PART 2
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CONTENTS

SOCIO-ECONOMIC CONSEQUENCES OF EXCESSIVE FISHING EFFORT AND THE NEED FOR FISHERY MANAGEMENT

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ABSTRACT

Although fisheries account for only 2% of Sri Lanka's GDP, the sector is very important in terms of employment, food supply and the generation of foreign exchange. The fisheries are essentially small-scale and coastal in character but steps are being taken to introduce new technologies and new types of vessels and to develop offshore fisheries. After a period of state control and regulation, the present economic policy aims at stimulating market mechanisms and liberalisation. A National Fisheries Development Plan for 1990/94 has been elaborated. Among the major constraints being faced are the conflicts arising between fishermen using traditional craft and gear and those taking advantage of new methods and motorised vessels. Multiple-use problems, arising especially from tourism, are another serious issue in coastal area management. Above all, the open-access nature of most Sri Lankan fisheries is a major impediment to more effective management of the resources and has led to serious over-fishing. Considerable encouragement can, however, be drawn from the successful re-orientation of the fisheries cooperative movement which now gives emphasis to village level organisation and the involvement of women. The paper concludes by presenting a number of suggestions to promote the sustainable development of the coastal resources, notably by limiting entry to the fisheries and by increasing the participation of the fisherfolk, through cooperatives, in the management process.

1. INTRODUCTION

Sri Lanka's sea area is approximately 23 times its land area. It comprises a territorial sea extending up to 12 —24 nautical miles and an Exclusive Economic Zone (EEZ) extending up to 200 miles from the baseline covering an area of approximately 230,000 sq km. There are nine provinces embracing 24 districts. Below the district level, there are 245 sub-divisions with clusters of villages headed by an Assistant Government Agent or Divisional Secretary. There are *25,451* villages in total.

The coastline, 1800 km long, meanders along sandy beaches, extensive lagoons and estuaries, mangroves, coastal marshes and dunes. Seawards lie reefs of sandstone or coral and shallow beds of coastal and estuarine seagrass.

The total population of Sri Lanka is about 17 million of which about a half live in coastal districts. The population is still predominantly rural in character. The average population density is one of the highest in the Bay of Bengal region. The most populated areas lie in the southwest, roughly corresponding to the major climatic region known as the Wet Zone.

Although fisheries account only for 2% of Sri Lanka's GDP, the sector is important in terms of employment, protein supply to the population and foreign exchange earnings. The main protein source for the Sri Lankan population is fish, 7.7 g/day while meat provides 1.5 g/day and vegetables *4.5* g/day. Fish contributes 65% of the animal protein and 13% of Sri Lanka's total

protein intake. The present per capita consumption of fish is about 15 kg per annum.

The Sri Lankan population consists of Sinhalese (74%), Tamils (19%), Ceylon Moors, Burghers and Malays (7%). The majority of the population is Buddhist (70%) while the balance is constituted by Hindus (15%), Christians (8%) and Muslims (7%). A recent socio-economic survey carried out along the west coast by the Ministry of Fisheries and Aquatic Resources (MOF) showed that Sinhalese, 87% of households, were the fishing community. The Matara district and the Chilaw areas were found to be almost exclusively Sinhalese. In the Puttalam district 34% of households were Tamil and 14% Muslim. The religion practised by the fisherfolk reflects the ethnic dominance in Matara, where 98% of the households are Buddhist. In contrast, in Chilaw 98% of the households are Christian while in Puttalam the figure is 56%. The majority of them are Sinhalese but there are also some Tamils in Chilaw. In the northern districts, the majority are Tamil except for migrant fishermen. In the eastern districts all three communities are present in varying proportions.

Prior to 1977 the State played the major role in economic activity, with a heavy accent on social welfare and income redistribution. The result was a slow growth rate (only 3.2%). Since 1977 economic policy has been shifted to stimulating the market mechanism and liberalisation. This is being achieved through unification of the exchange rate and adoption of flexible exchange rate policies, liberalisation and dismantling of import and exchange controls, reduction or removal of administrative and price controls, relaxation of state monopolistic controls and encouragement of private sector competition, introduction of liberal tax incentives for the private sector, investment and savings, and reform of subsidy policies.

Fisheries in Sri Lanka are basically small-scale. The objectives of fisheries development, as outlined in the National Fisheries Development Plan, 1990 – 94, are as follows:

i. To increase the production of fish in order to raise the nutritional status of the people through a higher per capita consumption of fish.

ii. To promote the rational and optimum exploitation of Sri Lanka's fisheries and aquatic resources based on the application of modern science and technology.

iii. To support the national programme for Alleviation of Poverty by increasing incomes and standards of living of those dependent on fisheries and fisheries related activities.

iv. To increase employment opportunities through fisheries and fisheries-related activities.

v. To increase foreign exchange earnings through exports of fisheries and aquatic products.

