

- (28) Cf. hierzu Hartmut Elsenhans, op. cit. (Anm. 7), S. 214 ff.; zur These, daß der Marxismus von Anfang an die Rechtfertigungsideologie der Intellektuellen auf dem Wege zur eigenen Klassenherrschaft sei, cf. György Konrad/Istvan Szeleny, *Die Intelligenz auf dem Wege zur Klassenmacht*, Frankfurt, Suhrkamp 1981, S. 112.
- (29) Zu diesen Theorien vom Staatskapitalismus in der Dritten Welt cf. Hartmut Elsenhans, *ibid.*, S. 82 – 89. Elsenhans erblickt – zu Recht – in den Staatskapitalismus-Theorien Immunisierungsstrategien zur Rettung der Behauptung, der Staat in den Weltperipherien sei kapitalistisch oder diene letztlich kapitalistischen Interessen. Jede Entwicklung in der Dritten Welt, die nicht gänzlich dem sozialistischen Lager zuzurechnen ist, kann somit tatsächlich als noch kapitalistisch denunziert werden. Die unklare Bestimmung von Staatskapitalismus erlaubt andererseits, ihn als Übergangsregime zum Sozialismus hin oder als Instrument anti-imperialistischen Kampfes auszugeben (cf. *ibid.*, S. 89).
- (30) Zur Evolution des lateinamerikanischen Staates cf. Marcos Kaplan, *La formación del Estado nacional en America Latina*, Santiago de Chile, Editorial Universitaria 1969; Oscar Oszlak, *The Historical Formation of the State in Latin America*, in: *Latin American Research Review*, vol. 18 (1981), Nr. 2, S. 3 – 32; Guillermo A. O'Donnell, *Apuntes para una teoría del Estado*, in: Oscar Oszlak (Hrsg.), op. cit. (Anm. 22), S. 199 – 250; Arnaldo Cordova, *Los orígenes del Estado en America Latina*, in: *Cuadernos Políticos*, vol. 14 (1977), S. 23 ff.; Norbert Lechner (Hrsg.), *Estado y poder en America Latina*, Mexiko, Siglo XXI 1981; zum Theorem einer „bürokratischen Entwicklungsgesellschaft“ cf. Hartmut Elsenhans, op. cit. (Anm. 7), S. 20 – 25, 271 f.; Jorge Graciarena, *El Estado latinoamericano en perspectiva: figuras, crisis, prospectiva*, in: *Pensamiento Iberoamericano*, Nr. 5a, Januar/Juni 1984, S. 39 – 74; Ignacio Sotelo, *La cuestión del Estado: Estado de la cuestión desde una perspectiva latinoamericana*, in: *ibid.*, S. 75 – 92.

Teresa Salazar de Buckle and William H. Holaday*)

THE APPLICATION OF A PROGRAMME APPROACH TO THE DESIGN OF TECHNICAL ASSISTANCE ACTIVITIES FOR THE PROMOTION OF INDUSTRIAL DEVELOPMENT IN DEVELOPING COUNTRIES

Introduction

Technical assistance projects for industry are generally designed to promote the development of a given industrial sector through the elimination of bottlenecks and constraints affecting the sector. Technical assistance actions may involve the introduction of new technologies and/or additional technical capabilities, the expansion of industrial capacity, industrial training, the creation and strengthening of institutions, etc.

It has been realized by multilateral and bilateral development assistance organizations that despite the provision of large amounts of technical assistance, the expected impact on the industrial development of developing countries has not been achieved. A frequent point of criticism from all parties concerned has been that many technical assistance and investment projects in developing countries have established R & D and other types of institutions, pilot plants and even industrial-scale plants that cease to operate with the end of the project or continue to operate at very low rates of capacity utilization and efficiency. Furthermore, technical changes derived from technical assistance projects that have been shown to be both technically feasible and economically desirable have often not been successfully introduced and disseminated within the country.

Among the factors that have been identified as reasons for this disappointing performance are the lack of adequate upstream and downstream linkages of the projects within the industrial sector and with other sectors, as well as the lack of co-ordination with other development activities. A further problem is that it is often difficult for Governments to identify accurately the real technical assistance needs within a sector and to establish priorities for action. Other problems include the lack of co-ordination between national institutions and the lack of co-operation and even competition between various development assistance organizations.

In many cases, an examination of individual projects may show that they had achieved their stated objectives during the life of the project, but had failed to produce the expected impact. This illustrates the fact that technical soundness by itself is not a sufficient condition to ensure that a project is likely to have a

*) The present article is a review of ongoing work at UNIDO; much of the description is taken from published and unpublished documents, for which references are given at the end of the article. Nevertheless, the views expressed are those of the authors and do not necessarily reflect the official position of UNIDO.

positive impact on a country's industrialization efforts.¹⁰ There are several conditions that a project should meet in order to produce a significant impact on the development of the sector: it should respond to the real needs and priorities of the country within that sector, should be self-sustaining after the end of the technical assistance, should be properly located within the institutional framework of the sector, and should be compatible with other related ongoing projects (this, as will be seen below, leads to the concept of programmes). Furthermore, an appropriate policy environment is necessary for the project objectives to be fully achieved.

