
Niger Plain	4.02	3.63	3.94
Forest Region	3.44	3.11	3.40
Average	7.93	33.97	15.51

Since landings by the domestic fleet can only be made in Conakry, it would require considerable distribution facilities in order to give a better balance of the spatial distribution of fish consumption than shown above. This poses something of a dilemma. In the countries to the south of the Republic of Guinea very considerable quantities of fish have been distributed in the interior of the country by private operators transporting frozen blocks of fish up-country selling as much as possible as "fresh" fish but smoking any immediately unsold quantities. It may be that a similar system will develop in the Republic of Guinea and it should receive encouragement as a cheap and efficient means of distribution. Landings by the domestic fleet will, however, occur intermittently in relatively large quantities, making such an informal distribution system more difficult.

In the event that such a distribution system will not develop, the government will be obliged to establish some form of parastatal marketing organization with cold stores in the interior of the country. Experience in this direction in other parts of West Africa, however, has not been very encouraging.

The resource situation based on a foreign fleet allocation of 80 boats and with the expanded domestic fleet can be seen from table 13.

Table 13 Resource situation 1995, after doubling of landings of national fleet

Species	Type	Zone	Estimated catch potential (mt/yr)	Catch Total	Catch Domestic	Catch Foreign	Per cent Exploited
Pelagic	Industrial	15m-400m	65000	59118	12210	46908	91%
Demersal			365000	68063	23996	44066	19%
- Trigger fish			300000	2935	0	2935	1%
- other			35000	55371	23996	31375	158%
- Cephalopods			30000	9757	0	9757	33%
Penaeid shrimp and other crustaceans			4000	4999	1114	3886	125%
Pelagic	Artisanal	0m-15m	35000	32653	32653	0	93%
Demersal and cephal.			45000	29127	29127	0	65%

The above table shows a considerable overexploitation of demersal, other than trigger fish, and shrimp resources and would require a further limitation of the foreign fleet, thus reducing foreign exchange earnings from licence fees. Furthermore, the considerable expansion of the national fishing capacities will require substantial amounts of foreign exchange for imports of fuel, engines and gear.

Employment within the sector would increase with this strategy by 467 work years and value-added by $US 2.9 million.

Strategy 1, while reaching the consumption goal does not address satsifactorily any of the remaining problem areas identified.

It may be preferable, therefore, to encourage the expansion of the artisanal fleet first and foremost. This policy has several advantages over the first alternative in that it will increase local employment not only within the fleet but also for boat building. Because of the wider spatial distribution of landings it may also contribute to the government's aim of a more equal distribution of fish consumption. Wider distribution of landings, i.e. smaller quantities in more places will make an informal distribution system more likely as well as offering better opportunities of using traditional and semi-industrial methods of preservation by smoking. This would reduce the need for cold stores and imported technology with its consequent dependence on foreign exchange and scarce management skills for its maintenance. The feasibility of such an increase in the artisanal fleet will depend on manpower availability amongst other factors.

This development alternative is thus presented as strategy 2.

Strategy 2

An increase in artisanal fisheries to fully exploit the resources in the artisanal zone would require additional capacities for net landings of about 12,000 t, fresh water fishing could be increased by 8,000 t. In order to reach the consumption goal, a further 10,000 t could be extracted with a limited expansion of the domestic national fleet.

Expansion of the artisanal fleet will, however, require vigilance on the part of the surveillance services to prevent the incursion of industrial vessels into the waters reserved for pirogues. At present the Republic of Guinea has a limit of fifteen miles reserved for the artisanal fleet but it will need careful enforcement.

From a social and economic point of view the maximum expansion of the artisanal fleet is probably the most advantageous solution. The beneficial effect on the geographical distribution of income and employment has already been noted above and its total employment creating potential is also likely to be much greater. A further expansion of the artisanal fleet will, however, require careful selection of boats to be used, since an uncontrolled increase can lead to an overexploitation of pelagic resources in the artisanal zone, as can be seen from table 14.

To expand national industrial fishing capacities by 10,000 t will also require the selection of the most suitable boat types to counteract possible heavy overexploitations of some species. Achieving this increase by the introduction of 3 additional freezer trawlers has been simulated and its effect on the resources in the industrial zone is shown in table 14. The simulation done is based on the originally proposed limitation of the foreign fleet to 80 vessels.

Table 14. Resource situation 1995 after increased domestic and artisanal capacities

Species	Type	Zone	Estimated catch potential (mt/yr)	Catch Total	Catch Domestic	Catch Foreign	Per cent Exploited
Pelagic	Industrial	15m-400m	65000	55821	8913	46908	86%
Demersal			365000	62336	18269	44066	17%
- Trigger fish			300000	2935	0	2935	1%
- other			35000	49644	18269	31375	142%
- Cephalopods			30000	9757	0	9757	33%
Penaeid shrimp and other crustaceans			4000	4723	838	3886	118%
Pelagic	Artisanal	0m-15m	35000	39149	39149	0	112%
Demersal and cephal.			45000	34907	34907	0	78%

Introduction of additional capacities without selection of the most suitable boat types thus would also lead to an overexploitation of demersal, other than trigger fish, and shrimp resources in the industrial fishing zone. however, to a lower degree than for strategy 1. Trigger fish would still remain underexploited. In the artisanal fishing zone an increase of 20 per cent in the number of boats without attention to the boat types introduced would lead to an overexploitation of pelagic resources. This situation, although an improvement over strategy 1 still needs correction.

