

South Asia Workshop and Symposium on Fisheries and Coastal Area Management

26 September - 1 October 1996
Madras, India

Proceedings

International Collective in Support of Fishworkers
College Road, Chennai 600 006, India

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SOUTH ASIA WORKSHOP AND SYMPOSIUM ON FISHERIES AND COASTAL AREA MANAGEMENT

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Introduction

The artisanal and small-scale sector contributes up to 25 per cent of the world marine fish production. Almost the entire catch is taken from the coastal waters. In addition, two-thirds of marine fish production come from stocks which pass the first and most vulnerable stages of their life cycle in coastal areas. The health of the coastal marine environment, therefore, is inextricably linked to the livelihood of over 120 million people who are directly or indirectly dependent on this sector.

However, coastal areas all over the world are being rapidly degraded as a consequence of activities of actors both within, and outside, the fishery sector. In addition to overfishing from non-selective fishing gears, like trawling, and the use of other destructive fishing methods, like dynamiting and cyanide poisoning, the coastal environment is also threatened by pollution from land-based sources coral reef destruction and mangrove deforestation. The degradation of the coastal environment, in turn, critically affects the livelihood rights, particularly of marginalized fishers, in several countries and often leads to social conflicts.

Significantly, while negative externalities from fisheries to other sectors are normally insignificant, those from non-fishing activities to fisheries are formidable, a factor yet to be reckoned with in many countries. For instance, although fisheries do not pose any threat to agriculture or industry, the environmental impact that agriculture or industry is capable of inflicting upon fish habitats can be damaging. Given this scenario, the critical importance of coastal area management initiatives sensitive to the concerns of the fishery sector is being recognized all over the world.

Rationale for the Workshop and Symposium

Fishworker organizations the world over are concerned about the degradation of coastal habitats vital to fishery resources. This concern was articulated in the first-ever Conference of Fishworkers and their Supporters in Rome in 1984, and, subsequently, in all the three conferences organized by ICSF since 1986. In the conference in Cebu in 1994, for instance, the impact of coastal area degradation on the livelihood of the artisanal and small-scale fishery sector was discussed at length. It was recognized that fishworkers' organizations need to look systematically into major coastal resource management issues and draw up action programmes that would, at the outset, address fisheries issues in the littoral area. This could eventually be expanded to animate fisheries sector institutions to defend the interests of fishing communities in the coastal zone against marginalization by other user-groups and interested parties.

There has, therefore, been a strong emphasis on issues related to the coastal environment in the activities and programmes of ICSF. In addition, a specific request from Indian fishworkers for a session to help them develop a framework to examine such issues, provided the impetus for the workshop and symposium on fisheries and coastal area management, held in Chennai (then called Madras), India, from 26 September to 1 October 1996. The focus was on countries in the South Asian region, i.e. Bangladesh, Sri Lanka, Maldives and India, which often share rivers and seas, while also facing similar issues of coastal area degradation and management.

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Structure and Objectives

The six-day programme was divided into two parts, a four-day interactive workshop followed by a two-day symposium. Participants of the workshop included representatives from fishworker organizations, non-governmental organizations (NGOs) working with fishworkers, policymakers, academics, as well as representatives of the FAO.

The objectives of the workshop were to:

- document coastal area degradation issues of concern to small-scale fishing communities;
- review legislation, guidelines and other instruments of direct relevance to fisheries and coastal area management; and
- facilitate an understanding among fishworkers' organizations and other interested groups on issues of natural resource management and property rights, with special reference to coastal fisheries.

The workshop thus provided an opportunity for participants to share their experiences, and to examine concepts and issues related to the institutional and policy dimensions of fishery and coastal area management in an in-depth manner.

Participants of the symposium included, in addition to those who attended the workshop, representatives of government agencies in Sri Lanka, India and Maldives, as well as local participants from Madras, such as bureaucrats, academics and activists.

The objectives of the symposium were to:

- examine the initiatives of the State in coastal area management in South Asia; and
- facilitate a dialogue between policymakers and representatives of fishworkers, and to examine ways in which fishery sector institutions can defend the interests of fishing communities in the coastal zone.

Methodology

Workshop and symposium participants came from diverse backgrounds. They included activists, academics and policymakers. The aim was to provide an environment conducive to dialogue, discussion and sharing, and to draw upon, and benefit from, the knowledge and experiences of the participants. The methodology that was adopted reflected this emphasis. Sessions were structured to allow a two-way process of communication. As such, there were no 'lecture sessions'. Panel discussions and sessions in small groups provided space for participants to express their views and concerns. While the programme schedule was prepared in advance, it was open to modification, depending on the priorities and needs identified by participants.

Pre-programme Preparations

Background material was prepared by the ICSF secretariat on major coastal resources management issues in all the countries of South Asia. This included a review of coastal area degradation problems in the region, from the perspective of the fisheries sector, as well as of legislation of direct relevance to Integrated Coastal Area Management (ICAM). A dossier containing a compilation of articles on issues related to natural resource management and

property rights regimes, aquaculture, fisheries and coastal area management, was also put together.

Participants of the workshop were requested to prepare, in advance, brief write-ups or situational reports focusing on coastal area management and degradation issues in their respective areas. In addition, a representative from each of the countries invited was asked to prepare a paper providing a broad overview of coastal area issues in his or her country. Resource persons invited to make presentations during the workshop and symposium were also requested to prepare papers.

Session Organization

Workshop

Sessions were structured to maintain a logical flow in discussion. The situation reports and the country reports presented on the very first day by the participants set the tone and agenda for the rest of the workshop and symposium. During this session, representatives of fishworker organizations and other NGOs provided information on coastal area issues in their respective localities. These reports, in combination with the country reports, provided a good overview of the range of problems threatening coastal ecosystems and coastal fishing communities in countries of the South Asian region. They also provided information on the sort of initiatives that are being taken by people's groups to counter these problems.

The sessions on the second day were useful in providing a conceptual framework to analyze the issues identified on the previous day. The first session highlighted the vital role and complexity of the coastal ecosystem, the threats to it, the need to protect and maintain it, as well as the potential role of fishworker organizations in this process. The need to prioritize livelihood rights in managing coastal resources was clearly recognized. The second session, on natural resource management and property rights regimes, stressed the importance of viewing issues of natural resources in combination with those of property rights, and to question the rapidly declining access of coastal communities to natural resources essential for their livelihood, as a consequence of increasing privatization of such resources, especially by commercial interests. The session brought out the need to differentiate between common property and open-access resources, and to examine also the equity implications of various property rights regimes.

On the third day, the first session focused on fishery management in the context of coastal zone management. This session emphasized that as the understanding about the coastal zone as a complex and interconnected ecosystem has grown, there has been a greater recognition of the limitation of the sectoral approach to fishery management, which ignores the impact of activities outside the fishery sector on the health and abundance of fishery resources. Coastal area management programmes have the potential of providing the fishery sector with a say in regulating the harmful activities of other sectors in the coastal zone, and, in combination with appropriate and equitable measures of fishery management, can go a long way in promoting the sustainability of fishery resources, and in protecting the livelihood and rights of coastal fishing communities.

The second session provided a comparative perspective on coastal area issues and management initiatives in the countries of the South Asian region, from the perspective of the fisheries sector. It stressed that countries of the region have, to a greater or lesser extent, been unable to systematically incorporate the interests of the fishery sector in coastal area management initiatives. The last session of the day, a panel discussion on aquaculture, brought out the negative social and environmental consequences of the spread of shrimp aquaculture in Bangladesh, Sri Lanka and India. The unregulated growth of shrimp aquaculture has led to

large-scale privatization and degradation of coastal resources, and, in several ways, has had a highly negative impact on the livelihood of fishing communities.

On the fourth and final day of the workshop, in response to a suggestion by participants, two small informal discussion groups, the first focusing on shrimp aquaculture, and the second on the requirements imposed unilaterally by the US on the use of Turtle Excluder Devices (TEDs) in trawling for shrimp, were formed. Following this, in the second session, representatives from the countries present participated in a panel discussion on the legal, institutional and policy dimensions of coastal area management, from the perspective of the fishery sector. The last session provided comprehensive information on international legal instruments of relevance to fishery and coastal area management.

Symposium

The keynote address of the symposium focused on the FAO's Code of Conduct for Responsible Fisheries and the efforts being undertaken for its dissemination. This was followed by a session on the Indices of Success in Coastal Area Management Programmes, which provided information on successful ICAM programmes in other parts of the world and drew from them useful indicators to gauge the success of ICAM programmes. In the third session, representatives of government agencies from Sri Lanka, Maldives and India, provided information on initiatives taken by their respective countries to protect coastal areas and habitats.

The workshop and symposium sessions, in addition to providing a wealth of detailed information, worked towards providing a conceptual framework to analyze fishery and coastal area management issues in the South Asian region.

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Report

This report is divided into seven sections, reflecting the main themes discussed during the course of the workshop and symposium. Each section brings together, in a synthesized form, all the discussions on a particular theme through the course of the workshop and symposium. A day-to-day and session-to-session reporting format has been deliberately avoided to make for easier reading. Each section of the report is best read together with the papers prepared by resource persons and participants on that particular theme. These are included as addenda.

SECTION I: FISHERIES-COASTAL ZONE INTERACTIONS

This section is based on the first session of the workshop, on 'Fisheries-Coastal Zone Interactions', facilitated by John Kurien and Rolf Willmann. In the first part of the session, participants divided into three groups. To guide and focus the discussions a list of questions was provided to each group (Addendum IX). In the plenary that followed, the facilitators tried to bring together, into a framework, the discussions in the groups. A synthesis of the session is provided.

The Importance of the Coastal Zone

Dynamic and complex interactions of the marine, terrestrial and atmospheric environments are evident in the coastal zone, with water being the factor unifying the terrestrial and marine ecosystem.

The coastal zone is characterized by a rich diversity of natural habitats, such as coastal and mangrove forests, coral reefs, reef flats / fringes / barriers, beaches, continental shelf areas, sand dunes, grasslands, marsh lands, rocky shores, flood plains, salt marshes, estuaries, mudflats, wetlands, seagrass beds and seaweed areas. A variety of natural resources, including corals, cowrie shells, seaweeds and algae, fish and other aquatic life, plants, minerals such as lime and salt, water, sand, oil and gas, provide food, fuel, construction material and other resources indispensable for human existence. Coastal habitats and resources are also vital because of their role in stabilizing the shoreline, and in protecting coastal areas and habitations from cyclones, tidal waves and other natural disasters, as well as because of their natural capacity to assimilate and absorb 'waste' and 'pollutants'.

There are a diversity of natural processes occurring in coastal areas, such as upwellings, seasonal sand banks, sand dune formation, sea erosion and accretion, siltation and sedimentation, the lunar and diurnal cycles, seasonal winds and cyclones, sea breezes, waves, tidal bores and flows, salinity changes, seasonal migration of fish and birds, algae blooms and fish kills, all of which contribute to maintaining the coastal ecosystem in complex, and often unknown ways.

While some resources and processes in coastal areas are visible and obvious, there are others which are not. There is little knowledge or understanding of how they contribute to ecosystemic

balance. It is difficult to attribute a value to such resources or processes for this reason. There is a need to foster an understanding of the coastal zone as an ecosystem where there are 'not so obvious' processes, all of which contribute to maintaining ecosystemic balance and which, therefore, need to be preserved. A 'precautionary approach' is called for in using and managing such resources, given the state of inadequate knowledge.

Human Activities in the Coastal Zone

The coastal ecosystem is fragile, unique and complex. At the same time, it is highly productive, with coastal zones supporting a majority of the world's population. Important human activities, such as those relating to agriculture, fishing, fish drying and processing, salt extraction and production, shell collection, coir retting, rare earth mining, mining of coral, limestone and beach-sand, groundwater extraction, land reclamation, plantation and afforestation, oil exploration and extraction, aquaculture, tourism and recreation, real estate development, chemical and power industries, ship breaking yards, wind mill farms, discharge of urban sewage and other effluents, construction and dredging of ports and harbours, and military and naval bases, take place in coastal areas.