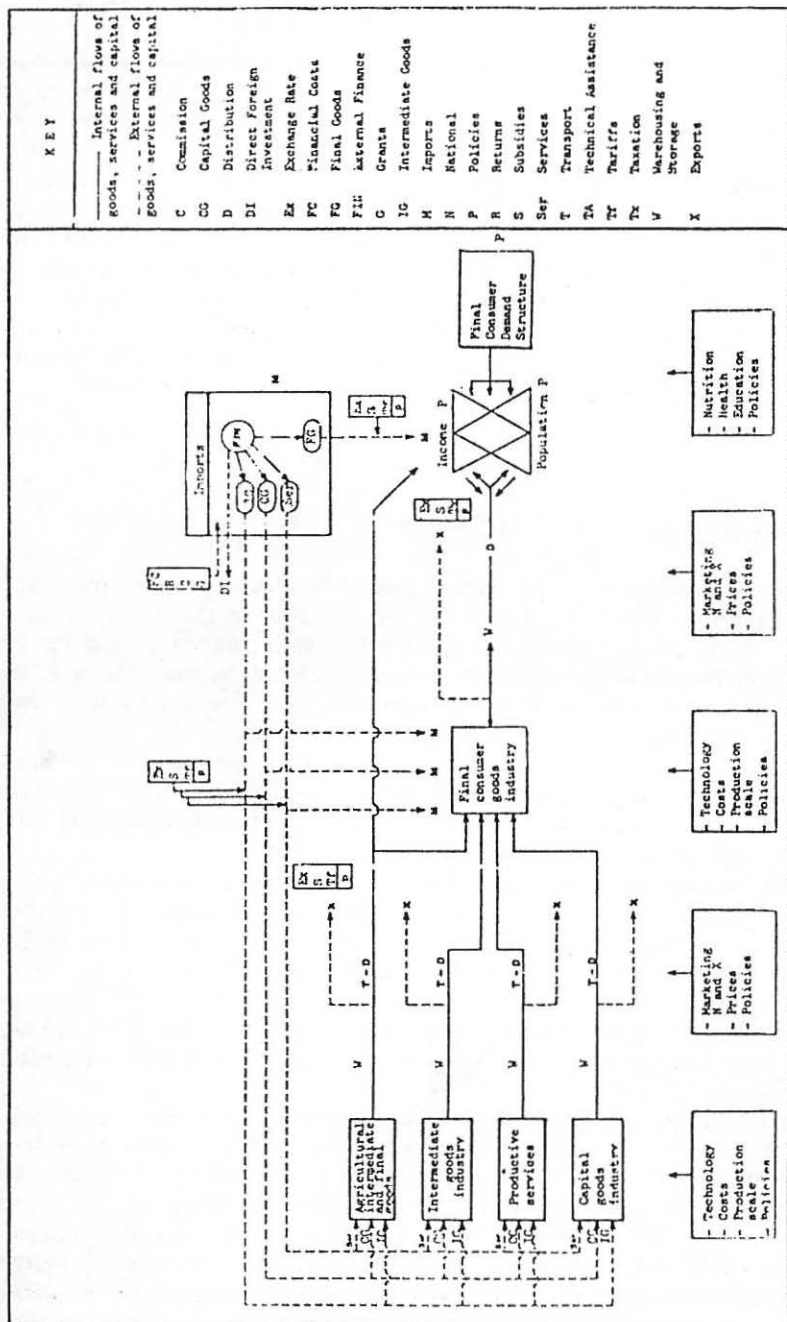
System Approach

For a project to be able to fulfill the above conditions, a good understanding of the structure of the industrial system in which the technical assistance activities will operate is required. The application of a system approach provides an adequate framework for understanding the structure of the sector before undertaking project design activities. Within the system approach, any industrial activity can be viewed as a system comprising a set of production, distribution and consumption components that are linked in an interdependent manner and that are influenced in their functioning by a set of policies. An industrial system can comprise one entire sector or several interlinked sectors/subsectors. Figure 1 shows a base diagram, which is the graphic representation of an industrial system, showing its components, the linkages between them and some of the policies that affect the various components and the system as a whole.

The system approach provides a broader view of an industrial sector than traditional approaches because it makes explicit the complex interdependence of the economic and social components within and outside the system and helps to provide the conceptual framework to analyze and evaluate these interrelationships. The application of the approach leads to the promotion of the integrated development of industrial systems, which is understood as the harmonious balanced development of an entire system, including all its components. Specialized issues such as the integration of women, energy and environmental considerations can also be addressed within the systems approach.

The final result of the application of this method is a programme for the integrated development of an industrial system during a given time period. A programme comprises a package of interrelated technical assistance and investment projects and specific policy recommendations. The programme addresses simultaneously all of the components of a system in which bottlenecks and constraints that hinder the development of the system have been identified, so that the technical assistance and investment projects in the programme have a greater potential for producing a positive impact on the development of the system. The system approach is thus the basis for the programme approach to promoting industrial development. In addition, this approach can also be a useful tool for developing integrated human resource development programmes needed to support

Figure 1: Production and consumption system : base diagram



and sustain the structural and technological changes required in the development of the system.

Such programmes can be useful to developing countries, to development assistance organizations and to donor countries. They can provide developing countries with a sound basis for promoting and following up the integrated development of their industrial sectors. They can also facilitate industrial co-operation between developing and developed countries by permitting a better identification of investment and joint venture possibilities. Programmes can also facilitate the efforts of development assistance organizations to design, appraise, approve, implement and evaluate technical assistance projects and programmes in an integrated manner, rather than only providing isolated unrelated technical assistance projects. Moreover, the assessment of the status of an industrial system made following the system approach can provide the necessary baseline data against which the impact of programmes and projects can be evaluated.

The MEPS Method

The system approach (1) can be applied to the analysis of industrial systems at three different levels: for a large number of countries (to produce a typology), for a group of countries (to produce indicative programmes), and for a single country. These can be considered as successive stages in a programming exercise or as related possible programming methods. The three levels can be described briefly as follows:

(1) Developing a typology of developing countries to identify groups of countries with homogeneous development patterns in the selected sector. This is done through a combination of statistical analysis of sectoral data and the use of the knowledge and insights of experts on the sector.

(2) Drawing up indicative industrial development programmes for groups of countries. Such programmes can serve as guidelines for country programming or as a tool for evaluating the viability of government requests or other project proposals and for improving them with respect to their impact on the industrial system. Within the indicative programmes it will usually be possible to formulate project proposals or packages of proposals as well as project concepts and ideas, but the quantitative simulation of the effects of proposed projects will be limited.

(3) Designing country sectoral programmes, either as a follow-up to a typology and/or an indicative programme, or independently of these. Country sectoral programmes can be prepared at two different levels of detail: integrated sectoral programmes or quantitative and integrated sectoral programmes. The former is a package of technical assistance projects and investment and policy requirements, while the latter is a package of technical assistance and investment projects that have been quantitatively assessed as well as specific policy recommendations for

the development of the system. The latter involves the use of a computer model to simulate the impact of alternative programme options on all of the key components of the industrial system which comprises the sector.

The use of the programme approach offers important accelerating effects and economies in programming work, that would be more difficult to reach on a project-by-project basis. Furthermore, each programming application will help to facilitate subsequent applications, thus making them less expensive. The three levels at which the programme approach can be applied are described in greater detail below, together with examples of their application.