An increase in fresh water capacities will improve the availability of fish inland, the spatial distribution of per capita consumption without the establishment of a distribution system would be as shown in table 15.

Table 15. Per capita consumption after increased capacities in artisanal and domestic fleet

REGION	Per Capita Consumption		
	Rural	Urban	Average
Conakry	0.00	50.55	50.55
Coastal Region	30.72	27.73	30.25
Fouta Djallon	4.54	4.10	4.47
Niger Plain	5.01	4.52	4.91
Forest Region	4.42	4.01	4.37
Average	8.85	32.00	15.93

As can be seen, a marked increase in fish consumption in the inland regions can thus be achieved, although this could be improved considerably.

The increase in employment for this strategy would be 5,069 work-years and the increase in value added would amount to $US 4.6 million.

Strategy 2 in addition to reaching the consumption goal and improving the level of seafood self-sufficiency would also reduce the overexploitation of resources for industrial fishing, although not sufficiently. It would further make better, although not optimal, use of artisanal resources, utilize fresh water resources and thus also improve fish distribution in the country.

Strategy 3

The results obtained in the modelling of strategies 1 and 2 show that in the industrial zone demersal fish, other than trigger fish, remains overexploited while demersal fish in the artisanal zone is underexploited. Thus a third strategy which is an alternate development was devised to at least partically remedy this situation. With this third strategy, ice trawlers of 14m length are limited to fish within the 15 mile zone rather than partly in the industrial and artisanal zones. This limitation will not lead to an overexploitation of demersal resources in the artisanal zone and will not have any effect on the pelagic resources in this fishing zone. This strategy based on a fishing policy decision thus will alleviate to some extent the overexploitation of demersal industrial resources and would allow for an increase in foreign licenes, although these must be limited to seiners.

A more selective choice of fishing technologies with more emphasis on artisanal pirogues being equipped for e.g. line fishing would make better use of existing demersal resources and reduce the overexploitation of pelagic fish in this zone. Since the catch of line fishing boats, although of higher value is lower in quantity than that of net fishing boats, additional investment for a further 10 ice trawlers would be required to reach the per capita consumption of 15 kg in 1995.

This strategy, including an additional 12 licences for seiners, was simulated and the resource situation after implementation of strategy 3 is shown below.

Table 16. Resource situation 1995 after increased domestic and artisanal capacities

Species	Type	Zone	Estimated catch potential (mt/yr)	Catch Total	Catch Domestic	Catch Foreign	Per cent Exploited
Pelagic	Industrial	15m-400m	65000	63924	5616	58308	98%
Demersal			365000	56729	12542	44186	16%
- Trigger fish			300000	3055	0	3055	1%
- other			35000	43917	12542	31375	125%
- Cephalopods			30000	9757	0	9757	33%
Penaeid shrimp and other crustaceans			4000	4447	562	3886	111%
Pelagic	Artisanal	0m-15m	35000	37197	37197	0	106%
Demersal and cephal.			45000	43618	43618	0	97%

As can be seen a better balance in the resource exploitation in both the industrial and the artisanal zones can be achieved by this strategy, although trigger fish still remains underexploited.

With the addition of 10 further ice trawlers the distribution of fish inland will also improve slightly, since the greater availability of chilled fish will increase the informal distribution. The per capita consumption is shown in table 17.

Table 17. Per capita consumption after increased capacities in artisanal and domestic fleet

REGION	Per Capita Consumption		
	Rural	Urban	Average
Conakry	0.00	46.39	46.39
Coastal Region	30.78	27.80	30.32
Fouta Djallon	4.59	4.15	4.52
Niger Plain	5.16	4.66	5.05
Forest Region	4.54	4.11	4.49
Average	8.94	29.73	15.30

The increase in employment for strategy 3 over the present system would be 5,388 work years and the increase in value added would amount to $US 6.4 million.

This alternative, same as strategies 1 and 2, will require the organization and distribution of inputs and repair facilities. While the artisanal fisheries present a greater problem in this respect because of their wider dispersion, total requirements will be considerable less for strategies 2 and 3 than for strategy 1 due to reduced needs for shore based infrastructure, e.g. cold stores, and lower imports of fuel and machinery. There are, therefore, also balance of payments advantages in giving maximum emphasis to the artisanal sector.

Strategy 3 would give very satisfactory results for the consumption goal, improve the distribution of consumption, attain the highest values for employment and value added and would improve the balance of exploitation levels between the industrial and artisanal zone.

Furthermore this strategy would also strengthen the local manufacturing capabilities. Increasing the number of small boats is more likely to increase the market for parts that could ultimately be manufactured locally.

5.2 Assessment of strategies

From the simulations it is obvious that special attention has to be paid to licences issued to the foreign fleet, monitoring of their catches as well as collection of exact statistics on the artisanal and national fleet in order to be able to closely monitor the development of resources and to adapt planned investments to changing requirements.

Resource surveys which are planned for 1989 will have to be taken into account within a project planning and monitoring exercise which should be a continuous function for the development programme.

A comparison between the three strategies and the system after implementation of the planned projects as well as the projection to 1995 of the consumption component are given in table 18.