However, the impact of human activities on the coastal ecosystem is often highly negative. They deplete and destroy natural resources and habitats and interfere with processes occurring naturally in the coastal zone. Human activities, especially of a commercial, profit-oriented nature, which require substantial acquisition and privatization of common resources, also lead to social conflicts, since local communities are either displaced, or their access to hitherto common resources is limited.

While some human activities in the coastal zone can be classified as livelihood-related, others are primarily profit-motivated, commercial activities. From an equity perspective, livelihood-related activities and traditional rights to resources, need to be prioritized over activities that are profit-oriented. What actually happens, however, is quite different. The violation/infringement of traditional rights to resources and livelihood is commonly observed. Nityanand Jayaraman gave the example of a fishing village near Pondicherry, residents of which have traditionally enjoyed exclusive rights to a rich fishing ground near its shores. People of adjoining villages have always respected this right, though it has had no legal backing. Recently, the access of the fishing community to these grounds has been threatened by the activities of a multinational company, which is in the process of setting up a floating LPG terminal. This threatens to disrupt fishing activities and interfere with the livelihood rights of traditional coastal communities.

In such cases there is a need to prioritize and recognize the livelihood rights of communities, and their traditional rights to the resource. Some communities have traditional rights over resources in the coastal zone. However, a new set of legal rights are often imposed over the same resources. The role of the state in defining or redefining traditional rights becomes crucial. There is a need to decide how, and by whom, such rights are prioritised. This may not always be easy, as, for instance, when there is a conflict between two activities, both of which contribute to sustaining livelihoods. John Kurien gave the example of the conflict between the coir retting activities of rope makers that affect fish production and, thereby, the livelihoods of traditional fisherpeople in Kerala.

Similarly there is a need to ensure that efforts towards environmental conservation do not interfere with the traditional rights of fishing communities. In Orissa, for example, Tarun Patnaik pointed out that the creation of a sanctuary and efforts to conserve turtles, have led to curbs on fishing within a particular distance from the coast. Conservation measures and projects must be sensitive to the livelihood and traditional rights of local communities.

The rights of future generations also have to be taken into consideration. While sustainability usually refers to ensuring that future needs are met, without sacrificing present needs, future ethical issues cannot be addressed without looking at existing inequities. The concept of sustainability, as usually addressed, is more about how today's rich can ensure a future for their, yet unborn, generations.

At the same time, while some of the impacts of human activities are obvious, there are also unintended side effects or negative externalities. There is a need to internalise these. Polluters must pay for the damage they cause, especially when the activity is obviously commercial in nature. While this may appear to be a compromise solution to completely banning environmentally harmful activities, it will help in reducing the scope of anarchic investment. Also, where the activities of the polluters, often powerful commercial interests, affect the powerless, organising the powerless to contest or challenge the situation may be a solution to bring about greater equality.

Very often it is not because there is a lack of knowledge about the environmentally destructive impact of a technology that it continues to spread. For instance, aquaculture continues to be introduced in new areas despite the trail of environmental destruction it has left in countries like Taiwan and Ecuador. While there may be a lack of awareness about the issue in local communities, the same is usually not true of industry or of governments. Such destructive technologies proliferate because industry is not committed to a resource in the way that local communities, which have survived on it for generations, are. Moreover, there is a great difference between the time perspective of industry and that of local communities. The latter, for instance, would also typically be concerned about maintaining the resource for use by its future generations. On the other hand, industry would be interested in making maximum profit from an activity in the shortest possible time.

Coastal Zone Boundaries

Though the boundaries of the coastal zone are, in fact, dynamic, it is nevertheless useful, from a legal and management perspective, to have the coastal zone demarcated clearly. To define the boundaries of the coastal zone is difficult. On the seaward side the boundary may be taken to include the continental shelf where upwellings take place. However, the productivity and resource specificities in different sea areas should be considered. It is equally difficult to fix a uniform boundary on the land ward side. All areas which have, or potentially have, a significant impact over coastal and fish resources, should be considered as part of the coastal zone. The coastal zone should also include lagoons, river mouths, coastal lowlands and areas over which the influence of the sea is directly experienced.

Coastal Zone Management

For proper management of coastal resources there is a need to widen participation in decision making and to devolve power to local communities. There is also a need to improve understanding of, and communication with, natural resources. Local people, whose interactions with these resources may go back generations, can potentially play a vital role in this process. While the management of coastal resources needs to be decentralized, and local level action is important, some coastal zone issues cannot be reduced to the local level. A broader perspective is required. It is not then a question of local versus global. Both levels need to be addressed simultaneously and conscious action at all levels is required.

Role Fishworker Organizations

There was some debate on this issue. Some participants were of the opinion that fishworker organisations, along with playing a role in protesting against developments that negatively affect coastal and marine resources and habitats, also need to be proactive and suggest alternatives to present destructive lifestyles and technologies. Various strategies, such as

forming alliances and creating enabling circumstances for other to act positively, influencing the media and gaining their support, need to be adopted. However, other participants contended that the onus of providing alternatives should not rest exclusively on fishworker organisations. Sometimes saying 'no' can itself be an alternative, especially since that whole issue of technology is characterized by particular kinds of production systems based on profit. It can be very difficult to think of alternatives within this paradigm.

SECTION II: NATURAL RESOURCES AND PROPERTY RIGHTS

(This section reflects the discussion during the second session of the workshop on 'Natural Resources and Property Rights'. A presentation by John Kurien was followed by discussions in the plenary.)

In his presentation, John Kurien highlighted the need to address natural resource questions in combination with issues of property rights. He pointed out that there are various types of property rights, namely private property, State property, common property and open access or no-property, and that there is often confusion between the latter two.

Common property is, in fact, a form of private property, the difference being that it is owned by a group of co-owners. There are often institutional mechanisms in place to manage the resource and to regulate usage. Conflict resolution mechanisms to resolve conflicts, as for instance, between the interests of the individual and that of the collective, usually exist. He gave the example of the stake-net prawn fisheries of Negombo lagoon, Sri Lanka, earlier described by Boniface Denzil. Here, rights to the resource are inherited and non-transferable, and have traditionally been confined to two communities. These communities have the right to catch prawn at the estuary mouth. They have evolved systems to distribute the resource equitably among themselves, whereby different persons are allocated access to areas of high catch in a rotational manner.

John Kurien also pointed out that common property regimes have evolved in a particular cultural context in which communities shared a close relationship with their resources. With 'modernization' and increase in mobility, the context is changing and many of these regimes are breaking down, degenerating into open-access resources. Critiques of common property regimes are often based on present reality, where even community members are contributing to resource degradation, primarily because they lack the authority to manage the resource and exclude others.

Also, within common property regimes there can be a gradation, ranging from regulated regimes to unregulated regimes, tantamount almost to open access. At the same time, the various types of property rights regimes can not be seen as watertight compartments. They often overlap in time and space. Khushi Kabeer provided an example from Bangladesh, of low-lying agricultural fields which are regularly inundated during the rainy season. At such times, the entire village has access to fish from these inundated fields. This is a situation of open access, when all the people of the village have customary rights to the fish. The same fields then become private property at certain other times. John Kurien pointed out that a similar situation is observed in certain rice growing areas of Kerala. Similarly, property owned by the State, can *de facto* be an open-access resource.

There are also several examples of clear individual (private) rights in relatively unregulated common property or open access resources, where access and collection rights are enjoyed by several individuals. A. J. Vijayan gave the example of the stake-net fishery of Kerala. In fact, the notion of private property is recognized even within regulated common property systems. In such cases the group may adopt certain general norms regulating the access, withdrawal and other practices of its members.

The dominant mainstream view supports the privatization of resources in the interests of efficiency. Private property is seen as the 'natural' option so that it is almost impossible to question it. It is considered as more 'stable' primarily because of the legal and social mechanisms supporting it. In some rare cases countries have defined common property regimes within their legal framework. Hassan Maniku pointed out that in Maldives the traditional rights of fishing communities to surrounding waters have been recognised.

In the context of the coastal zone it is necessary to reflect on the extent to which the unrestricted exercise of private rights is desirable, given the sensitivity and fragility of coastal ecosystems. From an environmental perspective, perhaps, the unfettered exercise of private rights should be checked as has been done in the coastal areas of several countries. The unchecked privatization of coastal resources is also undesirable from an equity perspective, if the livelihood rights of coastal communities are being eroded. Thus, while fishing communities need to dwell near the coast because of the nature of their occupation, their access to coastal resources is diminishing, as coastal land and other marine resources are privatized. In this context, Nityanand Jayaraman felt that the consumption patterns of the haves must be brought into the picture while talking of meeting the aspirations of the have-nots. There is then a need to question the current mode of privatization and to reflect on how common property regimes in the coastal zone can be rejuvenated.

Pierre Gillet pointed out that traditionally fishing communities had evolved several management systems to regulate the exploitation of fishery resources. In the densely populated Kanyakumari District, India, for instance, while social norms permitted fishing in the waters of another village, boats from another village were not allowed to land. This served as a strong disincentive for vessels from distant fishing villages since fish would rot on being kept for long periods on board. However, with the introduction of ice boxes and freezing technology, this system is no longer effective.

An interesting situation emerges when new common property resources are created by the community. An example is the creation and management of artificial reefs in Kerala. Satish Babu pointed out that different systems for their management have emerged. In villages near Trivandrum, while the initial investment required for creating the reef is borne by members of a group, the entire village has the right to fish there. In some other villages though, only the members of the group responsible for creating the reef are allowed to fish, while the rest of the village is excluded.

Farhad Mazhar was of the view that the word resource, as used by the mainstream, always excludes the issue of property rights. Resources, however, are not abstract. It is relevant to ask the questions: whose resources, used for whom. From a cultural point of view even the concept of property is not abstract. It has emerged historically. He pointed to the debates around the fishery sector in colonial times. In pre-independence India, at the time of the Permanent Settlement in Bengal, Zamindars were given the permanent rights to collect revenues on behalf of the British Raj. They were given rights to revenue collected from land as well as from water bodies. British colonial administrators argued that *jal mahals*, or water bodies, belonged to the Zamindar, and therefore, anybody fishing in these water bodies was violating the property rights of the Zamindars. Fishing should, therefore, be considered a criminal offence. The issue was taken to court. The court ruled that fish in nature cannot be considered anybody's property until it is caught. The court, therefore, upheld the concept of access to common resources and foiled colonial attempts to privatize property. After independence, however, property went to the State, and not to common people. The State has emerged as the biggest mediator in defining the concept of property. It is now the State which controls all resources. People's rights to common resources have been eroded.

SECTION III : FISHERIES MANAGEMENT IN THE CONTEXT OF ICAM

(This section reflects the discussion during the third session of the workshop, facilitated by Rolf Willmann, on 'Fisheries Management in the Context of ICAM'. His presentation, based on the paper prepared by him for the workshop, was followed by a discussion in the plenary.)

In his presentation, Rolf Willmann emphasized that issues of coastal area degradation and management are intricately linked to the concerns of the fishery sector. There are some management concerns stemming from within the fishery sector and these concerns have been addressed by traditional fisheries management. These include overexploitation of fishery resources; destructive fishing practices; conflict between large-scale and small-scale fisheries; conflicts within small-scale and large-scale fisheries; and coastal shrimp aquaculture, an issue which has assumed importance over the last decade or two.

There are, at the same time, management issues which are generated outside the fishery sector but which nevertheless impact on it. These issues have not traditionally been addressed by fisheries departments. These include pollution from various industrial, agricultural, municipal and other sources; destruction of fish habitats, such as through mangrove destruction, dredging, land reclamation, diversion of river waters and resultant salinity changes, etc.; and loss of customary rights over coastal space, an issue that has been addressed by fishworker organisations. Fishing communities are losing their rights to space on land and in the sea.