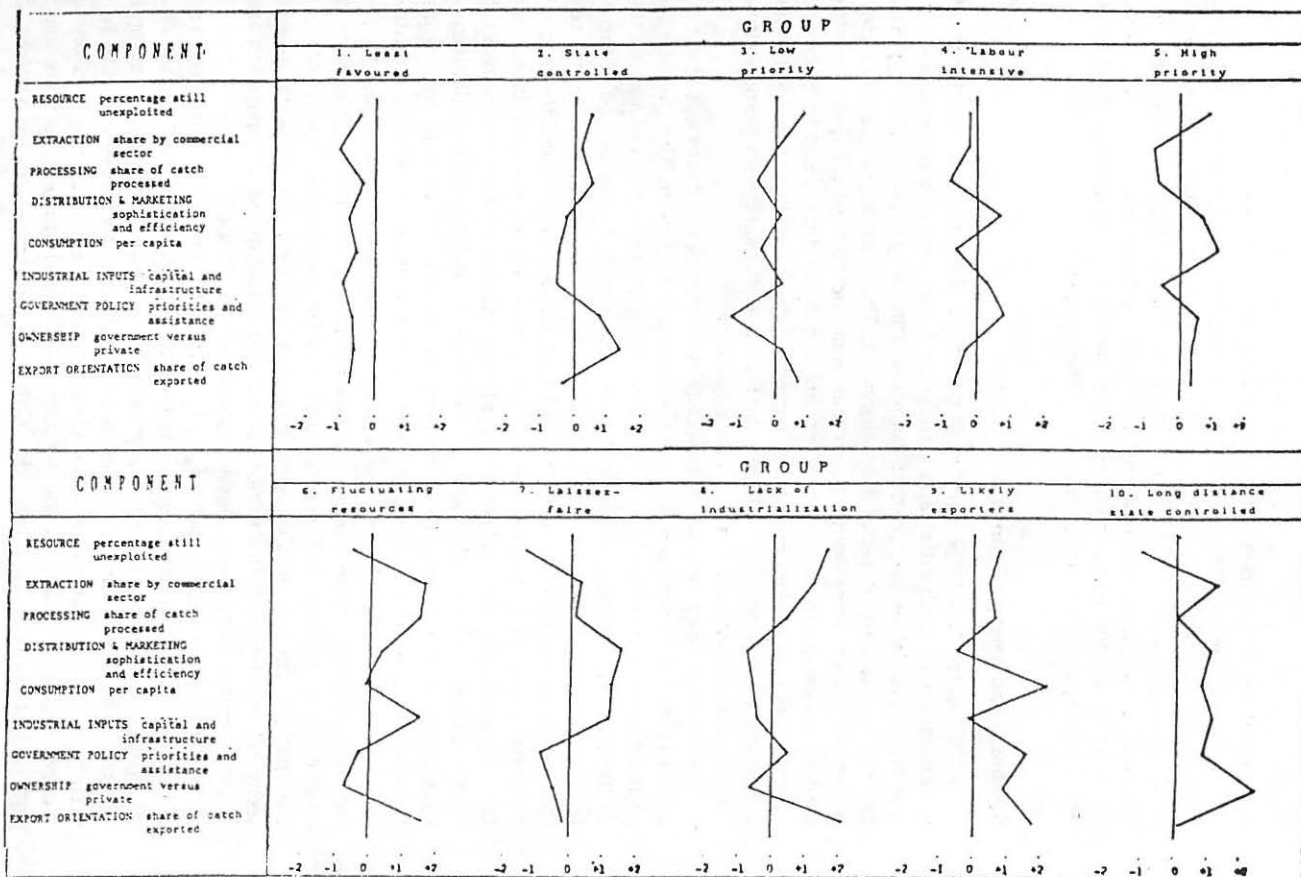
Sectoral Typologies of Countries

When applied to a large number of countries, the system approach permits the identification of similarities and differences in the patterns of development of a specific industrial sector, so that countries can be grouped into a typology according to patterns of sectoral development. This method of grouping countries represents a great improvement over the usual methods of grouping countries according to geographical, political or other criteria for industrial programming purposes, as it considers only those factors related directly to the development of a particular industry, i.e. the production and consumption components, the institutional infrastructure and policy environment.

The method for producing a typology is carried out in four steps. First a given industrial sector is analysed following the system approach. This permits the disaggregation of the sector into its component subsystems and linkages to the rest of the economy, taking into consideration economic, technical, social and policy factors affecting production and consumption. Then, characteristics are selected that describe the components and variables are chosen to show the present and potential status of each component. Data is collected on these variables in order to carry out statistical analysis using different clustering techniques. Next, based on the clusters identified, countries are grouped according to similarities of development of the sector. Each country group can be seen to have a distinct pattern of development. For each development pattern identified, a country case study may be undertaken. These studies provide in-depth and country-specific details, illustrate more closely the development patterns and contribute to the assessment of positive factors and constraints for each group. Finally, comprehensive pattern-specific development strategies covering the areas of investment, technical assistance, policies and regional and international co-operation are proposed, together with corresponding suggestions for action.

UNIDO has produced a typology of countries for the fisheries industrial system (FIS) of 64 countries following this method (2). The main results of the study consist of an assessment of the fisheries systems of 64 developing countries, leading to the identification of 10 distinct patterns of development prevailing in the fisheries systems of those countries and the classification of each country into one of the groups. Figure 2 illustrates the 10 patterns of development that were identified and Table 1 contains a summary description of those development patterns (3).

Figure 2: Patterns of development of the FIS in the 10 country groups



* See endnote 3 for an explanation of the scales used to draw the figures.