Over the years, fish production has increased, especially that of the coastal fishery. In the open access coastal fisheries, excessive fishing effort was applied, thereby depleting resources, and lowering incomes for small-scale fishermen. Under these circumstances, fisheries

management is an immediate requirement. In this management process the participation of the resource users is essential for successful implementation.

2. GENERAL CHARACTERISTICS OF COASTAL FISHERIES

2.1 Coastal fishery resources

Natural limitations on the marine fish resources around Sri Lanka are imposed by rather a narrow continental shelf along the 1700 km long coastline, with an average width of 14 miles and rarely extending beyond 25 miles. The Sri Lankan part of the shelf is 28,000 km2. There is no upwelling with significant impact on the fish resources.

The "Fridtjof Nansen" survey in 1978 – 1980 estimated the potential yield from coastal fish resources within the continental shelf to be 250,000 tonnes per year of pelagic and demersal species. Pelagic fish were estimated to have a maximum sustainable yield of 170,000 t per year and demersal species 80,000 t. The present yield from demersal species is around 35,000 t. Inshore demersal resources of shrimp (5000 —7000 t) and spiny lobster (600 t) are the most valuable.

Preliminary estimates of Sri Lanka's offshore resources indicate that 50,000 – 90,000 t per year could be taken without risk of over exploitation. The species include yellowfin tuna, skipjack tuna, bigeye tuna, bill fishes and pelagic sharks. The total marine fisheries resources, including Sri Lanka's offshore area, could thus perhaps yield up to 350,000 t per year.

2.2 Exploitation of coastal resources

The coastal subsector is the most important, accounting for some *75%* of total fishery production. In the last two decades, exports of marine and aquatic products have developed into one of the fastest growing export subsectors. More importantly, since all exports are 100% local resource based, the net foreign exchange earnings are higher in comparison with other sectors.

Table 1. Fish Production in 1985— 1993 (mt)

Year	Coastal	Offshore and deep sea	Inland	Total
1985	140264	2400	32743	175409
1986	144266	3400	35390	182056
1987	149278	4259	36465	190002
1988	155099	4425	38012	197536
1989	157411	*8155*	39720	205286
1990	134 132	11666	*31265*	177063
1991	159 151	15080	23832	198 063
1992	163 168	22000	21 000	206 168
1993	169900	33000	18000	220900

Source: Department of Fisheries and Aquatic Resources

Since 1950, the fisheries have changed from entirely artisanal to more semi-industrial as a consequence of motorisation of traditional craft and the introduction of new craft, permitting more effective fishing methods. The total number of craft is now estimated to be around 28,000, giving employment to approximately 120,000 persons in fishing and post-harvest activities. The major type of fishing gear is the drift gillnet. Long lines, troll lines, trawl nets, purse-seines, pole and line are also used.

The total yearly marine catch increased from 90,000 mt in 1972 to reach a peak of 185,000 t during 1983 and then declined to 146,000 tin 1990. The decline in fish catches reflects the disturbances in the north and the east which started in the latter part of 1983. Better data (e.g. catch per unit effort for different types of vessels and gear) is needed before sustainable fishing levels can be estimated and used as a basis for effective fisheries management plans.

In almost all coastal towns along the southwest coast, fisheries are of fundamental importance as most ofthe people in these areas are engaged in fishing and fishery-related activities. Over fishing of coastal shrimp stocks has occurred outside Negombo and Chilaw because of intensive trawling. Management measures have been taken in the form oftrawling restrictions in certain areas. Trawling is completely banned in Chilaw and permits to operate purse-seines are not issued at present.

Since independence fishing has been promoted and assisted by the state. In the overall economic development programmes, a series of schemes for its furtherance have been implemented, such as the promotion of motorisation of traditional craft and introduction and extension of new types of fishing craft and nylon nets. These developments, together with rapidly growing consumer demand for fresh fish, led to a rapid increase in production until the mid-I 980s.

2.3 Aquaculture

According to the MOF, the maximum area for coastal aquaculture development is about 120,000 ha of brackish water bodies of which two-thirds is large lagoons and estuaries. Approximately 6000 ha of this brackish water is estimated to be suitable for aquaculture. Appropriate environmental impact assessments have to be prepared, before these areas can be utilised showing that the development will not damage the enviromnent or prove unsustainable in the long term.

The existing 100 intensive and semi-intensive shrimp farms located along the Dutch Canal, close to brackishwater lagoons in the coastal district of the Northwestern Province, have become an environmental problem forthe Mundal/Puttalam lagoon system. The problem is mainly a result ofpoor site selection of the individual farms and bad management of the present culture systems. These farms are at present using the same limited brackish water from the Dutch Canal. The water supply problem could be solved by dredging the old canals connecting the Dutch Canal to the sea.