Rolf Willmann pointed out that integrated fisheries resource management addresses simultaneously both these dimensions/sets of issues. While, fisheries departments are usually not involved in taking decisions on land-based developments, through Integrated Coastal Area Management (ICAM) programmes, fishery line agencies are provided the opportunity to have a say on these matters, as recently witnessed in Trinidad.

The need to adopt an integrated approach to the management of coastal and other natural resources is being recognized. In general, there are several reasons for unsustainable resource use behaviour:

- There may be ignorance about the harmful effects of a particular pattern of resource use. Or knowledge, if available, may only be partial, more so since coastal zone interactions are highly complex. Only the short run impact may be evident whereas the long term repercussions may be far greater.
- Those who do the harm may not be the sufferers and, therefore, may have little incentive to change existing practices. In many cases the victims subsidise both the polluters and the consumers of the product since the price paid by consumers does not reflect the true cost of environmental resources. For example, consumers of cultured shrimp do not pay for the environmental impact of intensive shrimp aquaculture on local habitats or for the suffering of the local people. This is, in effect, a 'consumption subsidy'. A person can also be both a beneficiary and a victim.
- Harm may be mutually caused because of a lack of co-ordination. In open access fisheries, for instance, fishers feel helpless to take action towards resource conservation on their own, given the spread of the resource and the number of fishers dependent on it. The rational response under the circumstances may be to fish more, so that the resource eventually collapses

It was pointed out that both scientific and traditional knowledge need to be combined to develop a better understanding of the resource base and to promote sustainable resource use. While it is vital to respect traditional knowledge systems, it is important to keep in mind that

traditional practices may not always be ecologically sound and may need to be supplemented by scientific knowledge. For example, the traditional stake-net prawn fisheries of Negombo lagoon can be considered destructive in that they interfere with the spawning process. Similarly, with changes in market demand, fishers are now harvesting non-traditional species. Traditional knowledge and management measures may be inadequate in the changed context.

In order to check unsustainable resource use patterns, several management approaches and instruments, basically to internalise cost externalities, have been proposed. The precautionary approach requiring the reversal of the burden of proof is being espoused. Often Environmental Impact Assessment (EIA) reports are required for a project to become operational. However, EIAs are usually required only for large developmental projects. Smaller projects, which may also be environmentally destructive, usually do not require an EIA to become operational. To avoid falling within the purview of an EIA, companies often try to set up smaller units. Further, the accumulative effect of the project in combination with other proposed or functional projects, is rarely considered. At the same time, EIAs are often funded by, and reflect, the views of the developers. Other stakeholders and the general public are rarely consulted. In Sri Lanka, for instance, the public often learns about the findings of an EIA from newspaper reports, appearing even after the project is already operational.

To deal with cost externalities, private deals may be struck between those who harm and those who suffer. This does not occur frequently also because of the high transaction costs involved. Often, the intervention of the State or an organization, may be required to facilitate the process. The State may intervene through the adoption of various economic instruments:

- (a) it may issue tradable or non-tradable permits for pollution, on the basis of the maximum permissible limits for pollution calculated.
- (b) it may levy taxes on polluting activities, or provide subsidies for the use of environmentally friendly technologies.
- (c) it may levy user charges, as for instance, when it asks companies to pay for the use of effluent treatment facilities provided by the state.
- (d) it can set standards, stipulating, for example, maximum and minimum limits, or by making mandatory the use of best available technology. In the latter case small companies may not be able to afford the costs involved, and, therefore, be at a disadvantage.

Designing appropriate management strategies to regulate unsustainable resource use practices is hampered by the difficulty in estimating the real economic value of a resource. The use value or the market price of a product does not reflect the actual costs to society and to the environment of producing it. It reflects only the costs experienced directly by the negotiating parties. In fact, some schools of thought, such as Buddhism, feel that the value of a resource goes beyond mere human existence. The value of resources is intrinsic and cannot be calculated. Some economists are of the opinion that the use value, the option value (i.e. the possible present or future use) as well as the existence value should all be added. In practice, of course, this is very difficult.

In the case of common pool resources, such as fisheries, unco-ordinated exploitation of fishery resources and their consequent overexploitation, has been common. However, while co-ordination in the management of natural resources, such as forests, has often evolved naturally, without the intervention of outside agencies, this has not been so common in fisheries. This is also because the spread of the resource is relatively wide, with the resource being exploited often over hundreds of kilometres, so that communication and co-ordination between

resource users is difficult. In fisheries, common property regimes have primarily evolved around sedentary resources confined to narrow geographical areas, for example, reef areas. If a resource is locally confined people can, more easily, observe the effect of patterns of use on resource availability. Also, when the resource is confined, fewer people need to communicate with each other, so that transaction costs are reduced and it is easier to reach an agreement.

Traditional common property regimes have sometimes been sophisticated enough to include factors like population growth. In Japan, for instance, the distribution of forest resources is based on the number of households, with each household being permitted to send only one member for collection of forest produce. This has also served as a strong incentive to have a smaller family.

Traditional systems for resource management have often been destroyed with the emergence of the market, rapid population growth and under the impact of new legislation introduced by the State. The State often takes over resource management functions without adequate knowledge of the resource, or of previous management systems. Management measures instituted by the State may be resisted by the people. At the same time, the State may represent vested interest groups, so that a change in orientation of the State itself may be required.

The State, however, continues to play a role in fisheries management. The techniques adopted by States for fisheries management also aim at internalizing cost externalities. Each of these have their own advantages and disadvantages:

- (a) A tax can be imposed on the value or quota of fish caught. However, the market value of fish does not reflect its true value. The capacity of the fish to reproduce, for instance, is not reflected. It is also difficult to impose a tax on small-scale fishers. Fishers may react by fishing more to make up for income lost to tax. It may also be necessary to change the tax amount each year, since the availability of fish is influenced by various environmental factors.
- (b) Quotas, specifying the total amount of fish that can be caught, can be set. This, however, may lead to a wasteful race between fishers to take as much as possible before the quota limit is reached. This may lead to an increase in investment in fishing capacity.

Quotas may be divided into individual shares and allocated to different fishing vessels. The quotas are calculated yearly on the basis of estimates of Total Allowable Catch (TAC). Each quota owner has a right to a certain percentage of the TAC. Individual transferable quotas (ITQs) have been introduced in some countries. The system, however, often leads to concentration of ownership, since companies which can fish most efficiently will buy the quotas, often pushing out small-scale fishers. The government can limit the number of quotas that are held by one person, though such technical barriers can often be circumvented and the same company can purchase quotas in two or more names. In Iceland, the quotas allocated to big companies are assigned to vessels rather than to fishers. If small owner operators want to sell their quotas to larger companies, they require sanction from the union. It is, therefore, possible to make the ITQ system meet also social objectives.

However, particularly in the case of small-scale fishing, monitoring and enforcement may be difficult. The costs involved are also very high. Quotas are easier to enforce if the landings are centralised and boats are fewer. Therefore, quotas are not really feasible for small-scale fisheries, unless used in combination with other methods.

In most countries quotas have been fixed for only a few species. Even if fishers sell off their quotas in these fisheries they can usually continue to fish, perhaps with licenses, for other

species. In that sense, therefore, fishers are not completely alienated from their right to fish through the introduction of the quota system and the subsequent concentration of ownership commonly observed.

Quotas can also be assigned to a community. Under this system the community will be able to manage its own fisheries. However, the community will not have the right of alienation, or the right to sell the quota.

- (c) Effort control measures are the most commonly used. They attempt to restrict fishing capacity through the license system. However, effort is a composite index of various factors, such as length, breadth and width of vessel, freezing technology, fish finding equipment, holding capacity, etc. Efforts can be made to make licenses very specific. However, this approach will have relevance only in the present context when we know what makes up fishing power today. There will be an inability to respond to technical innovations which may have the potential of increasing fishing power exponentially. By the time governments respond to these innovations fishing capacity may have already increased, forcing them to buy out excess capacity. Even the latter measure may not actually succeed in reducing capacity, since it is often the worst boats which are handed back to the government.

In order to regulate effort effectively, there is a need to either freeze the technology or to keep reducing capacity as technology improves. In the US for example, effort in the scallop fishery is regulated by stipulating the use of only sail boats—a case of freezing the technology. In the case of small-scale fisheries it may not always be easy to control effort.

- (d) Territorial Use Rights in Fisheries (TURFs) may be introduced, in which territories are assigned to fishing communities for management. There is a need to define membership clearly as well as to fix boundaries. It is possible to introduce zoning regulations between villages, and even individual allocation of space within the territory. In Japan, for instance, communities have inalienable rights to fishery resources that fall within a 2-km distance from the shore. The community is entirely responsible for managing this area. This serves as a strong incentive for fishers to manage the resource well. The TURF system may, however, prove problematic in the case of migratory species.

To conclude, while fisheries has traditionally been an important sector in the coastal areas of most countries, with the growth of other economic activity in the coastal zone its relative importance is declining. Fishery sector institutions, therefore, rarely play an important role in policy decisions affecting the coastal zone. It is important then that the sector take the initiative in beginning or leading a process of coastal zone management, to be in a better position to exert influence on the nature of future developments, both on land and sea.

SECTION IV: SHRIMP AQUACULTURE

(This section draws from various sessions in the workshop. It primarily reflects the views expressed during the panel discussion on the shrimp aquaculture industry, co-ordinated by Khushi Kabeer. Represented on the panel were P. Christy from India, Herman Kumara from Sri Lanka and Farhad Mazhar from Bangladesh. The section also draws from a presentation on the social impact of aquaculture in Bangladesh by Binoy Krishna Roy.)

Despite growing evidence of the negative social and environmental impact resulting from the practice of export-oriented mono-shrimp aquaculture, it continues to spread in the countries of the South Asian region, with the exception of Maldives.

Bangladesh

In Bangladesh the aquaculture industry has spread, both in the east and in the west. Large tracts of cultivable agricultural land and of rich mangrove forest have been converted to shrimp farms, with disastrous environmental consequences. For instance, studies show that aquacultural operations have led to extensive land salinization. This is true even of extensive forms of aquaculture, where the monsoon supposedly washes off salinity from the top soil. Also, the preference for wild shrimp fries, since cultured shrimp are more prone to virus attacks, has resulted in a substantial loss of fish biodiversity. In addition, the expansion of commercial shrimp aquaculture has been accompanied by significant social tensions and conflicts.

Along the West coast, agricultural lands have been acquired for aquaculture. As a safeguard to unchecked aquacultural expansion, government rules stipulate that 85 per cent of landowners in a village have to agree to shrimp cultivation. However, ways have been found to circumvent these rules. While a few absentee landowners have, in fact, leased out lands for shrimp cultivation, in most cases land documents have been falsified. Adjoining lands belonging to small landowners have been forcibly occupied, often by terrorising, sexually harassing and even killing those who have opposed the process, especially the women of these villages. Moreover, in most villages over 60 per cent of the population is landless. Their voice is totally ignored in the decision to move to aquaculture, even though they are the ones most negatively affected, displaced and rendered unemployed, since their labour is no longer in demand for agricultural operations.

While it has been said that aquaculture is lucrative and brings in valuable foreign exchange, a cost-benefit analysis would indicate that the returns do not match the loss incurred, both environmentally, and in terms of the reduced income to local people due to the loss of traditional sources of income, as from agriculture and poultry farming. For instance, along the eastern coast, land earlier used for salt panning has been converted to shrimp farms. As a consequence people engaged in salt panning have been displaced. Further, income from aquaculture remains concentrated in the hands of very few, primarily the urban elite. At the same time, with the entry of powerful outsiders, social norms and ways of functioning of traditional local communities, are disrupted.