Table 1: Summary of development patterns identified

Group	Country name	Continent	Description
1	Ghana	Africa	The least favoured countries. Generally poor or under-developed countries needing fish protein but lacking in skills, inputs or infrastructure to maximize resource use.
	Kenya	Africa	
	Madagascar	Africa	
	Malawi	Africa	
	Mali	Africa	
	Nigeria	Africa	
	Sudan	Africa	
	Uganda	Africa	
	Untd. Rep. Cameroon	Africa	
	Unitd. Rep. Tanzania	Africa	
	Zaire	Africa	
	Zambia	Africa	
	Bangladesh	Asia	
	Turkey	Asia	
2	Angola	Africa	Largely state controlled fisheries. The government is involved in these countries' fisheries to a large degree. All of them have good potential for growth, both marine and freshwater.
	Marocco	Africa	
	Mozambique	Africa	
	Burma	Asia	
	China	Asia	
	Dm Kampuchea	Asia	
	Viet Nam	Asia	
	Yemen, Dem. Rep.	Asia	
	Mexico	Latin America	
3	Gabon	Africa	Low priority fisheries. Fisheries are not a high priority in these countries due to resource limitations, national wealth or other factors.
	Sierra Leone	Africa	
	Iran	Asia	
	Iraq	Asia	
	Saudi Arabia	Asia	
	Brazil	Latin America	
	Colombia	Latin America	
	Venezuela	Latin America	
4	Algeria	Africa	Labour-intensive fisheries. These countries are linked by having large artisanal fishery sectors and big domestic markets. Most of them have well organized fisheries departments and all but two have flourishing inland or freshwater fisheries
	Egypt	Africa	
	Tunisia	Africa	
	India	Asia	
	Indonesia	Asia	
	Pakistan	Asia	
	Sri Lanka	Asia	

Group	Country Name	Continent	Description
5	Congo	Africa	Small states with growth potential.
	Oman	Asia	These small population countries
	Untd. Arab. Emirates	Asia	all have relatively good fishery
	Guyana	Latin America	potential, particularly for export.
	Fiji	Oceania	Their governments have made
6	Kiribati	Oceania	fisheries a high priority sector.
	Namibia	Africa	Large but fluctuating resources
	Argentina	Latin America	and limited local demand for fish.
	Chile	Latin America	These countries have large fish
	Ecuador	Latin America	meal industries or export oriented
	Panama (Ex. CZ)	Latin America	processing plants. Although their
	Peru	Latin America	marine resources are substantial,
7	Uruguay	Latin America	they suffer from big natural fluctuations.
	Cote d'Ivoire	Africa	Laissez-faire fisheries.
	Area of Hong Kong	Asia	Commercial and private interests
	Korea, Republic	Asia	predominate in this group of
	Malaysia	Asia	countries which also have good
	Philippines	Asia	domestic markets and labour intensive fisheries. They all have
	Thailand	Asia	high per capita consumption of fish.
8	Mauritania	Africa	Lack of industrialization.
	Somalia	Africa	Good fishery potential but with serious lack of skills and inputs and very limited local market.
9	Senegal	Africa	Likely exporters.
	Maldives	Asia	Similar to group 5 above these 3
	Solomon Islands	Oceania	states are well poised to develop the export potential of their fisheries. They all have good traditional fishery skills.
10	Korea, Dem. P. Rp.	Asia	Long distance, state controlled.
	Cuba	Latin America	Strong government control but with somewhat better developed fisheries particularly in deep sea operations.

On the basis of the patterns identified, comprehensive development strategies were designed for the 10 country groups. Table 2 illustrates this, showing the strategies applicable to countries in one of the 10 groups.

The analysis of the proposed development strategies and the difficulties hindering their successful implementation led to the identification of the pattern-specific actions required for the development of the FIS for each group of countries. Table 3 summarizes the actions recommended for the 10 groups. As can be seen from the table, these actions can provide the initial basis for further analysis leading to the design of development programmes for each group that are integrated, comprehensive and pattern-specific.

As the FIS study illustrates, such typologies permit the creation and presentation of development strategies which are internally consistent and are tailored to suit each of the current types of development patterns observed at one point in time. The results of a typology are intended to benefit several types of users. First, government planning offices and ministries in developing countries can directly use the outputs of the study as inputs for further analysis and programming of the sector and for setting priorities for actions in an integrated manner. Second, the typology provides the possibility for countries to share and benefit from other countries' development experiences, and may thus provide a basis for promoting co-operation among developing countries. Third, it will also be of use to international technical assistance and aid-giving financial organizations in designing programmes for individual countries.

Based on the results of the FIS study, the programme approach was also applied on a pilot basis to the development of policies and measures to integrate women into all components of the fisheries industrial system in three countries (Senegal, Indonesia, Mexico). The results of this work are described in a report entitled "The Integration of Women in the Fisheries Industrial System" (4).

Indicative Programmes

The system approach can be applied to the further analysis of and programming the development of a given industrial system in a group of countries that have been identified as having specific patterns of development of that industry. The output of this analysis is a detailed description of the industrial system, including the bottlenecks and constraints identified, as well as an indicative programme, which comprises strategies and specific actions for technical assistance, investments and government policies to promote the development of the system.

Indicative programmes for groups of countries are prepared in four steps. First is the selection, based on the results of the typology, of the geographic area where the industrial system is to be further studied because it has potential for development, owing to the existence of natural resources, high demand, possibilities for economic cooperation etc. Although countries in one geographical area will often have different sectoral development patterns, it is likely that some similarities will exist in terms of resources, costs of factors of production, consumption habits,

Table 2: Group 4: Labour-intensive fisheries (Algeria, Egypt, India, Indonesia, Pakistan, Sri Lanka, Tunisia)

Strategies	Special problems
Increase fish production to maintain food security and employment	Some major fishing grounds located very far from markets and population centres
Improve marketing and distribution to raise consumption in inland areas	Capture and processing technology inefficient or energy expensive in some areas
Decrease waste by reducing spoilage and by utilizing by-catch from shrimp trawlers	Fishermen and fish plant operators lack knowledge of modern gear and techniques and of the operation, maintenance and repair of engines and machinery
Increase exports by better quality processing and by harvesting offshore stocks of tuna and shrimp	Appropriate technology for utilization of by-catch not yet ascertained
Expand aquaculture both for food fish and for export species	Fish canning plants lack continuity of supply
Develop support industries and general fisheries infrastructure	Artisanal fishermen lack capital and often operate at the mercy of markets and merchants

Appropriate actions

Development of good quality processing and curing in rural areas, improvement of fish transport and establishment of regular schedules for fish collection boats or trucks

Increased use of artisanal fishermen and intermediate technology vessels in off-shore fisheries. Energy conservation and more efficient energy use in fish plants

Training of personnel at all levels but with strong emphasis on practical and technical aspects

Further research and pilot projects

Better marketing and distribution, more freezing and cold store facilities at distant ports. Purchase of frozen fish from abroad to maintain supplies in off seasons.