Table 18. Comparison of some system variables after implementation of projects and strategies 1, 2 and 3

	After implementation of projects 1992		After implementation of projects projected 1995		Strategy 1 1995		Strategy 2 1995		Strategy 3 1995	
Per capita consumption	13.29		12.41		15.51		15.93		15.30	
Distribution (per cent) of										
	rural	urban	rural	urban	rural	urban	rural	urban	rural	urban
population	71	29	69	31	69	31	69	31	69	31
consumption	36	64	37	63	39	61	39	61	41	59

Table 18. Comparison of some system variables after implementation of projects and strategies 1, 2 and 3 (cont'd)

	After implementation of projects 1995	Strategy 1 1995	Strategy 2 1995	Strategy 3 1995
Level of sea-food self-sufficiency	86% of 1992 level 74% of desired level for 1995	92% of desired level	92% of desired level	92% of desired level
Employment (work-years)	12,864	13,331	17,933	18,252
Value added ($US million)	12.5	15.37	17.07	18.90
Foreign exchange requirements ($US million)				
Investment	82.5 over the period 1987 to 1992	109.5	96.5 over the period 1987 to 1995	99.0
Foreign exchange account				
Trade:				
Imports				
of fish	7.8	7.8	7.8	7.8
of inputs	8.4	11.2	12.2	12.3
Exports				
of fish	3.9	3.9	3.9	3.9
Balance of trade	-12.3	-15.1	-16.1	-16.2
Transfers:				
Receipts				
Licence fees	12.0	10 to 11 depending on new allocation	11 to 12 to foreign fleet	13.8
Observer salaries	0.114	0.114	0.114	0.114
Expenditure (for projects 1,2,4,5 and 6				
Interest and repayments	5.13	6.57	6.22	6.23
Operating costs (project 2)	0.95	0.95	0.95	0.95
Balance on current account	-6.266	-11.513	-11.157	-9.457

Table 18 shows that all three strategies achieve a higher degree of attainment for the government objectives set with respect to per capita consumption, seafood self-sufficiency, decentralization of consumption, increase in value added and employment than the planned projects alone. Neither of the strategies will have an impact on the resource management objective.

The cost of foreign exchange, however, is very high, since further investments would be required.

Thus within the subsystem of the FIS, the planned projects and the strategies proposed contribute to a very satisfactory development of the FIS and achieve most of the objectives for the system as set by the government. Their macro-economic impact is, however, complex. This use of scarce foreign exchange would have to be considered in relation to the nutritional needs of the population and to the positive impact on value added and employment of the economy. Strategy 2 would require less investment while giving a higher increase in value added and employment than strategy 1. Strategy 3 would use marginally more investment than strategy 2 but would result in a better balance on the current account than either strategies 1 and 2.

Strategy 3 would appear to offer the best results. However, the decision which strategy to adopt lies with the Government, bearing in mind all constraints and the priorities given to the various development objectives which are conflicting in part. Only after a Government decision has been made will it be possible to design a precise and definite development programme. Nevertheless, the analysis has pointed to some persistent problems that the Government will have to face:

(a) The impact of the planned projects will diminish over the years;

(b) There will have to be a clear fisheries development policy and the Government will have to have the capacity and capability to monitor and absorb support projects in this area;

(c) There are a number of bottlenecks and imperfections in the system which will have to be rectified already now through a package of technical assistance activities in order to make any strategy work;

(d) The difference between the development alternatives lies chiefly in the level of investment required and the resulting financial consequences;

(e) It is important to ensure that there is an adequate capacity within the Government of the Republic of Guinea to analyze fisheries projects from a sectoral or macro-economic point of view in order to optimize the effect on the balance of payments. A clear policy aiming at attracting and stimulating domestic and foreign investment must be put in place.

5.3 Supporting activities

Bearing the above in mind a support programme to strengthen the Government's decision-making capacity and to address the problem areas that will remain, also after the presently planned projects, has been devel ped. This support programme is necessary in order to maintain the positive impact of the implementation of the projects already decided on by the Government

also after 1992. Additional measures will have to be taken and support in the form of technical assistance will be required. A selection of a strategy for further development such as the three discussed above will require a clear policy, technical assistance measures and further investment to strengthen the industrial basis of the system. A support programme has been formulated aiming at

(a) maintaining the positive impact of the decisions for development taken, and

(b) strengthening the balance of payment situation by improving local manufacturing capabilities and thereby reducing import of inputs by identifying export possibilities, attracting foreign capital for financing the additional investment and generally laying a basis for attractive investment opportunities in the sector.

5.3.1 Policies

The analysis above shows that the goals set for the FIS can be reached with considerable positive effects on employment and value added for the economy as a whole. The opportunity cost for the use of foreign exchange will, however, have to be considered carefully. A priori, however, it would seem that a development of the FIS would be the best way of achieving a satisfactory nutritional level for the population.

It must further be kept in mind that the development of the FIS can serve as a catalyst for industrialization because of the sector's obvious linkage with the engineering and other industries. It is clear from the planned development of the sector that the government has a clear fishery policy, however, more emphasis should be placed on the fact that these development activities can generate a positive impact on the manufacturing sector as a whole. Thus the development programme developed by UNIDO pays special attention to the industrial linkages.

If a full development of the FIS is chosen with its considerable cost in terms of foreign exchange, economic and industrial policies must be oriented towards a reduction of the import component and towards an increase in export, for instance through the development of new products and penetration of new markets.

Investment opportunities attractive enough for domestic and foreign investors are essential for the success of such development.

5.3.2 Technical assistance

The technical assistance component of the support programme should address the bottlenecks and constraints and with respect to the problem areas identified the following actions are proposed as a support programme. These actions have been arranged in three thematic groups, viz.

Programme component 1 - Support to the State Scretariat for Fisheries to promote and monitor fishery sector development.

Programme component 2 - Support for fisheries exploitation and fish culture production.