The claim to valuable foreign exchange is also questionable. In Bangladesh, for instance, even though prawn production and exports have been going up, export earnings are coming down, as a consequence of fluctuations in money markets and manipulations of the exchange rate.

In Bangladesh, as elsewhere, returns from shrimp cultivation were high in the first few years. However, regular outbreaks of disease in recent years has affected profitability and exposed the environmental unsustainability of shrimp aquaculture. A total of 129,000 ha of land was under shrimp cultivation in 1995. Of this only 996 hectares was under semi-intensive forms and the rest was under improved traditional, or extensive farming methods. All shrimp farms, including those under extensive cultivation, were attacked by disease. The last to be hit were

farms under alternative cultivation of prawn and rice. Despite this poor showing, the government plans to make available an additional 13,610 ha of land for semi-intensive shrimp farming.

India

In India, shrimp aquaculture has been introduced in several States. The industry is located primarily on the east coast, where the lands are fertile and suitable for aquaculture. While traditional and extensive forms of mixed-species aquaculture for local consumption have always been popular, in recent years pressure from outside agencies and markets have prompted India to take up industrial shrimp aquaculture, directed at distant overseas markets. Areas have been earmarked for aqua-expansion, as, for instance, the Nagapattinam district of Tamil Nadu. Big industrial houses, such as Spencers, DCM Shriram and Mac Industries, have entered the aquaculture sector. Since aquaculture units are usually profit and export oriented they do not contribute to the local economy or to local food security.

As in Bangladesh, the growth of aquaculture has been accompanied by social tension, environmental degradation and ecological imbalance. There is a strong nexus between industrialists and politicians. The former usually employ agents, often with significant political clout, for buying/establishing control over land. Entrepreneurs have typically purchased high yielding lands, mainly privately owned, fertile wetlands. They have also encroached upon adjoining common lands used by rural communities for drying nets and grazing cattle. Similarly, temple lands have also been taken over. In many cases, land, including mangrove forest areas, have been leased to these units for a 99 year period by the government.

Fisherpeople along the eastern coast have been negatively affected by the shrimp industry. They have been displaced from their homes and common lands as land has been taken over for pond construction. Their nets and boats have been destroyed by aquacultural operations. There have been several other negative consequences, especially for women. In parts of Tamil Nadu, the fishing community has organised and has jointly decided not to sell land to the aquaculture industry, or to supply it with prawn seed. Along with protests and demonstrations, the court has also been approached. Networks have been formed at the local and regional level. As people's struggles and protests have become more strident, the Tamil Nadu government has been forced to respond. A commission to go into the issue was appointed, initially comprising bureaucrats and representatives of the aquaculture industry. After considerable struggle representatives from the fishing community were also included. In 1995, an Act regulating the industry in the State was passed. At present there is an interim stay order by the Supreme Court on the establishment of new shrimp farms. However, despite the court injunction, land is still being diverted for shrimp farms.

The Coastal Regulation Zone (CRZ) Notification stipulates that no developmental activity should be permitted in the 500 metre-wide strip of coastal land, designated as the coastal regulation zone (CRZ). However, in Tamil Nadu, shrimp farms have been prohibited only within a 200 metres zone. This is in clear violation of the CRZ notification. Again, in another violation of this notification, groundwater is being tapped for aquaculture establishments from the CRZ area. Also, though the Notification provides for the protection and preservation of historical sites in coastal areas, aquaculture farms can be found within 200 metres of the Tranquebar fort, a historical monument. Further, while in Tamil Nadu the Land Ceiling Act restricts the size of landholdings, in gross violation of this Act large parcels of land have been allotted to the corporate sector for aquaculture.

The aquaculture industry continues to flourish despite these legal violations. It continues to be promoted by the government despite the social and environmental havoc it has wreaked, and despite the increased vulnerability of cultured shrimp to viral disease outbreaks. All this in a

dubious quest for higher foreign exchange earnings. There is little alternative to a total ban on the shrimp industry, even of the semi-intensive form.

Sri Lanka

In Sri Lanka also, government policy actively supports aquaculture as a means of increasing foreign exchange earnings. Several incentives are being given to the aquaculture industry, such as exemption from income tax, credit facilities as well as exemption from custom levies on the import of plant machinery, equipment, and other materials. As a consequence, aquaculture is growing rapidly, especially in the north-western, parts of the country.

Most aquaculture farms are situated in the highly productive lagoon areas, as, for example, in the Puttalam lagoon. Lagoons are also some of the richest spawning and breeding grounds for fish. Aquaculture has been responsible for the pollution of these fertile water bodies, so that fish resources have been negatively affected. The livelihood of various types of fishers, i.e. those who depend exclusively on lagoon fisheries those who depend on sea fishing but who fish in the lagoons during the monsoons, as well as migratory fishers from the north-east who have been displaced from their traditional fishing grounds and migrate southward, is being jeopardized. The livelihood of farmers is also under threat as a result of land salinization and other environmental consequences of aquaculture. Aquaculture farms are also encroaching into protected areas, nature reserves and other sensitive ecosystems, leading to the destruction of sensitive and fragile natural habitats.

There is, however, very little information available, with the Government or with local Provincial Councils, about the extent of land already under shrimp aquaculture. Environmental Impact Assessments (EIAs) are usually not required for aquacultural operations. Government agencies providing licenses to aquaculture units do not have any zoning plan, and consequently continue to issue licenses even in ecologically sensitive zones. There is also a lack of a proper monitoring system.

Action Required

Despite the environmental and social havoc the shrimp aquaculture industry has wrought in other parts of the world and in the South Asian region, it continues to grow, defying all logic. Even if local people are ignorant about its harmful consequences, governments, international agencies and industry, are not. In their short-sighted quests for profit, they continue to compromise social and environmental interests. There is a need to organise at all levels to challenge and check the growth of an industry which destroys local resources and livelihoods and fosters social tension.

It is imperative to develop a better understanding of all dimensions of the issue, and to network and share information at the international, national and local levels. There is a need to build alliances between organizations opposing aquaculture.

At the same time, however, as Khushi Kabeer pointed out, there is a need to be conscious of the fact that some environmental groups often appropriate people's struggles to serve their own interests. An example is the recent campaign against shrimp trawling by western conservationists, which may actually promote shrimp aquaculture. The unilaterally imposed ban by the US on the import of shrimp caught by trawlers not equipped with Turtle Excluder Devices (TEDs), was pushed primarily by the Earth Island Institute. It was observed that while the use of TEDs may be useful in reducing by-catch, and may actually benefit artisanal fisheries, the fact that the ban has been imposed unilaterally needs to be opposed. It is more likely to be a protectionist measure. Moreover, it will promote trade of cultured shrimp, and provide an impetus to commercial shrimp aquaculture. The discussion underscored the need for forming alliances judiciously.

To check the spread of environmentally and socially disastrous forms of export-oriented aquaculture, radical changes at the policy level are needed. Herman Kumara stressed that no expansion of aquaculture should be permitted till a detailed study on its social, economic and environmental impacts has been conducted. Project approval agencies, responsible also for monitoring activities, need to be strengthened. These bodies must have representatives from the public, especially those directly affected by aquaculture projects, as well as representatives from the fishing community / fishery co-operative societies. These agencies should be accessible so that people are able to approach them with their grievances.

John Kurien pointed to the need to analyze the relationship between industrial aquaculture and industrial fishery. Estimates of prawn production in Asia indicate that 570,000 tonnes of shrimp will shortly be produced. The feed requirement for this will be of the order of one million tonnes. In other words, 3.5 million tonnes of fish will be required to produce fishmeal in Asia alone, more than the total marine fish harvested in India today. This level of production cannot possibly be met by artisanal coastal fisheries. Fish for fishmeal will have to be supplied through industrial fisheries. While both aquaculture and industrial fisheries are, in themselves, unsustainable, there is a need to understand the manner in which they are linked and reinforce each other. There is a need to demand for a ban on both.

The conversion of fish to fishmeal has other implications as well, a point emphasized by Nalini Nayak. As more and more fish is diverted to fish meal plants, women fish processors are deprived of access to fish and are consequently displaced from their traditional source of livelihood, as being witnessed in West Bengal, India. Often such women have few alternatives but to seek employment as wage labour in fish processing plants, usually under exploitative conditions. There are many other such linkages between demands to ban aquaculture and industrial fisheries, and demands for a sustainable fishery, based on a feminist perspective.

While there is some confusion between the various forms of aquaculture, with claims being made that extensive forms of aquaculture are sustainable, several dimensions need to be explored. Khushi Kabeer emphasized that even extensive forms of aquaculture have been found harmful, as evident from the experience in Bangladesh. Aquacultural operations require an optimal level of salinity, requiring intake of fresh water. This often leads to problems of salinity ingress and seepage. Moreover, even extensive aquaculture is vulnerable to disease and viral attack. Further, the capture of wild shrimp fries for stocking aquaculture farms is destructive, since several other species are caught and destroyed.

Therefore, all forms of commercial shrimp aquaculture may be considered to be destructive and undesirable primarily because they cater to external markets controlled elsewhere. Local control over markets and production is jeopardized. In Bangladesh, for instance, traditional aquaculture had been practised sustainably for generations, in rotation with paddy, to meet local demand. Several species that came in with the tide were raised. However, with commercialisation, entrepreneurs from outside the locality have come in, and contradictions have begun to emerge. There has been an emphasis on the monoculture of prawns. Other destructive social and environmental impacts have been experienced, though the form of aquaculture practised remains termed as extensive. Further, the profit generated is controlled by relatively few people, primarily the urban elite.

It has also been claimed that aquaculture can benefit the poor and the small farmers. Jesurethinam stressed, however, that focusing on the landowner/landless dimension helps bring out some of the underlying contradictions in these claims. While landowners may benefit through higher returns, the actual victims are the landless labourers, displaced from their work in agricultural operations. As agricultural land is converted to aquaculture production, it is primarily the landless agricultural labourers who lose employment and are displaced.

Moreover, even small farmers enjoy higher returns only in the initial years, till such time as their shrimp crops remain disease free. Massive losses may be incurred after that, made worse by the fact that their land may have been rendered saline and unfit for agriculture, as a consequence of the practice of aquaculture.

It is significant that returns from commercial shrimp aquaculture are not, in fact, very much higher than the costs of production. Kee-Chai Chong drew the attention of the group to a study that has indicated that returns from an unmanaged hectare of mangrove forest are about Rs11,300 per hectare/year, while returns from the most profitable shrimp alternative use is about Rs11,600 per hectare/year. This underscores the need for environmental audits in a structured manner.

Thus, commercial aquaculture has negative social, economic and environmental consequences, whether practised by industrialists or by small farmers. As an alternative, traditional forms of polyculture to meet local demand, and coastal small-scale fisheries, should be encouraged. The case for small-scale coastal fisheries as opposed to industrial fisheries, is strong. John Kurien gave the example of Kerala, where an average of 37,000 tonnes of prawn were caught in the 1960s, when there were few trawlers operating. Today the catch averages in the region of 40,000 tonnes. However, the composition of prawn catch in the 1960s would have today earned three times as much foreign exchange. This is because the use of overefficient technology has led to the near-disappearance of commercially important prawn species. This is a strong argument for promoting coastal artisanal fisheries for prawns. At the same time, prawn caught in the sea are not only disease free, they also taste better than cultured prawns. There is a need for consumer awareness campaigns and an effective marketing strategy to highlight these aspects.

SECTION V: COUNTRY REPORTS

(This section draws on presentations made by representatives of movements and NGOs, as well as by representatives of government agencies, at various points during the course of the workshop and symposium. It also draws on the presentation on 'Coastal Area Management in South Asia: A Comparative Perspective' made by Chandrika Sharma, based on her paper prepared for the workshop.)

Maldives

(This report on Maldives synthesizes the presentation made by Maizan Hassan Maniku.)