Establishment of co-operatives, small scale credit schemes and support by extension services

Examples of ongoing actions

Regional fisheries development programmes including harbours projects, provision of ice plants, cold stores and fish transport vessels, with finance from ADB. (Sri Lanka, Indonesia)

Fleet operation with artisanal tuna fishermen working around a mothership from a large domestic enterprise. (Indonesia)
Use of national energy and fuels such as biogas in fisheries. (India)

Establishment of training centres, academies, colleges and university departments for fisheries. Fisheries research projects on waste fish utilization. (Indonesia)

Joint venture agreements with foreign fleets and fish suppliers. (Egypt, Tunisia)
Artisanal-private sector co-operation in capture and supply of fish. (Indonesia)

Ministry of co-operatives, fisheries projects K.I.K. (small scale credit Indonesia) fisheries programmes. Fisheries extension service and co-operative establishment. (Indonesia)

Strategies

Special problems

Fish farmers have difficulty getting legal access to land and water. Fish culture is mostly integrated with small scale agriculture or animal husbandry.

Tabelle 3: Group specific actions

INVESTMENTS	Groups									
	1	2	3	4	5	6	7	8	9	10*)
RESOURCE MANAGEMENT										
Survey					x			x	x	
Monitoring		x	x	x		x			x	
Policing					x	x				
Aquaculture	x			x	x		x			x
Conservation						x	x			
Extension to non-EEZ waters										x
EXTRACTION										
Ice plants	x				x		x			
Design and construction of energy, economical and appropriate vessels	x	x		x	x	x	x			
Fish ponds	x									
Conversion of vessels						x				
Develop local fleet						x			x	
Fishing gear			x				x			
instrumentation			x			x	x			
PROCESSING										
Energy-economical plants and processes	x			x		x				
Improved methods of fish curing		x		x			x		x	
By-catch utilization					x		x			
Selective rehabilitation		x			x	x				
Low cost packaging						x				

Appropriate actions

Integration of aquaculture with rural development programme. Simplification of legal and administrative procedures. Support by extension services

Examples of ongoing actions

Fish pond development programme, S. Sumatra, S.F.D.P. ADB project. Bilateral and World Bank aid for brackish water ponds. (Indonesia)

INVESTMENTS

	Groups									
	1	2	3	4	5	6	7	8	9	10*)
DISTRIBUTION & MARKETING										
Cold stores	x		x	x	x					
Cold chain		x	x	x	x	x	x			
Improved fish transport systems	x	x	x	x			x		x	x
Rationalization		x	x				x			
FISHERIES INFRASTRUCTURE										
Harbours	x	x			x	x	x	x		
Boatyards	x									
Marine engineering work-shops	x									
Fish markets	x	x		x			x	x		
Upgrading					x					
TRADE										
Domestic promotion			x			x		x	x	
Export promotion						x			x	

SUPPORT ACTIONS AND MECHANISMS

GOVERNMENT POLICIES

Integrated development policies	x	x	x	x	x	x	x	x	x	x
Goals and priorities			x							
Institutional and legal infrastructure			x	x			x		x	
Standardization of imported machinery	x									
Promotion of co-operatives			x	x						

SUPPORT ACTIONS AND MECHANISMS	Groups									
	1	2	3	4	5	6	7	8	9	10
GENERAL INFRASTRUCTURE										
Roads and transport system	x				x					x
Water supply	x	x		x						
TRAINING AND EXTENSION										
Mechanics and technicians	x			x					x	x
Quality control		x		x	x	x	x	x		x
Extension services	x			x						
<u>Fishermen</u>										
Basic	x	x	x	x	x			x	x	x
Intermediate	x	x	x	x	x			x	x	x
Advanced	x	x		x	x			x	x	x
RESEARCH & DEVELOPMENT										
Resource						x				
Processing					x		x			
Marketing				x	x					
Climatically appropriate energy systems	x						x		x	
TECHNOLOGY										
Fuel/energy conservation systems	x									
Transfer of intermediate technologies	x			x	x		x		x	
Transfer of advanced technologies		x	x						x	
CREDIT & FINANCE										
<u>Credit</u>										
Industrial			x						x	
Small-scale			x	x	x	x	x			
<u>Monitoring investment</u>										
Local: govt./private		x				x				
International		x				x				
JOINT VENTURES										
Fleet		x			x			x	x	
Processing			x		x			x		
Marketing		x	x		x				x	

*) Groups: 1: least favoured; 2: state controlled; 3: low priority; 4: labour intensive; 5: high priority; 6: fluctuating resources; 7: laissez-faire; 8: lack of industrialization; 9: likely exporters; 10: long distance state controlled

etc., which can facilitate data collection and analysis, thus making the programming work more cost effective. Second is the identification of the sectoral development patterns that prevail in the countries of the area selected. Third is the selection of countries that are representative of each development pattern and conducting case studies of those countries. This involves desk work and a brief visit to the countries before preparing indicative development programmes based on the analysis made. Finally, programmes for other countries in the group are produced through desk work complemented by extrapolations based on the information obtained in the previous steps (typology and case study).

UNIDO is presently conducting an indicative programming exercise on the fisheries industrial systems (FIS) of 8 West African countries belonging to four different patterns of development. Before carrying out the case studies on four countries (one from each group), operational kits were prepared to facilitate the use of the system approach, to standardize the kinds of information to be collected during the desk studies and field work and to ensure that data was included on all the components of the system (5).

The outputs of the indicative programming exercise will consist of programmes for the development of the fisheries industrial system in nine West African countries with different levels of precision. For the four case study countries, Senegal, Cote d'Ivoire, Ghana and Sierra Leone, the main outputs of each case study were a preliminary version of a fisheries system development programme consisting of technical assistance project concepts and ideas, investment proposals and policy recommendations. The background and justification for the preliminary development programmes is to be provided by the following information obtained or refined during the case study: government objectives with respect to fisheries, including nutritional goals, distributional aspects, etc.; an assessment of the present status of fisheries in quantitative terms; an analysis of the requirements for the further development of the system, including an identification of bottlenecks and constraints, as well as rehabilitation, training, investment and assistance needs; an examination of existing pipeline fishery-related projects; and an analysis of prevailing policies and their effect on the system.

For the other countries being studied (Mali, Benin, Togo, Gambia and Mauritania) indicative programmes are being developed on the basis of the original typology together with information collected through desk studies and in the case studies. The outputs of this programming exercise for each country studied will consist of: a refined description of the pattern of development (with greater precision than in the typology), refined development strategies, and a more precise definition of required actions to overcome bottlenecks, including: project ideas, investment ideas, and advice on policies.