Programme component 3 - Support for the mechanization and modernization of artisanal fisheries and processing.

5.3.2.1 Programme component 1 - Support to the State Scretariat for Fisheries to promote and monitor fishery sector development.

Problem area 1.1

Insufficient capacity of the Guinean sectoral administration for project planning, monitoring and co-ordination and low level of expertise for global sector management, based on a systemic understanding of the fisheries sector and its relation to the economy as a whole.

Description of problem area and proposed action

The Guinean Fisheries Administration is at present not in a position to monitor and co-ordinate existing and planned projects and to plan for supplementary activities if and when required. There is no clear understanding of the systemic nature of an adequate programme approach to sectoral development.

There is also an urgent need to reinforce the project planning, monitoring and co-ordination, analysis and evaluation capacity of the State Secretariat for Fisheries (SSF), within the National Directorate for Fisheries and Aquaculture, Division for Studies and Co-operation (DSC) and to complete the CIDA contribution (PAI-Pêche 1989-1992).

It is therefore recommended that the computer model available at UNIDO be installed in the Division for Studies and Co-operation, to be operated by Guinean fisheries officers:

- For the promotion of a systemic view of the fishery sector in order to develop an understanding of the fisheries sector as a whole in which every action in any of its components has consequences on other components;

- As a tool for monitoring existing projects and analyzing their actual impact on the level of attainment of national objectives for the fisheries sector;

- As a tool for designing supplementary projects in order to better reach objectives and to substantiate the Government's argumentation in the request for further funding for programming the future sectoral development strategies and action plans.

Since the choice of additional boats to be introduced in the national industrial fleet is particularly important to ensure that exploitation stays within resource limitations, it is further recommended to transfer a modular computer system for the monitoring of industrial resources. This would on the one hand make a choice of suitable industrial boat types to be introduced easier and at the same time this simulation could be used to establish which types of national industrial boats would leave a balanced resource potential available in the industrial zone to attract the foreign fleet, thereby ensuring an earning potential in foreign exchange through licence fees and providing a basis for the issue of licences.

Furthermore careful attention should be paid to the fishing technologies used in the artisanal fleet to ensure the maximum use of resources. A survey of resources within the four mile zone has recently been undertaken by ORSTOM and while good estimates of the number of boats and boat types exist, statistics on catch compositions are at present not kept. With the 1987 level of fishing activities in the artisanal fleet, approximately 40 per cent of the potential, the use of average catch composition per boat type is sufficiently accurate for computational purposes, however, when fishing of the artisanal fleet is to be extended to make the fullest possible use of available resources, the choice of boats to be introduced and their fishing methods become increasingly more important with higher catch levels, to guard against overexploitation of some species. A survey of existing boats and the location of landings sites would make it possible to use a sampling procedure to establish fishing methods and catch compositions. On the basis of this survey, requirements for additional boats, their type and fishing methods to be used can then be decided on. Another parameter to consider is the availability of trained fishermen.

Problem area 1.2

High requirement of foreign exchange for investment and for additional import of inputs.

Description of problem area and proposed action

In order to assure a lasting support for the existing and expanded national fishing capacities, it is important to identify and make full use of local manufacturing opportunities for the supply of parts, fishing equipment, smoking equipment and packing materials. While project No. 6 includes a factory for the manufacture of nets and ropes, the manufacture of metal parts or packing material specifically for the fishing industry may not be viable because of economies of scale. Local manufacture of similar parts for a number of sectors, however, may be a feasible alternative. Thus an industrial advisory service for the promotion of integrated industrial development could strengthen the national manufacturing capabilities and provide assistance to the fisheries industrial system. This service must also facilitate an inflow of foreign capital for financing the necessary investment.

5.3.2.2 Programme component 2 - Support for fisheries exploitation and fish culture production.

Problem area 2.1

Underexploitation of trigger fish in industrial zone.

Description of problem area and proposed action

Trigger fish due to its tough skin and boniness is considered not very suitable for smoking. This makes fishing of this species uneconomical at present. However, this species could become suitable for fish consumption in fresh and/or smoked form when filletted, as demonstrated in 1985 and 1987 by the FAO fish smoking project in Bonfi-Conakry. Furthermore, the underexploitation of trigger fish not only wastes available resources but also the effect on the ecological balance that the occurrence of one species of fish in large numbers has on other species has not been established. The

commercial use of trigger fish should have some priority in a development programme for the FIS in the Republic of Guinea. Another important task is to design ways of collecting sufficient quantities of this species from industrial fishing by-catch at present being discarded or to design semi-industrial operations to land this type of fish for further processing after having been filletted. This option would have to be studied in detail, especially the market potential has to be investigated, since the economic feasibility depends on the potential demand.

Problem area 2.2

Insufficient knowledge about the impact of increased landings on the market and price formation.

Description of problem area and proposed action

(i) An unanswered question is how far the market can go on absorbing quantities of smoked fish and whether with increasing income and greater availability of fresh fish there may not be a switch in demand. A market study would, therefore, be required.

(ii) A further aspect of increased supply which requires additional study is the price situation. Officially, price control at least for artisanally caught fish has been lifted but general observations and conversations with fishermen did not suggest that present prices reflect the scarcity value of the commodity and the lifting of price control had not caused any major rise in prices. Since the planned projects and all three strategies are based on an increase in fish landings, it is important that a study be made on the price formation in the fisheries sector and this is crucial to the future development of the sector.

Problem area 2.3

Overexploitation of fresh water fish resources.