The Maldives comprises about 1,190 low-lying islands scattered over a distance of 500 km, of which only about 200 are inhabited. Administratively, Maldives is divided into 20 atolls. The country owes its physical existence to the coral reefs. The small size and the relative isolation of the islands make them particularly vulnerable. People are forced to depend on a narrow resource base for their livelihood. The two most important industries in Maldives—tourism and fishing—are both directly dependent on coastal resources and on a healthy coastal environment. The economic and physical survival of Maldives then hinges on its ability to maintain its coastal ecosystem.

Fisheries

Historically, fisheries have always contributed to the economy of Maldives. Records indicate that the country has been engaged in trade, even as far back as in the first century. 12th century reports speak of the processing and export of tuna to China and the Arabian countries. At present about 100,000 tonnes of tuna is caught, almost half of which is consumed locally. Per capita consumption of fish, primarily of tuna, is as high as 75 kg per person per year in Maldives.

Maldives also has a strong database on tuna. Export data dates back to 1946 and catch data to 1956. Scientific data collection systems have been introduced since 1984. However, since tuna is a migratory stock there is a need for a regional database.

Until the 1970s, the tuna fishery predominated in Maldives, with almost no fishing in coastal waters. It is only in recent times that the exploitation of reef fish catch has increased, primarily for export and for the tourist market. The catch of reef fish went up to 14,000 tonnes in 1994 from none in 1970. As a consequence, by the early 1990s, coastal fish resources were considered over-exploited, underlining the need for a strategy for their sustainable management.

The number of persons engaged in fisheries has decreased since the seventies from about 27,000 to approximately 22,000 today, since people have shifted to economically lucrative sectors, such as tourism. A greater proportion of fishers are now engaged in the exploitation of coastal and reef resources. Similarly, while the contribution of fisheries to GDP was as high as 32 per cent in mid-1970s, it fell to about 17 per cent in 1994. Tourism, with a contribution of only 5.5 per cent to GDP in the mid-1970s, is now the largest contributor. Both tourism and fisheries use more or less the same resources, one in the extractive sense and the other in the non-extractive sense.

The growth of tourism in Maldives has been planned and regulated. For instance, only 10 more islands have been targeted for tourism over the next 10-year period. The Ministry of Tourism has outlined a comprehensive environmental strategy for developing islands as tourist resorts. Desalination plants have been made mandatory to avoid the over exploitation of scarce fresh water resources. Similarly, sewage discharge and treatment plants have to be approved by the Ministry of Public Health. However, with urbanisation, increase in population and the growth of tourism, coral and sand mining has increased, imposing a greater strain on scarce resources.

The conflict between tourism and fisheries is evident only in the more populated central zone, where a majority of the tourist resorts are concentrated. Resort operators are primarily interested in maintaining the environmental beauty and quality, and thereby the tourist potential, of the islands. In order to protect reef resources, efforts are made to control destructive fishery activity. Fishers using non-traditional methods to catch bait fish, such as masks, are not allowed to fish. Certain other destructive practices, such as breaking coral and using chlorine to divert fish from their habitats, are also checked. However, such cases of conflict are not frequent, since it is common for fishing communities to monitor themselves.

Joint Venture Agreements in Fisheries

While Maldives has entered into a few joint venture arrangements in fisheries, there is a restriction on the type of gear that can be used. Only pole-and-line fishing for tuna is allowed. Foreign vessels are not permitted in coastal waters up to a distance of 75 km. Monitoring systems are in place. There is a vessel tracking system, and each ship has a modem. Further, vessels have to land their fish in Maldives, so that total landings are monitored. Despite such measures there are inevitably problems and encroachments.

Tuna poaching, especially by Japanese and Taiwanese vessels fishing in the Indian Ocean, was common earlier. At present, poaching is not such a major problem except at certain times of the year, as in September/October. The culprits tend to be distant water fleets, especially of French and Spanish origin. However, since most local fishing takes place within a 35-40 mile range, Maldivian fishers are not really affected. As there is no continental shelf, resident and migratory stocks of tuna are found really close to the atolls. In fact, the entire atoll system acts as a fish aggregating device. Migratory stocks create the peak season even though there is tuna in the waters off Maldives throughout the year. Since environmentally friendly fishing methods are in use, stock variation has been mild over the years.

Traditional Fishery Management

Maldives society has traditionally been decentralised and democratic with strong community structures. It has been a resilient society with a successful history of trade, and of adapting to changing world conditions. Institutions of 'modern' governance are relatively recent. With these, and under the influence of globalization, industrialisation and consumerism, a forced uniformity is being imposed on Maldives society. New concepts related to one nation, one language, one system and one legal structure are demanding recognition. The relationship between natural resources and human beings is also being redefined.

While local communities have traditionally managed their fisheries, recent efforts at centralised fisheries management have been accompanied by their own unique set of problems. For one, the distances between islands make communication very difficult. As a result, even before people are familiar with a particular set of management measures or laws, a new set of measures are already in place, leading to considerable confusion. Moreover, recent laws often conflict with customary laws which are more acceptable to the community, to the extent that even the courts find these contradictions difficult to resolve.

Government Initiatives in Managing Fishery and Coastal Resources

While communities have traditionally managed their fisheries, at the government level it is the Ministry of Fisheries and Agriculture which has been almost entirely responsible for marine environment conservation and management. The establishment of the framework law on environment in 1993 was an important step. Under this law, various departments were given the authority to make rules on environmental issues. Presently these include the Ministry of Fisheries and Agriculture (MOFA), responsible for managing all coastal natural resources; the Ministry of Planning, Human Resources and Environment (MOPHRE), the key agency for reviewing and approving projects; the Ministry of Tourism; the Ministry of Construction and

Public Works; the Ministry of Atolls Administration; and the National Commission for the Protection of the Environment (NCPE), which helps MOFA and MOPHRE- as well as other ministries to develop rules in line with the framework legislation. There is, however, some confusion and overlapping of responsibilities between these various agencies with respect to protection and management of marine resources.

The government, with the support of the FAO / BOBP programme, is now in the process of exploring and understanding traditional community-based fishery management measures. It is being understood that local communities had always been managing their resources sustainably, and that such systems need to be revived and strengthened. Maldives is, therefore, relearning its tradition in a different language, more acceptable internationally.

Several meetings and workshops at the community level have been organised to develop a better understanding of existing resource use patterns. The concept of Integrated Reef Resource Management (IRRM) emerged from these meetings. This approach is unique to the situation in a country composed of small islands, such as Maldives, whose existence depends on its reef resources. On the other hand, Coastal Area Management (CAM) projects may have more relevance to countries with large continental land masses.

Some of the issues related to fisheries and coastal areas that are now emerging in Maldives include the following: (a) the erosion of customary rights: With the imposition of new legal regimes, traditional systems of management are eroding, often leaving behind a vacuum. For instance, until the 1970s fishers or resource users from one atoll had to obtain permission to fish in another atoll. This served as an effective management measure. There is a need for comprehensive legal recognition of traditional resource use rights; (b) overlapping responsibilities between different government departments; (c) user conflicts: While earlier only oceanic resources had been utilised, a whole range of coastal resources are now being exploited, leading to conflict, both within the sector and with other sectors; (d) illegal fishing practices: The use of illegal fishing practices to exploit coastal marine resources, such as groupers, to cater to the lucrative export markets of South-East Asia, have increased; (e) lack of compliance with rules: This is also because problems in communication make it difficult for resource users to keep pace with the frequency with which new rules and regulations are passed; (f) pollution: At present, pollution in coastal waters is high only near urban and populated islands, such as Male. However, the levels are still under control, largely due to the assimilative properties of oceanic waters; (g) lack of reliable data on fisheries and marine resources: This is partly because Maldives lacks trained manpower for such purposes.

Bangladesh

(This report on Bangladesh is primarily based on presentations made by Farhad Mazhar, Khushi Kabeer and Rafiqul Haq Tito.)

Bangladesh, landlocked on three sides, is washed by the Bay of Bengal on the south. The 480-km Bangladesh coastline is dominated by mangrove and estuarine ecosystems. Most coastal areas of the country are low-lying and exposed to the influence of the sea. They are highly vulnerable to cyclonic storms and tidal waves which form over the Bay of Bengal.

As compared to the other countries in the South Asian region, there are certain unique characteristics of the fisheries in Bangladesh. Fish forms an integral part of the diet in Bangladesh. Several major rivers cut across the country and inland fisheries contribute more than 50 per cent to total fish production. The waters of the country are home to a rich variety of fish species, many of which spend different stages of their life in riverine, estuarine or marine waters, and thrive on the interconnectedness of these ecosystems. Further, low-lying coastal areas in the country have historically been exposed to a pattern of seasonal flooding in the

monsoon followed by a dry season. A majority of finfish species as well as several species of inland water prawns inhabiting rivers and flood plains, lakes and estuaries, have been adapted to these changes.

However, as Farhad Mazhar pointed out, the situation is fast changing. Extensive irrigation, flood control and coastal protection works have disrupted the natural links between water bodies. Coastal resources and habitats are being rapidly degraded and depleted, destroying in the process rich spawning and breeding grounds for fish. The catch from inland fisheries has been declining due to changes in such natural hydrological systems, also a consequence of the inefficient management of public water bodies. Marine fish resources are also showing signs of overexploitation.

Government Initiatives

As mentioned, fertile coastal areas of the country are showing evident signs of degradation. This, Farhad Mazhar stressed, has also been a consequence of misguided and faulty planning and implementation of developmental projects by the government, based on the misguided 'urban notion of fishery' and 'urban concept of water'. Fishery is seen as a sector, as an industry, generating profit. This view hinders an understanding of the complexity of the fisheries. In Bangladesh, there has been a symbiotic relationship between fisheries, agriculture and many other natural-resource based activities. Most farmers also fish so that there are no pure categories of 'fishers' or 'farmers'. The view of fishery as a sector is, therefore, narrow and compartmentalized. The interaction between elements in nature is ignored as is the importance of nature as a condition of production, which needs to be managed and maintained. This faulty understanding prompts the enactment of faulty legislation and the implementation of faulty projects.

Similarly, the urban concept of water views water as floods, with the ability to damage urban property. The Flood Action Plan is a direct outcome of this viewpoint. This Plan aims to tame the rivers of Bangladesh and to prevent flooding, especially of urban areas. It fails to recognise water as an ecological element supporting the different life systems. The symbiotic interconnectedness of the riverine, estuarine and marine ecosystems, is ignored. Millions of dollars will be spent to treat 3.14 million ha of aquatic land, and to convert flood plains to dry land. The consequences for fisheries will be disastrous. The consequences for traditional farming systems and livelihoods will be equally bad.

All this highlights the need to understand the cultural concept of resources as well as to see this in a historical perspective. The concept of wholeness and interconnectedness of resources and of the ecosystem is gradually being recognized by the mainstream. These views are, for instance, reflected in the Coastal Environment Management Plan for Bangladesh, prepared by ESCAP, though in an inadequate manner. The negative impact of agricultural development on fisheries and on marine resources is recognised. These new developments and ways of thinking have to be analyzed critically, to examine ways in which they can be used positively for better resource management and more appropriate legislation.

Government initiatives to protect and manage coastal resources have so far, largely been inadequate. While the government has made some efforts to regenerate degraded mangrove forests and to protect coastal habitats, at present, there is no legislation specific to coastal area management. The coastal management plan prepared by ESCAP has no legal status. A National Environment Management Action Plan (NEMAP), based on the principles of the National Environment Policy, attempts to address environmental issues in an integrated manner. The Plan also focuses on the management of coastal and marine resources.

India

(The India report is mainly based on the presentations made by B.R. Subramanian from the Department of Ocean Development, and Subba Rao from the Ministry of Environment. It also draws on some of the presentations made during the panel discussion on 'Institutional, Legal and Policy Dimensions of ICAM, in particular, the presentation of Thomas Kocherry.)