A further output of the indicative programming work will be a UNIDO position paper on the fisheries industrial system in the West African countries. This paper will describe the potential role of UNIDO, in co-operation with other international agencies and financial institutions, in the development of the fisheries industrial systems in these countries.

Indicative development programmes for groups of countries provide the following:

(a) The basis for developing a position paper on a given industrial system for a group of countries;

(b) Guidelines for country programming of a given industrial system;

(c) Guidelines for developing countries for their own sector planning and for requesting more integrated and well coordinated technical assistance;

(d) Guidelines for an assessment of the requests for technical assistance placed by developing countries;

(e) Guidelines for the design of "modular technical assistance programmes" (integrated packages of projects for a country or for a group of countries);

(f) A tool to identify which other countries would be suitable for carrying out projects/programmes similar to those already implemented in countries belonging to the same development pattern;

(g) A guide to promote economic and technical co-operation among developing countries (ECDC/TCDC) activities in a given industrial system;

(h) A tool to promote the interest of donors and developing countries in the design of country-specific sectoral programmes, as described below.

Country Sectoral Programmes

The analysis and programming of an industrial sector in one country represents the third type of application of the system approach to sectoral programming. The work can be undertaken at two different levels of detail and effort. The first level would produce an integrated sectoral programme, and the second level would result in a quantitative and integrated programme for the development of the sector. The latter represents a full application of the method and would require 4 – 6 months of work, while the former would require a maximum period of work of about 2.5 months.

(i) Integrated Sectoral Programme

In this case, the programme approach would be applied within a preparatory assistance project that would have a maximum of duration of 2.5 months. The main output of the project would be package of related technical assistance projects that can include direct support, institution-building, training, pre-feasibility and feasibility studies etc., as well as opportunities for investment projects and recommendations concerning necessary policies, or areas in which policies need to be elaborated. The difference to most preparatory assistance projects will be that instead of resulting in just one project, the output will be an integrated development programme aimed at simultaneously overcoming all the major bottlenecks and constraints hindering the development of an industrial system.

The preparatory assistance project following the programme approach will provide the basis for well-prepared project documents that answer all the most important questions about the system. It should also provide baseline data for the future evaluation of the impact of technical assistance on the development of the system. The work would involve both desk study and one visit to the country and could also involve the use of the MEPS model at an intermediate level of disaggregation to carry out some computer simulation of programme options.

(iii) Quantitative and Integrated Sectoral Programme

The main output is a quantitative programme for the integrated development of an industrial system, similar to the type described above, but with a greater level of precision, and containing not only all the required technical assistance projects but also the investments that would be needed (including estimates of their cost), and specific recommendations for appropriate policies. This is possible because of the level of disaggregation of the industrial system carried out, which permits the full use of the MEPS quantitative model on a micro-computer (6).

The full application of the MEPS method permits a large number of quantitative simulations of changes introduced in any one or more components of the system (for example, technical changes, price changes, changes in supply and demand, expanded and diversified production, different policy decisions etc.) and shows the effects of these changes on the various components and on the system as a whole, thus making it possible to select the most appropriate activities for a development programme. Furthermore, the MEPS application means that the potential impact of all technical assistance and investment projects under consideration by the Government (both those emanating from the programming exercise and those already in the pipeline) can be measured and the risks and constraints that would endanger their success can be identified and proposals made for overcoming them.

A final feature of a project to prepare a quantitative and integrated sectoral programme will be the transfer of the MEPS method to the country, including the provision of the computer software and the training of local counterparts in its use. This will provide a tool for monitoring the progress of the implementation of the programme (which will generally cover a five- to ten-year period) and for conducting negotiations, both among the domestic actors and with potential foreign donors or commercial business partners.

Advantages of the MEPS Methodology

The advantages of this methodology over conventional methods for technical and economic assessment and programming the development of industrial sectors are the following:

(a) Development programmes are generally formulated with a macro-economic approach with reference to national economic policies but with a micro-economic

approach when specific projects are formulated and evaluated. The links between the macro and the micro aspects are often not sufficiently taken into consideration. This methodology combines the micro and macro analysis and makes it possible to evaluate a given development programme at both levels and to determine the necessary policy measures.

(b) The use of this methodology permits the immediate quantitative comparison between different technical or economic options, thereby facilitating decision making.

(c) The methodology links directly the production components of an industrial system with the demand and makes it possible to evaluate the effects of the interaction between production and demand.

(d) The methodology incorporates the sectoral interdependence of a given system, thus facilitating the analysis of integrated development. It allows quantitative evaluation of different options for both vertical and horizontal integration.

A Full Application of the MEPS Methodology

An example of the results of a full application of the programme approach using the MEPS methodology to an industrial system by UNIDO is a study of the fisheries industrial system (FIS) in a West African country carried out by UNIDO in cooperation with the World Bank and FAO. Since it was a full application of the method, it included all the stages described in Figure 3, including the definition of objectives, the assessment of the present status of the system, the identification of the main constraints hindering its development, the design of development strategies and programming. In 1987, when this work was started, the Government was already considering a group of investment and technical assistance projects with a total estimated cost of nearly US-\$ 100 million. Therefore, an important part of the analysis included the quantitative assessment of the potential impact of these projects on the system in relation to the government objectives for the development of the system.

Some of the results obtained during the assessment stages of the FIS study are shown in the base diagram (Figure 4). This diagram provides an overview of the system in 1987. It shows a very high level of exploitation by the foreign fleet that leads to overexploitation of resources, a very minor contribution of the domestic industrial fleet, an active artisanal fleet in marine waters and a small fresh water fleet. The almost complete lack of infrastructure for landing catches and the unavailability of storage facilities and distribution channels from landing to processing sites is also pictured. Their absence not only hinders full capacity utilization but also produces handling losses. Fish processing 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. The distribution and marketing sector is underdeveloped, also lacking the infrastructure for storage, transport and communication.