Description of problem area and proposed action

An expansion of fresh water fishing requires increased supply of equipment and gear as well as repair centres. A major problem in this sector is the wide spatial distribution of the activity which makes the provision of support services and the marketing of any catch above subsistence a difficult operation. Some concentration is clearly necessary but the scattered nature of the resource will reduce the possibilities in this respect and a satisfactory solution may well depend on developments in other sectors of the rural economy and policies adopted by the government.

To increase fish food availability in inland Guinea, supplementing fluvial fisheries production, fishculture acitivities should be initiated as soon as possible. It has been demonstrated in other West African countries that it takes approximately 10 years under local conditions to establish an effective fish farming capacity in rural areas for sustained aquaculture fish production. Emphasis must be placed on economical operations, located near human settlements and dimensioned according to the population density. A development programme should be designed with demonstration of techniques, extension work and training of personnel. The necessary Government policies in this respect must be established.

5.3.2.3 Programme component 3 - Support for the mechanization and modernization of artisanal fisheries and processing.

Problem area 3.1

Insufficient knowledge about support service requirements for increased landings in the artisanal fleet.

Description of problem area and proposed action

In order to enable the artisanal fishing fleet to operate at full potential it is essential to install repair and maintenance centres in appropriate locations. The establishment of such centres for the marine artisanal fleet requires a precise knowledge of the number of boats and their locations as well as fishing technologies used. This information would be provided by the recommended survey described in problem area (a). The introduction of additional boats in the artisanal fleet will require additional repair facilities and equipment and spare part supplies and it will be necessary to survey existing repair facilities in order to make recommendations on the establishment of a network of repair and maintenance facilities if feasible.

Problem area 3.2

Insufficient and inefficient landing facilities for the marine artisanal fishing fleet.

Description of problem area and proposed action

Improved landing facilities become necessary to handle the increased volume of fish landings, a selection of the most suitable locations for these landing facilities can be made on the basis of the survey to be undertaken for the artisanal fleet. It is of utmost importance that such landing facilities be designed in co-operation with the fishermen, in order to ensure that they will have the expected positive impact on the productivity of the artisanal fisheries and will reduce spoilage and handling loss due to quicker and more efficient handling. The involvement of local manufacturing facilities would furthermore facilitate maintenance as well as strengthen the local manufacturing sector.

Problem area 3.3

Insufficient knowledge about modern technologies in the artisanal fleet and lack of awareness about quality requirements for fish for human consumption.

Description of problem area and proposed action

On the basis of the surveys undertaken and in co-operation with the fishermen, more efficient technologies can be introduced in artisanal marine extraction as well as processing. Improved designs for the traditional canoe types and improved fishing gear would considerably increase the productivity of the artisanal sector. Emphasis should be put on the use of locally available materials in order to, on the one hand, stimulate local manufacture and, on the other hand, to improve the foreign exchange situation by import

substitution. New forms of processing should be developed in co-operation with local personnel to ensure the acceptability of new fish products. Furthermore, in order to reduce handling losses more stress should be placed on the quality of fish for human consumption. This will require training in new technologies as well as training in hygiene and quality control. The market study to be undertaken will furthermore highlight where smoking centres or other forms of processing should be established to process additional quantities. Training in the repair and maintenance of existing and/or planned cold stores and ice plants would ensure a more regular supply of ice, better storage facilities and would thus improve the quality and durability of fish.

5.3.3 Investment

In addition to the already planned projects strategy 1 will require an additional investment of $US 27 million, strategy 2 an additional investment of $US 14 million and strategy 3 an additional investment of $US16.5 million. For the latter strategies, however, investment in support for fresh water fishing must also be made. It has not been possible to estimate the magnitude of such investment. Also the selection of boat types may lead to marginal changes in the investment cost.