With a long coastline of over 8,000 km, India has a variety of natural coastal ecosystems. The eastern coast is low-lying, with lagoons, marshes, beaches and deltas, while the western coast is dominated by rocky shores. The islands of Lakshadweep are composed of atolls (as in the Maldives), while the Andaman and Nicobar islands are volcanic in origin, arising from a submerged mountain chain.

The coastal areas are productive and rich in natural resources. Almost 20 per cent of India's population as well as several important urban centres and ports are located in coastal areas. Several human activities are concentrated in coastal areas, such as those related to ports, harbours and shipping, mining, including the mining of sand, oil exploration, fishing, tourism, and the disposal of domestic and industrial wastes,

Coastal Area Degradation

Though the impact of many human activities on the coastal environment has been negative, there is little reflection on the kind of environmental and social problems emerging in coastal areas, even by those who are being, or will be, affected by it. For instance, the improper construction of ports and harbours and of breakwaters is often the cause of coastal erosion. One example is that of the Madras port. About a hundred years ago the Marina beach in Madras was quite narrow. The construction of the Madras Port as well as associated dredging operations, have led to coastal erosion north of the port, and accretion to the south, so that the Marina beach has widened considerably. On the other hand, fishing communities on the coasts of northern Madras are gradually losing their lands to erosion. With the recent Coastal Regulation Zone (CRZ) Notification, the construction of all ports will require an Environmental Impact Assessment (EIA), as will all projects in the coastal zone that cost over Rs. 5 crores. However, while EIAs will be conducted for each individual project, the combined effect of different projects in the area is not likely to be taken into consideration.

While dredging of ports and navigational channels disturbs, and is detrimental to, the benthic environment, the disposal of dredged wastes affects biodiversity and fish stocks. Dredging of the Paradeep port of Orissa, for instance, has been harmful from the perspective of fisheries. However, such biological impacts are rarely taken into account, and need to be incorporated in models developed for the purpose. EIAs are necessary to determine the location for disposing wastes from dredging operations. It is advisable that ports are not located in ecologically sensitive areas. Despite this, the construction of two more Single Buoy Mooring Stations (SBMS) are currently being planned in the sensitive Gulf of Kutch area.

Coastal waters are also exposed to pollution from shipping. An important oil tanker route, for instance, passes through the Indian EEZ via the Gulf of Munnar. Oil spillage from tanker traffic has been responsible for wiping out coral life almost entirely near the Lakshadweep islands. Also, few Indian ports have waste reception facilities, leading to considerable pollution. Blow-outs and pipeline ruptures from offshore oil platforms are also responsible for polluting coastal waters.

The Department of Ocean Development periodically monitors pollution levels in India's coastal waters. 25 parameters of pollution have been monitored in 77 locations over the past five years. Coastal waters off Bombay have been found to be the most polluted in the country. Partly responsible for this is the large amounts of untreated sewage dumped into the creeks off

Bombay. Oxygen levels, especially during low tide, are very low. Water quality improves with distance from the shore, a result of the assimilative powers of the ocean. The Kakinada region in Andhra Pradesh is another area where pollution loads are high. This is a consequence of sewage discharge as well as discharges from the numerous fertiliser industries in the area. Similarly, considerable amounts of pollutants are carried to the Gulf of Khambat from industries and urban centres of Gujarat, through the waters of rivers such as Narmada and Tapti. However, pollution loads in coastal waters are surprisingly low. This is perhaps because pollutants get mixed with sediments and remain trapped in estuarine areas, water flow being less in the pre-monsoon months. During the monsoons the estuaries, with the pollutants, are flushed out. Sea water plays an important role in diluting pollution loads and cleansing coastal waters. The backwaters of Kerala are flushed out in a similar fashion during the rains. Though pollution levels are not evidently very high in coastal waters, pollution loads in inland waters are likely to be much higher. For instance, pollution levels in fish samples collected from the backwaters of Kerala have been found to be high.

Off the coast of Tuticorin, the high rate of sedimentation, as well as the earlier dumping of fly ash into coastal waters by the Tuticorin nuclear power station, has led to the sedimentation and stifling of the once famous pearl oyster beds. The shipbreaking industry in Saurashtra, Gujarat, is another major cause of coastal pollution. Oil, plastic and other wastes find their way in coastal waters. There is a need for careful monitoring of water quality in the region.

Coastal Area Management Initiatives

Concern about environmental degradation of coastal areas prompted the Ministry of Environment and Forests to issue Environmental Guidelines for Development of Beaches in 1982 and to advise States to prepare Master Plans for the development of coastal stretches. This document recognised that 'direct impact' on the coastal ecosystem could be experienced as a consequence of activities even in hinterland areas. In 1991, the Ministry of Environment and Forests, Government of India, issued a notification under the Environment (Protection) Act, declaring coastal stretches as Coastal Regulations Zone (CRZ) and regulating activities within them. The provisions of this are to be implemented through coastal States and Union Territories. The institution of an authority at the State level, responsible for enforcement and monitoring of provisions under the notification, is also envisaged.

While the notification was issued way back in 1991, it is significant that there is little awareness about it. Few people know of its existence. It is only in recent months that there has been some debate about its implications in States like Kerala and Tamil Nadu.

The notification defines the coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters which are influenced by tidal action, in the landward side, upto 500 m from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and HTL, as the CRZ. However, since mangroves, coral reefs, and areas close to spawning and breeding grounds of fish and other marine life, are specified to be ecologically sensitive areas (and are included in CRZ-I), the areas to be regulated under the notification also include those that technically fall outside the coastal zone as defined by it. It is also specified that the distance from the HTL shall apply to both sides of rivers, creeks and backwaters that are influenced by tidal action, and shall not be less than 100 metres or the width of the creek, river or backwater, whichever is less. Each State is free to decide this, depending on its own situation.

The CRZ has been classified into four categories for the purpose of regulating development activities. CRZ-I includes areas that are ecologically sensitive as well as the area between the HTL and the LTL. CRZ-II includes areas that have already been developed up to or close to the shoreline. CRZ-III includes areas that are relatively undisturbed and those which do not belong to either Category I or II. CRZ-IV includes coastal stretches in islands. This approach is quite

unique in that it takes into account current development reality, and then tries to regulate further development. The CRZ notification is applicable to all lands in the coastal Zone, irrespective of ownership.

The notification, however, represents only a preliminary step in the direction of coastal management. Concern has been expressed over the fact that technically a notification can be modified, amended and even withdrawn at any time. There are several other concerns about the notification, and its implementation.

The notification aims only at regulating activities in a narrow, geographically defined, coastal strip. In doing so, it fails to recognise the links between activities in inland and offshore areas which affect the coastal environment in a significant way.

It completely lacks a seaward component and ignores the need to regulate developmental activities in, or affecting, coastal waters. It appears, though, that the government is actively considering issuing an ORZ (Ocean Regulation Zone) notification along the lines of the CRZ notification.

The notification does not recognise the need for, or make mandatory, inter-departmental co-ordination in the implementation of its provisions. It is left to the State governments to decide which departments are represented in the Coastal Zone Authority or are responsible for formulating, implementing and monitoring the coastal management plan. Equally important, the notification fails to make provision for stakeholder and public representation, either in the proposed Coastal Zone Authority, or in the process of formulating and implementing the plan. John Kurien emphasized the need for a structured process to facilitate participation, such as through public hearings.

There are also problems with the implementation of the provisions of the notification. States have still not finalized their Coastal Zone Management Plans. Moreover, it is being alleged that the classification of CRZ areas proposed by the States has been prompted by industrial and economic interests. Subba Rao pointed out that only conditional approval is given to plans, and that these can be modified if so required. The notification, however, is inadequate in that it fails to specify the manner in which the plans, and the classifications proposed therein, can be revised, changed or modified.

Fishery Sector Perspective

From the perspective of the fisheries sector some of the provisions of the notification, if well implemented, can be of benefit. The prohibition or regulation of certain harmful developmental and construction activities within the CRZ is likely to improve the quality of coastal waters and the preservation of natural coastal ecosystems, such as mangroves and coral reefs, which are important spawning and breeding grounds for fish. The notification specifically recognizes the traditional and customary rights of fishing communities to build, repair and consolidate their homesteads in CRZ-III areas. It also specifically allows activities that require waterfront facilities, such as jetties and boat yards, of benefit to fishworkers. However, ice plants and fish processing plants are not permitted. This may adversely affect the interests of fishworkers in the processing sector. There is also a concern that fishing communities may lose their right to build, repair, consolidate or expand their homesteads, and to otherwise commercialise their spaces, especially in ecologically sensitive areas (CRZ-I).

In general, while the notification is weak and inadequate in several respects, several people's movements and fishworker organisations in India, such as the National Fishworkers Forum (NFF), are pressing for its implementation in its present form. There is an apprehension that demanding amendments or changes at this stage could be counterproductive, and may result

in the notification being withdrawn or diluted. It is felt that amendment should come in the process of implementation.

Thomas Kocherry expressed the view that the CRZ Notification, in conjunction with the Marine Fishing Regulation Act (MFRA) in existence in all States except Gujarat, and with the Deep Sea Fishing Policy, will provide an adequate legal framework for improving the coastal zone and for protecting coastal and marine fishery resources. The State Acts will, however, require strengthening and modification, while Gujarat will need to enact the necessary legislation. All states will also need to impose a uniform ban on monsoon trawling. At the same time, the Deep Sea Fishing Policy must be adhered to, and as recommended by the Murari committee report, joint ventures should be banned. Further, the understanding of the deep sea should change to include also coastal waters. Top priority should be given to establishing the traditional and customary rights of fishing communities.

He also emphasised that to strengthen the conservation and management of fishery resources, a separate Fisheries Authority under an independent ministry is required. 75 per cent of the members of this Authority should be from the different fishing interests of the country, particularly the traditional fisherpeople, while the remaining 25 per cent should consist of scientists and bureaucrats.

Finally, there should be a new demand asking for a total ban on industrial fishery as well as on coastal shrimp monoculture. Campaigns to implement the CRZ Notification, the deep sea policy and the MFRA need to be undertaken, in collaboration with groups fighting against aquaculture and joint ventures agreements for deep sea fishing.

Sri Lanka

(The Sri Lanka report synthesizes presentations made by R.A.D.B. Samarnayake, Herman Kumara and Boniface Denzil.)

The island of Sri Lanka lies off the southern tip of India. Its 1,500-km long coastline comprises headlands, bays, lagoons, peninsulas, split bars and islets. Sri Lanka's coastal areas are rich and dominated by coral reefs, seagrass beds, mangroves, salt marshes, lagoons and estuaries.

The Sri Lankan economy is highly dependent on coastal resources. The coastal region, comprising 24 per cent of Sri Lanka's land area, contributes about 40 per cent to the nation's Gross Domestic Product (GDP). Most of its vital sectors, such as tourism, industry, mining and fishing, are concentrated in coastal areas and over half of its population is settled in coastal districts. Increasing degradation and depletion of coastal resources as well as conflicts over the use of such resources, are evident. For instance, with the growth of the tourist industry, beach space, traditionally used by fishing communities for residential purposes or for fishing operations, is being taken over.

Fishery Management Measures

Coastal degradation has had an impact on the fishery sector. In Sri Lanka, fish resources are vital from the perspective of food, employment, income and foreign exchange. Fish contributes about 30 per cent of animal protein to the diet of the population, and nearly 80 per cent of the total fish production is taken from the coastal region of Sri Lanka. Traditionally, several fishery management measures have been practised by Sri Lanka fishers, some of which are still in evidence. In the Negombo lagoon, for instance, Boniface Denzil pointed out that the number of shere-seires have been regulated traditionally. Fishing rights are given to specific communities and are hereditary. At present, the government is actively involved in managing fish resources. The license system has been introduced to control the overexploitation of fishery resources.