With regard to consumption, the per capita level is low compared to neighbouring countries (approximately one-third of that of one immediate neighbour)

Figure 3: Application of MEPS to an industrial system

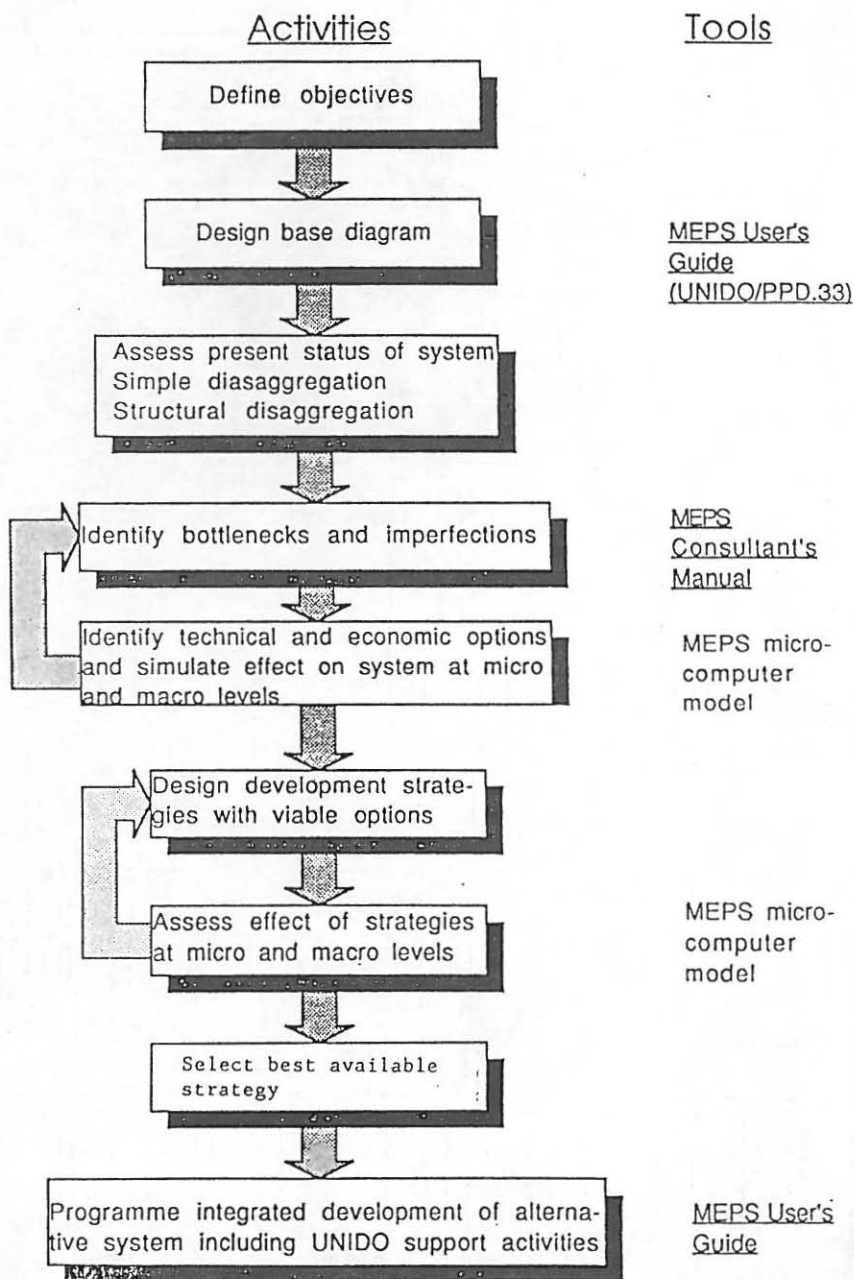
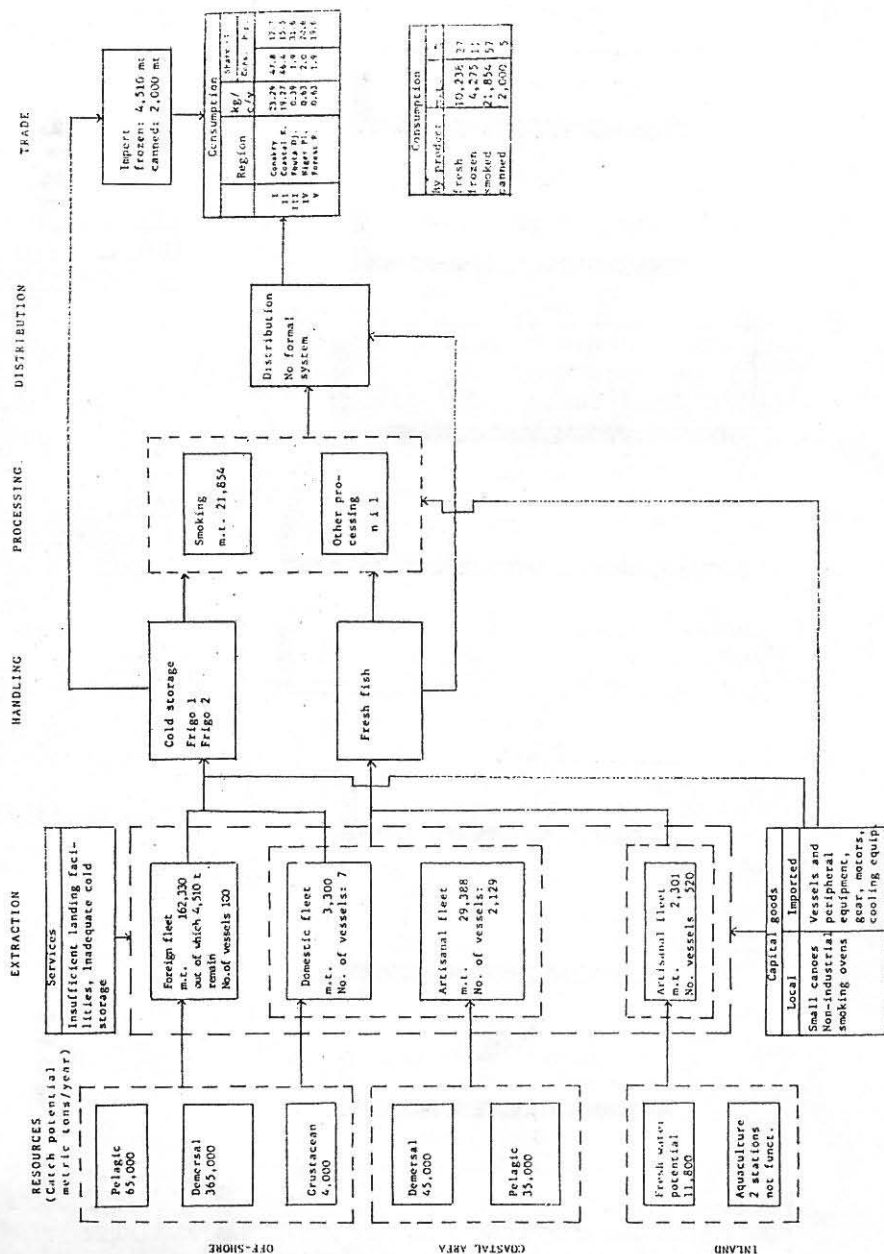


Figure 4: Base Diagram of the Fisheries Industrial System (FIS) — the Present System



and is concentrated mainly in the capital due to the location of landings and poor distribution network. All capital goods for the system have to be imported, with the exception of canoes and smoking ovens.