Sustainable fish culture systems for local communities have still not been developed. Marine cage culture, crab fattening, extensive polyculture of fish and shrimp, seaweed culture and mollusc culture are possible areas for development. There is a need for integrated and applied research. Cooperation between environmental and resource use researchers is needed to achieve sustainable aquaculture development in the coastal zone.

2.4 Multiple use of the coastal areas

In addition to fisheries, other industries such as tourism make demands upon the coastal areas. Tourism has developed rapidly during the last 20 years. The beaches are Sri Lanka's most important tourist attraction. They cover more than 11,000 ha and vary greatly in size and type. Diving and snorkelling on coral reefs are popular tourist activities and other forms of nature-oriented tourism in the coastal zone might be considered and developed.

It is often said that tourism and fisheries are complementary. However, experience has shown that inappropriate tourism planning has caused many conflicts between these two major economic activities in the coastal zone. Disputes have arisen between hotel authorities and local fishing communities. In many cases the beach frontage of the hotel is fenced, sometimes against the provisions of the Coast Conservation Act, obstructing access for the fishermen.

There are few other significant employment opportunities in the coastal areas. The coconut industry is widespread and in some areas, industries for food processing, textile manufacturing and building materials have been established. Family-based agriculture and cattle farming are carried out, but very few of the poor coastal families have access to suitable land because of the limited available land area.

The fisheries industry in Sri Lanka is basically small-scale in both the coastal and offshore subsectors. In the coastal areas, there are about 100,000 active fishermen using traditional craft. There is an open access system in the coastal fisheries although some fisheries have limited access, e.g. the beach-seine fishery and stake-net 'Kattudel' fishery in the Negombo and Chilaw lagoons. The main target is pelagic species and the exploitation of demersal species is limited.

2.5 Fish marketing

The demand by consumers is mainly for fresh fish and therefore the bulk of the catch is marketed fresh. Fish marketing is competitive and daily auctions are conducted at landing centres. Wholesalers purchase fish and retailers, especially bicycle vendors, purchase fresh fish from wholesalers or sometimes directly from producers. These bicycle vendors usually have a set of customers who are supplied daily with fish. The unsold catch is frozen. Supermarkets stock processed fish but the amount marketed in this form is limited.

2.6 Fisheries cooperatives

The organisation of fishermen in Sri Lanka started in the 1940s with the introduction of cooperatives. The fisheries cooperative movement has had periods of progress and of problems. The reorganisation of small, village level fisheries cooperative societies (FCSs) in 1972 into large primary societies proved to be unsuccessful due to the removal of local leadership which hitherto ran these FCSs. Further, the successful FCSs felt that their resources were being used by the unsuccessful FCSs. Capital inputs in the form of boats, engines and gear were issued under producer subsidy schemes/institutional credit schemes to these FCSs but recovery of loans was poor.

The latest experiment in organisation of fishermen was undertaken in 1989 with emphasis on

the establishment of village level FCSs. During a short span of three years, over 760 fisheries cooperatives were established with a membership of 83,000. Among the important features of these newly established FCSs is that they are open to all the members of a fisherman's family; the membership of the spouse has proved particularly important and there are now 20,000 female members in the FCSs. Most of these new cooperatives seem to be functioning satisfactorily and at present they have a total share capital of Rs. 7 million ($US 1 = Rs. 49.50) and savings amounting to Rs. 19 million. Under a producer subsidy/bank credit scheme, they have been provided with loans up to Rs. 121 million. The FCSs are vertically integrated to a national level Fisheries Cooperative Federation through District Fisheries Cooperative Unions.

The participation of women is clearly evident in these village level cooperatives. When women are made co-borrowers in credit schemes, it has been observed that repayment rates are improved. Women members are given credit facilities to engage in self-employment activities such as fish marketing, coir-rope making, poultry farming and sewing.

3. SOCIO-ECONOMIC ISSUES IN COASTAL FISHERIES MANAGEMENT

Most of the 100,000 fishermen engaged in fisheries in Sri Lanka are dependent on coastal fisheries as their sole source of income. Some 10,000 persons are employed part- time and a further 5000 are indirectly employed by the industry. The dependent population is about 500,000.

With few exceptions, there is open access to the coastal fisheries. Beach seine (Madel) and stake net (Kattudel) fisheries are among the few instances where territorial use rights are in force (TURF). They are comparatively well managed with a system of limited entry into the fishery. In these fisheries, limited entry is based on criteria such as area of residence of resource users (e.g. resident fishermen of a given village), time of operation, number of fishing units, inheritance (e.g. rights being handed over from father to son), etc. In these fisheries, because of the above management measures, there is no immediate danger of depletion of coastal resources. However, in the majority of coastal fisheries, there are no such limits on entry. Because there is open access, fishing effort has increased over the years. This has led to conflicts among groups of fishermen engaged in different types of coastal fisheries.