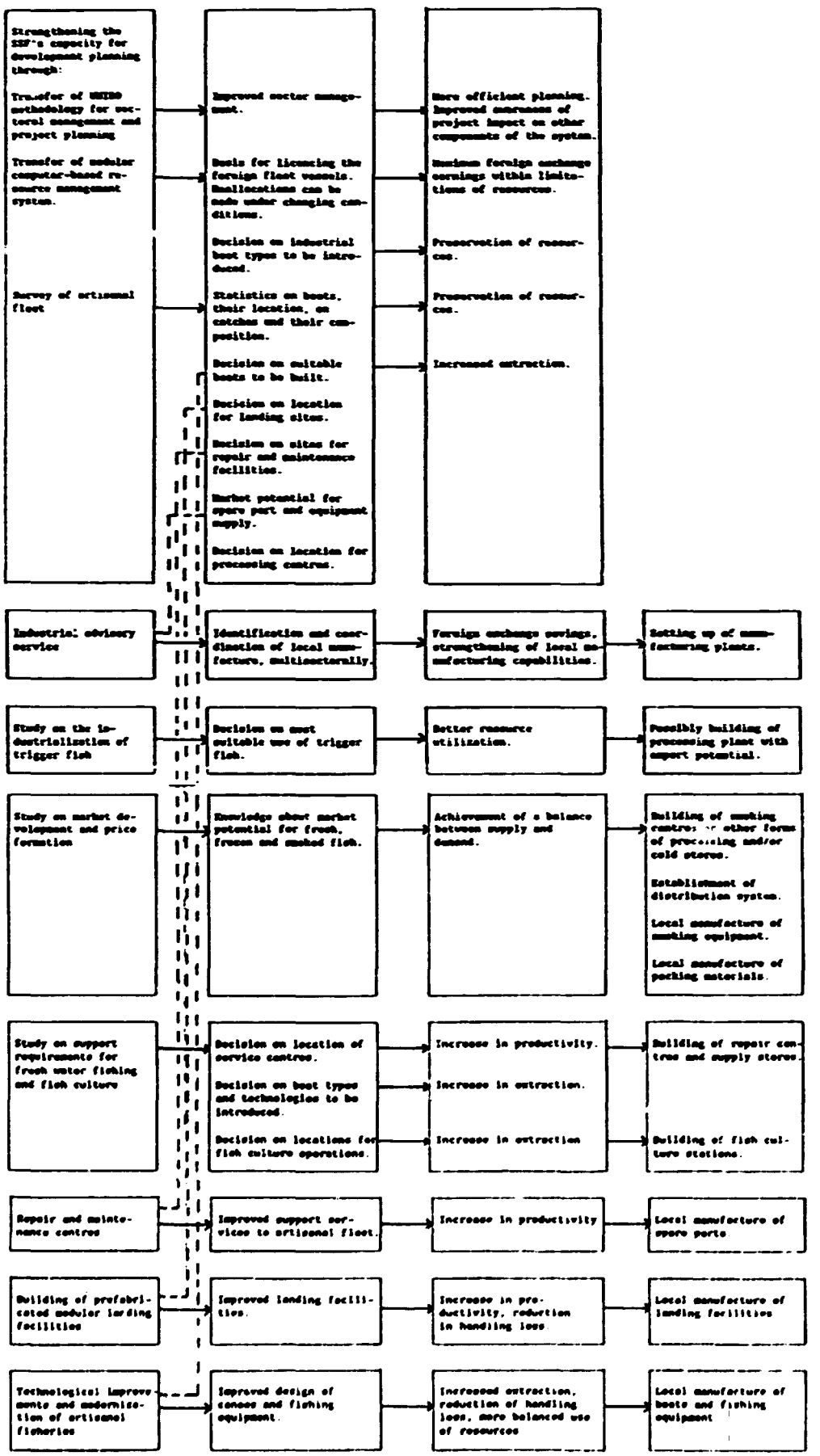
The support activities outlined in section 5.3.2 will be undertaken in co-operation with FAO. These UNIDO/FAO support activities are summarized in table 19.

5.4 The development programme

The comprehensive programme developed by UNIDO takes into account the projects planned by the Government of the Republic of Guinea as well as the areas of technical assistance and investment opportunities identified above to complement these projects. The programme is shown in annex 1 with references to the planned projects and the additionally suggested activities.

The most important points of the project concepts for the support activities are given in annex 2 to this report.

Table 19. Proposed UNIDO/FAO support activities to complement the FIS development



Annex 1

Development programme for the Fisheries Industrial System in the Republic of Guinea

Problem areas identified in present system	Reasons for bottlenecks	Activities	Government policies
Fisheries Administration			
Inadequate sector management and project planning and co-ordination	Weakness in statistical data systems, project planning and monitoring	Strengthening of Division for Studies and Co-operation within the National Directorate for Fisheries and Aquaculture (support project 1.1)	Establishment of a Commission for project monitoring and evaluation for a systemic approach to sectoral development and programme approach to project planning
Resources			
Overexploitation of some species, e.g. shrimps - 263% demersal - 281%	Lack of resource management, lack of surveillance and control	Survey of resources, statistics on catches (project 1) Identification of boat types for optimal use of resources (support project 1.1)	Establishment of a fisheries management system
Underutilization of trigger fish 300,000 t catch potential	If not filletted, fish not suitable for traditional smoking methods	Research towards commercial use of trigger fish domestically or with export potential (support project 2.1)	Possible subsidies on catches for limited period
Foreign fleet			
Licence fees only partially paid $US 7.7 million of possible $US 23 million with present number of licences issued	Lack of control of foreign fleet	Establish monitoring and surveillance (project 2)	Establish fixed licence fees, legislation for enforcement within resource management

Problem areas identified in present system	Reasons for bottlenecks	Activities	Government policies
Domestic fleet			
Capacity utilization of existing fleet - 76%	Lack of equipment, spare parts, repair facilities to reach full potential	Installation of repair shops, maintenance centres, supply of equipment and spare parts (project 4)	credit lines for private enterprises
	Lack of boats	Purchase of boats and/or investment in local manufacture (project 4)	Co-operative management or joint venture agreements
		Support services, such as port facilities with ice plants, cold stores (project 5)	
Resource underutilization by domestic fleet 1.2% of industrial resources 2% of artisanal resources	Boat types used not optimal in design and capacity for industrial fishing, competing with artisanal fleet	Identification, through simulation of suitable boat types for industrial fishing (support project 1.1)	
Artisanal fleet			
Capacity utilization of existing fleet - 75%	Lack of equipment, motors, spare parts, repair facilities, lack of ice containers, inadequate technologies used	Supply of motors, equipment, repair yards (project 6) Design of ice containers from local materials, Transfer of new technologies (support project 3.3)	credit lines more accessible to private enterprises