The simulation of the potential impact of the approximately US-\$ 80 million worth of projects (7) that were approved in 1987 by the government showed that considerable improvements in the FIS would be achieved and that they would succeed to some extent in achieving the goals set by the government. However, not all the government objectives could be achieved by the planned projects, particularly increasing the availability of fish to 15 kg per capita in 1995 and overcoming the imbalance between regional population distribution and fish availability.

In order to reach the goal of 15 kg per capita of fish available by 1995 and to attain a higher level of seafood self sufficiency, local fish extraction should increase by approximately 30,000 tons per year by 1995. Quantitative simulations of two possible strategies for the attainment of this goal (either doubling the landings by the national industrial fleet or expansion of the artisanal fleet) were carried out. The simulation permitted a precise comparison of the results of each one, showing their advantages and drawbacks. The first alternative would lead to further overexploitation of some resources and require substantial amounts of foreign exchange for imported inputs; for the second alternative, this would be much lower. Further advantages of the second alternative would include increased employment in the system and expanding the availability of fish outside the capital.

Even after the implementation of one of the two strategies proposed to increase domestic availability of fish and achieve seafood self-sufficiency, some problem areas would still remain. Therefore, a successful development of the FIS will require additional support measures in the form of technical assistance projects and appropriate government policies.

A package of eight technical assistance projects, with a total value of US-\$ 1.1 million, was prepared on the basis of computer simulations made using the model. This package constitutes an integrated technical assistance programme that would provide the necessary support to ensure the success of the development programme of investment and technical assistance already planned and the achievement of all the government's objectives relating to the FIS following one of the proposed strategies. The complete programme includes specific policy recommendations affecting each component of the system that would be necessary for the programme to succeed. These policies include the establishment of a fisheries management system, establishment of fixed licence fees, the opening of credit lines for private enterprises and co-operatives, the conclusion of co-operative management or joint venture agreements and the possible establishment of temporary subsidies to promote the utilization of under-used resources.

Summary and Conclusion

The programme approach was developed at UNIDO in response to the widely perceived need for increased impact of technical assistance projects on the industrial development of developing countries. The advantages of an integrated development programme are that it provides a package of technical assistance and investment projects and policy advice to promote the harmonious balanced development of all components of an industrial system.

The grouping of countries (typologies) according to patterns of development of a given industrial system and the preparation of indicative programmes for groups of countries are complementary tools and options for the design of integrated development programmes. Ideally, typologies should be developed covering all the most important industrial systems in developing countries to provide the basis for preparing indicative programmes and country sectoral programmes.

Indicative programmes represent a cost-effective programming method. By applying the programme approach to a group of countries with identified patterns of development (through sectoral typologies), it is possible to prepare an analysis of the industrial subsector, strategies for technical assistance and investments and policy advice that can form the basis for development programmes for all the countries in the group. These can be used by Governments, development assistance organizations, bilateral aid donors and potential investors.

Country sectoral programmes can be prepared independently of the foregoing programming activities, or they can be undertaken as a follow-up to a typology and/or an indicative programming exercise. They can be prepared at two different levels. An integrated sectoral programme provides a package of related technical assistance projects, as well as investment needs and policy recommendations for the development of an industrial system in one country. If the time and resources are available, a quantitative and integrated sectoral programme has the advantage of permitting precise quantitative simulations of all proposed projects and policy changes to determine the optimal package of measures for achieving a country's objectives in the development of an industrial system. Furthermore, there are the benefits that can be derived from the transfer of the MEPS model to the country to be used as a tool for monitoring and adjusting the implementation of a development programme and negotiating with domestic and foreign investors, as well as for planning the development of other sectors.

While it is not expected that the programme approach will eliminate the need for individual technical assistance projects, it is hoped that it will complement the traditional approach to project identification and design and succeed in increasing the positive impact of technical assistance on industrial development.

NOTES

- (1) MEPS is a tool for the application of the system approach. This method was originally developed by the Junta del Acuerdo de Cartagena (JUNAC) and further expanded in co-operation with UNIDO. MEPS is an acronym for the original Spanish name of the method,

Metodología de Evaluación, Programación y Gestión de Sistemas de Producción y Consumo, or translated into English, methodology for the assessment, programming and management of production and consumption systems.

- (2) The results of this work are described in a report entitled: "Industrial Development Strategies for Fishery Systems in Developing Countries", Sectoral Studies Series No. 32, PPD. 30, 3 April 1987, UNIDO, Vienna.
- (3) Each group's component score in the figure is the arithmetic mean of the countries within it. Each component was scaled so that across the 64-country sample each has a variance of one and a mean of zero. Similarly, deviations from the mean greater than +1 or less than -1, are more than one standard deviation away from the average of the 64 countries, that is, they are exceptional.
- (4) PPD. 34, 15 May 1987, UNIDO, Vienna.
- (5) The kits for two countries (Ghana, Sierra Leone) included charts for data collection on the participation rates of women throughout the various components of the systems with a view to ensuring their consideration in ensuring project concepts and policy recommendations.
- (6) This is an engineering and accounting model, comprising a large number of equations in which parameters related to production, inputs, investments, labour force, imports, etc. are estimated for each component and for the system as a whole, based on data collected in the country, taken from expert opinions and extracted from statistical sources and input into the model. This model is different from econometric projection models based on the analysis of historical time series as well as from optimization models which imply the aggregation of results in a single objective function. It is not a predictive model but an instrument to facilitate the comparison of hypotheses and alternate policies by successive approximations.
- (7) These projects address constraints related to resource management, the national industrial and artisanal fleets, landing facilities and training.

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