Major conflicts took place following the introduction of new technology in the coastal fisheries. In the late 1950s, there were conflicts between the fishermen using traditional craft and gear and those enterprising fishermen who took up the challenge of using motorised boats and nylon nets. In the late 1960s, many fishermen wanted to procure motorised boats with nylon nets and in the 1970s purse seines were introduced. In the mid 1980s, there was so much resistance from fishermen using other types of gear, that measures were taken to limit sizes and numbers of purse seine nets and their area of operation. A high licence fee was introduced and eventually the issue of licences was suspended. Disputes between coastal trawl fishermen and groups engaged in other types of fishing led to the complete banning of trawling in Chilaw in response to the representations of fishermen who were against trawling in spite of an effective management system introduced by the trawl fishermen themselves. As a result, the Government is implementing a massive programme for the relocation of these fishermen to other fisheries. Some concrete measures have been taken with a view to limiting entry to the coastal fishery. For instance,

allocation of producer subsidies (up to 50%) for fishermen to purchase boats, engines and fishing gear has been changed from coastal fisheries to offshore/deep sea fisheries.

The various types of fisheries in Sri Lanka face major management problems. Fortunately, these problems were identified in time and the Government is taking long term remedial measures. First, it was found that the existing legislation, enacted in the 1940s, was inadequate to deal with the vast development in coastal fisheries during the last few decades. With the assistance of FAO, new fisheries legislation has been prepared to promote the sustainable development of coastal fisheries. Among important management measures which will soon become law, are a licensing system for all active fishing methods, the introduction of fisheries management areas and conservation-based exploitation, together with bigger fines and jail terms for violators. In certain fisheries, for example purse-seining, a high resource fee is being introduced to limit entry.

In order to encourage participation by resource users in the management process, they have been organised under the umbrella of the cooperative movement. A programme to educate fishermen in the importance of fisheries management is being undertaken. With the assistance of the UNDP, a Fisheries Management Project at a total cost of Rs. 106 million is being implemented. Major components include a census of fishing communities to collect and analyse socio-economic data, a craft and gear survey and preparation of legislation for management of specific coastal fisheries. A Fisheries Management Unit is being established in the Department under this Project.

4. EXPERIENCES IN IMPLEMENTATION OF MANAGEMENT MEASURES

Since certain controls have to be introduced to manage an open-access fishery, implementation of management plans is not easy and there are many practical difficulties. The purse-seine net fishing regulations introduced in 1986 show the difficulties encountered in the management process. Although area, number of nets and type of nets have been specified along with other equipment, purse-seine operators violate these regulations. Recently, enhanced fines, jail terms and confiscation of boats, nets and other equipment of those engaged in purse-seine fishing have been proposed to make management of this fishery effective. The failure is mainly due to the specification of the nets which cannot be operated in prescribed areas of the sea (between 7 and 10 miles from the shore). The comparatively low prices of fish due to increased supply in areas where purse-seines are operated, and higher income from this fishery, are also contributory factors. The small-scale fishermen using other craft and gear object mainly for these reasons.

Fisheries where there are TURFs (eg. the beach-seine fishery and stake- net fishery, management measures are usually successfully implemented.

5. CONCLUSIONS AND SUGGESTIONS

The importance of managing the coastal fisheries is now being realised more than ever before, mainly because most of the fisheries in Sri Lanka still enjoy open access and there are no limits on the growth of fishing effort. There are thus many problems, for instance the diminishing marginal returns of fishing operations and the effect on the environment as a result of over-exploitation. The following suggestions and notes are provided regarding sustainable development of coastal resources.

i. For any management measure to be successful, fishermen must be properly educated about the magnitude and nature of the available resource. Thus it is very important to have correct information on the stocks or at the very least there should be indicators where there is maximum or over-exploitation.

ii. When planning and implementing management measures for the coastal fishery, the participation of fishermen is essential. In this regard, fishermen's village organisations are a definite advantage.

iii. Many active fishermen are employed by 'absentee' boat owners who are not interested in conservation of resources in a given coastal area.

iv. It is usually difficult to limit the entry of fishermen to a given type of fishery. However, it may be possible to transfer them to another type of fishery (rather than to a completely new industry). In Sri Lanka, the coastal fishermen are being transferred to offshore fisheries with some success.

v. Legislation, with licensing arrangements for all major types of fisheries including resource fees depending on the income generated, should be introduced together with effective enforcement mechanisms. When drafting legislation for the management of coastal fisheries, the participation of the fishing community is essential.

vi. Provision of infrastructure and other facilities to those fishermen of the community who adhere to management measures, should be considered with a view to limiting entry to certain fisheries.