Problem areas identified in present system	Reasons for bottlenecks	Activities	Government policies
Artisanal fleet (cont'd)			
Underutilization of artisanal resources 36% of MSY	Insufficient number of boats, lack of landing facilities, lack of equipment	Local manufacture of boats (project 6)	credit lines for private enterprises
	Lack of packaging and distribution facilities	Identification of suitable boat types, building of landing facilities, additional supply stores for equipment and spare parts and repair yards	Reallocation of fishing by ice trawlers to artisanal zone
		Design of appropriate technological improvements of canoes and gear (support projects 1.1,3.1 and 3.2)	
Handling loss	Lack of quality control and handling equipment	Training in quality control methods (support project 3.3)	
Fresh water fishing			
Capacity utilization of existing fleet - 65%	Lack of equipment, motors, spare parts, repair facilities	Equipment and motor supply repair yards (project 6)	credit lines for private enterprises
Resource underutilization, 20% of catch potential	Insufficient number of boats, lack of equipment	Local manufacture of boats, supply of equipment, spare parts, installation of repair yards and maintenance centres (support project 2.3)	credit lines for private enterprises and co-operatives
No fish culture activity	Low knowledge of production potential, fish culture methods and practices	Rehabilitation of old fish culture stations, building of fish ponds in suitable locations (support project 2.3)	extension services, fish seed provision to farmers

Problem areas identified in present system	Reasons for bottlenecks	Activities	Government policies
Handling and Marketing			
Potential inland market not served	Lack of communication networks lack of packing and transport	Establishment of distribution chain, (project 3, not operational)	credit lines for private enterprises
No cold storage facilities		Packing material manufacture (support project 1.2)	
Insufficient knowledge about market and price development		Market and price formation study (support project 2.2)	
Processing			
Need for expansion to keep pace with increased catches	Only cottage industries at present	Building of improved artisanal smoking plant (project 6)	
Handling loss	Lack of hygiene, simple equipment	Building of processing facilities for additional catches based on outcome of market study, follow-up to support project 2.2	
Trade			
Expensive imports of fish	Imports needed due to lack of local catch capacities	Replace imports by local fleet catches (projects 4 and 6)	
No exports	Lack of capacity	Part of industrial catch for export (project 4)	

Problem areas identified in present system	Reasons for bottlenecks	Activities	Government policies
Trade (cont'd)			
No exports		Identification of export potential (support project 2.1)	
High foreign exchange requirement	Imports of fuel, equipment spare parts and gear	Factory for local manufacture of nets and ropes (project 6)	
		Strengthening of local manufacturing capabilities for parts and equipment (support project 1.2)	

Annex 2

Project concept 1.1 - Strengthening the State Secretariat for Fisheries' capacity for sectoral development planning and monitoring, and improving fisheries resources utilization

Immediate objectives

- To enable the Government to select adequate developmental policies and strategies for the fisheries sector as a whole and to implement the related master plan with sound monitoring practices and adequate control over sectoral foreign involvement.

- To enable the Government to select appropriate fishing technologies and boat types for national extraction capacities, so that a balanced resource potential remains available and to decide on the number and types of foreign vessels to be licenced.

- To enable the Government to select appropriate fishing technologies and boat types for expanding national extraction capacities in the artisanal fleet, without overexploiting resources.

Outputs

Output 1

Report to the Government of the Republic of Guinea with recommendations regarding the operational organization and workplan of the SSF, Division for Studies and Co-operation, within the National Directorate for Fisheries and Aquaculture based on a systemic approach of the fishery sector and a programme approach to project identification, formulation and monitoring.

Output 2

Installed computer model at the State Secretariat for Fisheries, with three officials fully trained in its use, MEPS-FIS transfer and application for project monitoring and impact analysis of extraction (artisanal and industrial) on the resource and on revenues.

Output 3

Report to the Government of the Republic of Guinea with recommendations regarding the number and types of foreign vessels to be licenced and the types of fishing technologies to be introduced in the national fleet for a further expansion of domestic capacities.

Output 4

Report to the Government of the Republic of Guinea on the present status of the artisanal fleet, number of boats, their location, statistics on catches and recommendations to the Government regarding the number and type of artisanal vessels to be introduced as well as their location. Furthermore, the report will contain recommendations for the spatial location of support services in the form of repair and maintenance centres and landing places.

Estimated costs for project:	$US 270,000
Duration of project:	12 months

Project concept 1.2 - Establishment of an Industrial Advisory Unit in the Ministry of Industry and Trade in the Republic of Guinea

Immediate objective

To support the consultation process within the establishment of the industrial master plan and to build up an Industrial Advisory Unit in the Ministry of Industry and Trade to represent the industrial interest in the fisheries development process and to ensure that due emphasis is given in the fisheries policies to the development of domestic industries. The State Secretariat for Fisheries will be acting as a technical secretariat for the sectoral consultation, feeding the consultative process at the level of the promotion of industrialization opportunities and of the identification of these opportunities in the context of sectoral planning towards industrialization.

Outputs

Output 1

An Industrial Advisory Unit in the Ministry of Industry and Trade.

Output 2

Installation of a computerized tool for planning and programming of fishery-related industrial activities with the officials of the Advisory Unit fully trained in its use.

Estimated costs for project: $US 190,000

Duration of project: 12 months

Project concept 2.1 - Techno-economic study on the industrialization of trigger fish (Balistes Carpriscus) in Guinea

Immediate objective

To validate the technical, economic and marketing possibilities of industrializing trigger fish for internal and export oriented markets.

Outputs

Output 1

A report on the internal and export market potential of salt-dried and smoked trigger fish.

Output 2

Well established processing and packaging techniques at the pilot plant level and a report with the technical/economic and market results of pilot scale production of salt-dried and smoked trigger fish. (Note: This pilot plant could be a section or part of the Cooperative Fish Smoking Centre assisted by FAO in Bonfi, Conakry, and should be in operation for a minimum of 1 year or two fishing seasons.)