Coastal Area Management Initiatives

With a history of 15 years, Sri Lanka's coastal management programme is considered successful amongst developing countries. The programme was first adopted in response to Sri Lanka's highly visible coastal problem, that of coastal erosion. The mandate of the Coast Protection Unit set up under the Colombo Port Commission in 1963. was consequently to seek an engineering solution to the erosion problem. The Unit concentrated on the construction of coast protection structures designed to meet site-specific requirements. There was, however, no mechanism to co-ordinate the activities of other departments with jurisdiction over coastal areas, so that efforts at coastal protection were often piecemeal and ad hoc.

In 1978, a Coast Conservation Division was established within the Ministry of Fisheries with the responsibility for handling all matters related to coast conservation. However, it was only in 1981 that the Coast Conservation Act (CCA) No. 57 was enacted to deal specifically with coastal problems in a more comprehensive manner. The Act came into operation in October 1983. A year later, the existing Coast Conservation Division was upgraded into the Coast Conservation Department (CCD) headed by the Director, Coast Conservation (DCC), under the Ministry of Fisheries. The CCD, presently under the Ministry of Fisheries has, at various points in time, been under the Ministry of Fisheries, the Ministry of Defence, and the Ministry of Ports and Shipping.

The CCA also established the Coast Conservation Advisory Council (CCAC), an advisory body, to review coastal management problems of significant concern and to give appropriate advice. The CCAC has eleven members. The CCAC includes representatives of different government agencies. Three members are appointed by the Minister, including one representative of the fishing community. The CCAC reviews plans for Special Area Management (SAM) projects, Environmental Impact Assessment (EIA) reports, etc. It takes policy decisions on variances requests from developers.

The CCA defines the 'coastal zone' as that area which lies within a limit of 300 m landwards of the Mean High Water Line and a limit of two km seaward of the Mean Low Water Line. In the case of water bodies like lagoons, rivers and streams that are connected to the sea, the landward boundary is considered to extend up to two km. The Act aims at regulating development within this narrow zone to prevent environmental degradation, pollution and erosion.

The Coastal Zone Management Plan formulated by the CCD, and approved in 1990, deals with coastal problems, such as coastal erosion, degradation of natural coastal habitats and the loss and degradation of historical, cultural and other important monuments and sites. Specific management objectives and techniques for each problem are identified. The plan aims to achieve its objectives through regulation, direct development, research, co-ordination, education, and plan and policy development. The principal means of regulation is the permit system, whereby the CCD appraises any proposed development activities in the coastal zone, and issues or denies a permit based on this appraisal. In the case of development activities that are considered to have a significant impact on the coastal environment, EIA Reports are called for. The CCD also plays an important role in trying to co-ordinate the activities of various government agencies responsible for the management of coastal resources.

However, there have been lacunae in the enforcement of provisions under the Act. Herman Kumara pointed out that illegal developments, such as the encroachment of land for housing, land reclamation, coral mining etc continues. Moreover, while EIA requirements for issuing permits for developmental activities in the coastal zone include a provision for a public hearing, very often the public learns of the findings of the EIA after the project has been implemented. For instance, in some cases the findings of EIAs of aquaculture projects have been announced after two to three harvests have already been completed. Further, the period within which the

public car. question, or discuss, the findings of the EIA has been reduced from 30 working days to 15 working days.

R. A. D. S. Samarnayake emphasized that while action has been initiated to check violations, the CCD operates under certain limitations which not only hinder its capacity to take action but also take way from the efficacy of the action it undertakes. For instance, it is a real challenge to control coral mining, given the fact that demand for coral-based lime continues to be high. For coral miners, few other employment options are as lucrative. In fact, fishing boats provided to them earlier by the government as a rehabilitation measure, are also being used for coral mining. There are then various socio-economic dimensions that have to be considered in imposing a ban on coral mining. Legally, the CCD can issue demolition orders to coral-based lime kilns based in the coastal zone. This had been done in the case of about 250 lime kilns. However these units merely relocated to interior areas, beyond the CCD's jurisdiction. Divisional Secretaries continued to issue licenses for new units with the concurrence of the Mines and Minerals Bureau.

Similarly the CCD has little control over aquaculture farms since they are all located outside the coastal zone. Only small hatcheries are located in the coastal zone. These units have been required to keep a setback area. In cases where this has not been done demolishment orders have been, issued. The National Aquatic Resources Agency (NARA) has been asked to prepare guidelines for their operations. The CCD also has little authority over important coastal ecosystems, such as lagoons, beyond the stipulated two kilometre area for water bodies.

Moreover, me CCD is understaffed. Few persons are available for regular monitoring and enforcement. While compliance surveys are conducted annually on a regional basis, to detect violations, this is inadequate. The CCD is keen to delegate authority to divisional secretaries for monitoring and enforcement.

Despite these constraints, the CCD has been partially successful in minimising ad hoc development. In cases of violations, the CCD has issued demolition orders. Demolition orders for illegal constructions in the coastal zone have periodically been issued, a very unpopular move, resented especially by hotels and restaurants. Only fishing communities/settlements have been exempted from this action, till such time as alternative sites for relocating them are found.

Second-generation Programme

Sri Lanka is now preparing a second-generation programme which is intended to address, in an integrated manner, coastal issues that were not addressed under the earlier coastal management initiatives. The Cabinet of Ministers, in 1994, approved policies promoting a broader and more integrated coastal resource management system proposed in Coastal 2000: Recommendations for a Resource Management Strategy for Sri Lanka's Coastal Region. The second-generation programme calls for a broader perspective of coastal zone management in terms of objectives, range of geographic areas and participating agencies. There will be a greater emphasis on SAM projects, where resource management issues can be addressed in a holistic, integrated manner, within a demarcated geographical area. Nearly 22 SAM project sites have been identified. It appears, also, that greater community participation will be sought through the SAM planning process, with government agencies playing a facilitative rather than an implementative role.

It is claimed, however, that despite talk of people's participation in the planning and implementation of SAM projects, the management plan for Negombo lagoon prepared by local people, is yet to be approved. Efforts to consider the plan, with the co-operation of government agencies, such as Central Environmental Authority (CEA), are, however, under way

SECTION VI: INTERNATIONAL LEGAL INSTRUMENTS

(This section is based on the last session of the workshop on International Legal Instruments of Relevance to Fisheries and Coastal Area Management. A presentation by Brian O' Riordan, based on the paper prepared by him for the workshop, was followed by discussions in the plenary. The section also draws on the presentation by Margarita Lizurraga during the Symposium, on the FAO's Code of Conduct for Responsible Fisheries.)

International conventions are becoming increasingly important in the regulation, use, allocation and management of marine resources, both in coastal waters and in the high seas, as well as in inland waters. These comprise 'hard law' (i.e. legally binding treaties) and 'soft law' (i.e. non-binding agreements).

International processes, including conferences, conventions and codes that are of significance to fisheries and coastal areas, include the United Nations Convention on the Law of the Sea (UNCLOS), the United Nations Conference on Environment and Development (UNCED) and the consequent Programme of Action, Agenda 21, the Convention on Biological Diversity (CBD), the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, the FAO's Code of Conduct for Responsible Fisheries, the Regional Seas Conventions under the United Nations Environment Programme (UNEP), the International Convention on the Prevention of Pollution from Ships (MARPOL), the London Dumping Convention, the Ramsar Convention, and so on. They cover issues related to marine environmental protection and preservation, conservation and management of marine living resources, navigation and scientific research.

UNCLOS

Issues relating to marine law have been codified only over the last 50 years. Until the advent of UNCLOS the sea was virtually an open access resource. UNCLOS, signed in 1982 and ratified in 1994, provides a legal and institutional framework for all aspects of marine use. All other marine law conventions fall under its purview. It defines the fundamental obligations of all states that are party to it, the nature of their obligations to implement international rules and standards, and also defines dispute settlement processes.

UNCLOS has, perhaps, set a precedent along with a number of other conventions, combining modern international environmental law and elements of classic international law. An example of the latter is a treaty between two countries. Environmental law opens up a new framework of possibilities, since rules are set based on ecology and other sciences. This highlights the fact that the rules of nature exist quite apart from the will of sovereign states. Environmental rules cut across all artificial national borders, highlighting the interdependence between nations. Thus, while States have the right to pursue their own environmental policies, they have a simultaneous responsibility to protect and preserve the marine environment. This underscores the point that states have the rights to conduct their affairs as they please, as long as this does not damage the common property of human kind. Environmental law is a positive development of globalization processes.

The UNCLOS agreement, as ratified in 1994, is similar to the one signed in 1982, except for a few additional clauses. Many countries had already taken up the provisions of UNCLOS prior to its ratification. One of the reasons why several countries, especially the industrialised nations, did not sign it was because of the various clauses related to deep sea bed mining and ownership of deep sea resources. During the course of the UNCLOS proceedings and after its ratification, several conventions and agreements, including the Straddling Stock Agreement, the CBD, and the FAO's Code of Conduct for Responsible Fisheries, were finalized, together adding up to a framework established under UNCLOS. It is, in that sense, an evolving convention.

UNCLOS has set basic parameters to define the area under national jurisdiction. It recognises the rights of States to establish a territorial sea of 12 nautical miles, a contiguous zone upto 24 nautical miles and an Exclusive Economic Zone (EEZ) upto 200 nautical miles from the specified baseline, usually the low water mark. These basic parameters have been adopted in all conventions.

Under UNCLOS, stakeholders are the States. The main stakeholders are the flag State, or the State where the fishing vessels are registered, the port State, the State whose ports, including offshore terminals, the vessels visit, and the coastal State, the State that has jurisdiction over an exclusive economic or fishery zone adjacent to its coast. While NGOs and other organisations are recognized by various UN bodies and have the space to articulate their views, the recognised parties are the States. In that sense, fishworkers and other affected parties have less power in relation to the power of States, to influence such international processes.

Within UNCLOS there are loopholes which powerful and non-signatory nations use to their advantage. For example, under UNCLOS, vessels of one national sovereignty can register in another country. This also makes it possible for them to circumvent various international conventions that are applicable and to which their countries are signatories. International conventions are now trying to plug such loopholes. Another provision under UNCLOS supports the right to innocent passage. The coastal State, the State which has jurisdiction over the waters through which a vessel is sailing, has certain limited powers. It can, for example, prevent and punish vessels dumping pollutants, especially if the violation has taken place within its territorial sea or contiguous zone. The powers of the coastal State diminish as distance from the shore increases. However, when the vessel arrives in the port State, the port State has the authority to impound it and to deal with any claim from other coastal States.

Similarly, while UNCLOS recognizes the sovereignty of States, the European Union as a whole has an EEZ, with each member State within it declaring its own EEZ. UK is not a signatory to UNCLOS. Non-signatory States may use certain case laws under UNCLOS to their own advantage. Further, parties which are not signatory do not necessarily feel bound by case law. While conventions are establishing a kind of international case law or soft law, it will take some time for this to become established and legally binding.

UNCLOS has powers for dispute settlement at the International Court of Justice, a statutory UN body. There is also a special International Tribunal for the Law of the Sea set up in August 1996 at Hamburg, as well as an arbitral tribunal and a special arbitral tribunal. The scope of the latter relates to fisheries, protection and preservation of the marine environment, and marine scientific research and navigation. There is also a specific UNCLOS secretariat in New York.

One of the most significant achievements of UNCLOS has been in establishing the rights of coastal States to a 200-mile EEZ, and of the exclusive right to fish and other resources in this zone. UNCLOS also recognizes the rights of geographically disadvantaged States and landlocked countries. Article 61 and 62 of UNCLOS, refer to resources under the EEZ of States. States have the responsibility of conducting stock assessments and of ensuring that there is no overfishing beyond the Maximum Sustainable Yield (MSY). Article 62 emphasizes that if there is a surplus of stocks within the EEZ, other States have the right to fish there under fishery agreements. In this, priority will be given to geographically disadvantaged and landlocked States.