Output 3

Based on outputs 1 and 2, a techno-economic report on the viability of industrializing trigger fish production in Guinea.

Estimated costs for project: $US 220,000

Duration of project: 24 months

Project concept 2.2 - Market and price formation study on Guinean fishery products

Immediate objective

To carry out a study on potential market and price behaviour on the domestic market and on selected African and West European markets.

Output

A study determining:

(a) The development of internal markets for new fish products;
(b) Possibilities of export of high unit value fish products, primarily in European markets;
(c) Export possibilities to other African countries;
(d) Analysis of the mechanisms for price formation;
(e) Outline of a price and incentives policy to establish a balanced development for supply and demand for fish products.

Estimated costs for project: $US 340,000

Duration of project: 6 months

Project concept 2.3 - Establishment of support requirements for fresh water fishing and fish-culture in the Republic of Guinea

Immediate objective

To assist the Government in promoting investment in additional fishing capacities and repair services with the greatest beneficial impact on the fresh water fishing fleet; and also in promoting the establishment and sustained development of rural fish culture activities.

Outputs

Output 1

Report on fresh water activities along the main rivers of the Republic of Guinea and in the main zones where fish culture could be feasible, establishing fishing technologies used, boat building capabilities and support services available and their location and possible fish culture sites. The report is to determine the requirements of spare part and equipment supply and make recommendations on (a) types and numbers of boats to be built and their location, (b) type and location of support centres and (c) government policies to aid the development of inland fisheries. The report should also propose a rational and feasible master plan for fish culture development in inland Guinea with requirements for Government support, demonstration and extension; as well as recommendations regarding the most suitable types of and locations for fish culture operations.

Output 2

Technical assistance and investment projects.

Estimated costs for project: $US 140,000

Duration of project: 8 months

Project concept 3.1 - Repair centres for the marine artisanal fishing fleet, in particular its outboard engines

Immediate objective

To design a network of repair and maintenance centres for the Guinean marine artisanal fishing fleet.

Outputs

Output 1

A report containing:

(a) A description of repair, maintenance and spare parts requirements, of the marine artisanal fleet according to locations, levels and types of technology used,

(b) Description of facilities and infrastructure available in the country that can service this artisanal fleet.

(c) Quantitative and technical recommendations on the type and location of workshops and facilities to be installed, and on upgrading/rehabilitating of the existing ones.

(d) Training and technical assistance requirements.

Output 2

The detailed design(s) for individual centres/workshops linked in a network that would serve the marine artisanal fleet in a coordinated manner.

Output 3

Project documents for technical assistance and investment activities to assist in establishing the network of repair and maintenance centres.

Estimated costs for project: $US 100,000

Duration of project: 12 months

Project concept 3.2 - Prefabricated modular landing facilities for the marine artisanal fishing fleets

Immediate objective

To design modular landing sites that are appropriate for the requirements of the marine artisanal fishing fleet that are of low cost; and to the greatest extent possible make use of locally available raw materials.

Outputs

Output 1

A report indicating the number, location and specifications of the landing sites required.

Output 2

One or more modular landing designs suitable for various local conditions and fishing habits, with emphasis on low costs and utilization of locally available raw materials.

Output 3

Project documents for technical assistance and investment projects required for building a number of landing sites within the government FIS development programme and involving, where possible, private sector investors.

Estimated costs for project: $US 110,000

Duration of project: 12 months

Project concept 3.3 - Technological improvements and appropriate technology transfer

Immediate objective

To design the most appropriate ways and means for an efficient technological improvement of fishing canoes and gear, for fish products lines and for a sustainable increase in locally value added in fish food production, handling, processing and distribution.

Outputs

Output 1

A report based on relevant modern technology data collected, analyzed, evaluated and guidelines compiled and recommendations prepared by the experts for the Government to facilitate its decision on modernization and diversification of the national fish industry. The report is to contain:

(a) A description of different improved designs for the existing traditional canoe types, including recommendations on the most appropriate building material of local origin, suitable for the different fishing gear and propulsion equipments currently utilized, taking into consideration the needs and expectations of the fishermen,

(b) A description of improved fishing gear,

(c) A description of different possible production line designs for locally manfactured, with locally available or local materials, fish containers (including cheap wrapping materials), ice containers (for fish preservation on board fishing canoes, thus enabling longer and more productive fishing trips; and for quality improvement of landed fish),

(d) A description of the human resources, technical equipment and financial resources necessary to establish a unit for fish quality control and inspection within the SSF, as well as a description of an operational procedure for operating this unit.

(e) A design of a small scale skinning-filletting machine for the trigger fish and of a pilot scale operation ot test this new equipment in Conakry.

(f) A design of a pilot-scale manufacturing facility for the different most commonly needed fishing inputs and fishing equipment spare parts suitable for local production as a way of import-substitution,

(g) Training and technical assistance requirements for above activities.

Output 2

Trained local staff to operate the pilot plant and maintain the technological equipment, cold stores and ice plants as follows:

- 5 trained national senior technical staff in production and quality control techniques (two technologists, 2 engineers and one quality control expert);

- In-service personnel trained in the basic production technology as well as the required quality control techniques.

Output 3

Establishment of a fish quality control and inspection unit in the SSF: equipment, laboratory installation, training of personnel for operating the unit, as a consequence to output 1 activity (d).

Output 4

Project documents for technical assistance and investment activities related to output 1.

Estimated costs for project: $US 760,000

Duration of project: 12 months