According to Article 62, countries can claim that they have a need and that a particular coastal State has surplus stocks, not being exploited for its own use- The concept of surplus is, however, conditioned by biological, as well as other economic and social considerations. Countries can claim that, even if fish stocks are not exploited relative to their MSYs, catch per unit effort for their own fleet will decline, with a consequent economic loss, if other nations are given licenses

to fish. Also in practice, no country has given access to its surplus based on claims by another country. Moreover, landlocked States do not usually have a fishing fleet, and therefore, in practice, have not staked a claim asking for fishing rights to declared surplus.

There is also a distinction between the concept of MSY and of TAC (Total Allowable Catch). TAC is not necessarily based on MSY in many cases if it may be much lower, since it also reflects social, economic and other precautionary objectives of the coastal State. The definition of TAC reflects the economic needs of the community, and if communities claim that their economic needs are being threatened, the action of the coastal State in allowing access, is then a violation of the UNCLOS convention. Thus, even if there is a biological surplus, States can, on the basis of social and economic reasons, deny access.

Given this background, the decision by countries to allow access to foreign fleets, as in India, is often suspect, in that the economic and social interests of their coastal fishing communities, are threatened. Courts within these countries can be approached, if UNCLOS has been ratified by these countries.

Other international instruments which relate to the management of marine and coastal resources include:

Agenda 21

Agenda 21 is a Programme of Action for sustainable development adopted at the United Nations Conference on Environment and Development (UNCED) in 1992. Agenda 21 recognizes UNCLOS as the international legal basis for the protection and sustainable use of the marine and coastal environment and their resources. While Agenda 21 is not legally binding, it is nevertheless influential, since the Commission on Sustainable Development (CSD), responsible for its implementation, reports directly to the General Assembly of the UN.

The United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks

The impetus for this process came from Agenda 21. This agreement provides for the protection of straddling fish stocks and highly migratory fish stocks. Under UNCLOS there is provision for a regional body to manage resources. There are no stocks, irrespective of the EEZ and High Seas, that can be fished under an open access regime. Countries have to belong to a regional management authority. Unfortunately, there is no effective management body in the Indian Ocean as yet. The Indian Ocean Tuna Commission has been established very recently, in March 1996, for the management of migratory tuna stocks. The Straddling Stocks Agreement emphasizes a precautionary approach, with the onus of proof being on the country which comes to fish rather than on the country complaining of overfishing. Further, measures, at least to the same extent as taken by the coastal states to protect a particular stock in national waters, have to be taken by countries engaging in high-seas fishing of straddling stocks and highly migratory species. The Agreement also specifies provisions for resolving disputes. The Law of the Sea office of the UN has appointed several people for this purpose and their decision is considered as final. Moreover, the decision has to be taken within a period of two years. The decisions of this body apply also to non-member countries.

FAO's Code of Conduct for Responsible Fisheries

The Code was adopted in 1995. While the Code is voluntary, certain parts of it are based on relevant rules of international law, such as on UNCLOS, the Straddling Stocks Agreement and Agenda 21. It thus has some binding provisions. The Code aims at the conservation, management and development of all fishery resources falling both within and outside national jurisdiction. There is a specific focus on the integration of fisheries in Coastal Area Management. It is a flexible instrument, capable of being periodically revised to achieve desired results.

Conventions within the UNEP Regional Seas Programme

The Regional Seas Programme of the United Nations Environment Programme (UNEP) was established in 1974. Regional seas conventions have been signed to protect the world's coastal areas, inshore waters, and open oceans. Regional seas conventions foster regional associations of nations which agree on an action plan and on certain basic principles. These conventions cover a variety of seas around the world. There is, as yet, no such arrangement in South and East Asia, even though draft legal instruments are pending.

The Convention on Biological Diversity (CBD)

The CBD, aimed primarily at the conservation of biological diversity, was adopted in 1992 at the Earth Summit. The CBD is legally binding. It was further strengthened in 1995, at the Conference of Parties of the Convention, through the Jakarta Mandate on marine and coastal biodiversity.

The Washington Conference

This is another process set in motion by Agenda 21. The Washington Conference in 1995, organized under the auspices of UNEP, focused on the protection of the marine environment from land-based activities. It agreed on a global programme of action to control marine pollution from land-based activities, in particular the production and consumption of Persistent Organic Pollutants (POPs). Further meetings are to be held to evolve legally binding treaties.

The International Convention for the Prevention of Pollution from Ships (MARPOL, 73/78)

This aims at eliminating pollution of the sea by oil, chemicals and other harmful substances which may be discharged by ships.

The London Dumping Convention (LDC, 1972)

The primary objective of this convention is to prevent the indiscriminate disposal of harmful wastes at sea.

Once a country signs and ratifies a convention, it is bound to incorporate the recommended rules, guidelines and practices within each convention, into its laws and legislation. While signatory nations have the power to implement their own laws within their own waters, at another level, if there are infringements of these conventions, there are specified procedures to ensure compliance. For instance, within UNCOS there are various bodies, such as the International Court of Justice, which deal with such matters.

Significantly, while all these conventions recognize that States have jurisdiction over their waters, within many of these there are clauses which refer to the importance of States recognizing customary practices and traditional rights.

SECTION VII: INTEGRATED COASTAL AREA MANAGEMENT

(This section draws on the presentation made by Donna Nickerson during the symposium on 'Indicators of Successful Integrated Coastal Management Approaches', based on her paper. In her presentation, she drew on her practical experiences in ICAM programmes. The section also integrates some of the issues raised during the discussions that followed the presentation.)

Ecosystem Approach

Integrated Coastal Area Management (ICAM) is an ecosystem approach to resource management. The five essential elements of ICAM include public involvement; a comprehensive ecosystem approach to identifying and solving problems; integration of disciplines, skills and knowledge; decision making by consensus to the extent possible; and, flexibility. The ICAM approach was first adopted in the US, as a consequence of people's struggles for a better-managed coastal environment. ICAM is a long-term, experimental, dynamic and incremental process. Each ICAM programme is unique, and requires an ongoing process of analysis and review, to gauge whether efforts are on-track. For this reason, indicators, drawn from practical experiences in ICAM programmes, are very useful.

Indicators that show progress within the ICAM governance process include:

- Early participation by stakeholders;
- Representation of the 'key' stakeholder groups in the management structure;
- Accessibility and use of sound science and other accurate, timely and relevant information by everyone in the decision making process and the wider public;
- A comprehensive understanding of the issues by all concerned;
- A holistic 'systems thinking' approach towards management of the issues;
- Involvement of the wider public in ICAM activities and decision making;
- Clear vision, objectives and priorities for management;
- Effective co-ordination; and
- National support for local level initiatives.

Indicators of progress in the outputs of the governance process include:

- Sustainability of the new governance process;
- Extent of stewardship within ICAM and the wider public;
- Adequate financial support or actions;
- Greater equity in resource allocation and use;
- Environmental changes
- Use of the monitoring information to redirect the programme's activities.

The ICAM process calls for the participation of all stakeholders and is based on a consensus approach for dealing with problems of resource degradation and management. Thomas Kocherry pointed out that for this approach to be successful stakeholders must be equal. In addition, facilitation by an unbiased group is pre-supposed. However, since both these conditions are rarely met in practice, values, such as prioritizing the needs of the disadvantaged stakeholders, need to be explicitly adopted. These issues were reinforced by Khushi Kabeer. She pointed out that most decisionmakers and bureaucrats belong to the educated, ruling class and work for the interests of that class. Unbiased facilitation is then largely a myth since existing inequities cannot be wished away. In addition, the actions and decisions of the facilitating committee are also influenced by those who finance it. In this context, Rolf Willmann felt that an important indicator of the success of ICAM programmes should also be the extent to which it contributes to the empowerment of disadvantaged groups.

Nityanand Jayaraman pointed out that the Indian CRZ Notification, if viewed against the indicators presented, was grossly inadequate. In particular, the need for stakeholder participation has been totally ignored. No mention has been made of it in the Notification. Donna Nickerson emphasized that the lack of stakeholder participation in ICAM initiatives had, in fact, been the main reason for the failure of the programme in Thailand.

Conclusion

Participants had come together at the workshop and symposium to search for an alternative paradigm for the sustainable management of marine and other coastal natural resources. As pointed out by Nalini Nayak, essential elements of such a paradigm need to draw on our past and to incorporate the concepts of nature capital, the need for environmental audits, the need to respect customary law, traditional knowledge, and the concept of property rights. It needs to draw on the nurturing roles women have traditionally played in protecting biodiversity and in sustaining communities. At the same time, it needs to reverse trends that have marginalized women from the fishery, and that have converted women into property.

In conclusion, the workshop and symposium provided the space for a sharing of experiences and a constructive exchange of views. It provided an opportunity for participants to reaffirm their support for the livelihood struggles of people in the coastal areas of the South Asian region. Based on a greater understanding of the linkages between natural resources and property rights issues, and of coastal area management issues in the South Asian region, participants were able to arrive at a common understanding of the priorities for future action and the need to continue the process of sharing and networking.

SOUTH ASIA WORKSHOP ON FISHERIES AND COASTAL AREA MANAGEMENT

26-29 September 1996

Madras, India

Statement of the Workshop

Background

Social activists, researchers, representatives of fishworkers' organizations and their supporters, from Sri Lanka, Maldives, Bangladesh and India in the South Asian Region, as well as from several other countries, shared their concerns and views on fisheries and aquaculture, the livelihood struggles of the communities in the coastal regions, and on coastal area management.

Coastal regions of South Asia are extraordinarily rich in ecological diversity. This richness has been historically maintained and cared for by the women and men living along the coast. Fishing communities, through generations of interactions with the sea, rivers, lagoons and other elements in nature, have played a particularly important role in this process. Women of these communities have always played a vital part in sustaining and nurturing fisheries and fishing communities. Unique modes of human-environment interactions have evolved in this region. These have been based on people's knowledge of the terrestrial and the aquatic milieu, as well as of the highly complex and sensitive interactions between them.

People in the Asian subcontinent share common rivers and seas. Caring for fragile and interdependent coastal ecosystems is a crucial strategic concern of the people of this region. Due to this common concern, participants met to explore ways of working together, sharing experience and providing mutual support on their particular struggles. It was felt that solidarity at the people's level is extremely important to resolve issues of major importance in the region. Noting the increasing struggles of coastal communities for their livelihood rights, participants came together to express their solidarity and pledge their support to this struggle. Participants also reiterated the importance of understanding mutual needs, and, where appropriate, sharing their resources equitably.

Introduction

Coastal areas are not simply geographic locations proximate to the world's oceans. They are arrangements of complex, diverse and fragile ecosystems, unique in nature. These very features require special attention. Coastal ecosystems, such as mangroves, coral reefs, backwaters, estuaries, lagoons and seagrass beds, besides performing crucial coastal protection functions, provide rich spawning and breeding grounds for fish and other aquatic organisms.

Another important dimension is the vital contribution that coastal ecosystems make to sustaining livelihoods, particularly of fishing communities. From both an economic and livelihood perspective, fisheries are one of the most important of the resources available in coastal areas.

Living aquatic resources make a crucial contribution to food security, particularly in the coastal zone, as a source of high value protein, providing the sustenance that supports livelihoods, social structures and economic development. In South Asia fish contributes more than half of the animal protein intake in the diet of coastal communities. In the Maldives and Bangladesh,

for instance, fish contributes as much as 80 percent of the animal protein intake. This has direct nutritional implications for the fishery dependent, poor and marginalized coastal communities.

Governments in the South Asian region have, however, not sufficiently recognized the ecological, human and economic significance of coastal areas, and of the resources within them. These dimensions have not been sufficiently incorporated in environmental laws and regulations and in the macro economic policies pursued by governments in the region.

While the workshop specifically focused on the coastal zone, attention was drawn to the fragmented and compartmentalized view which often dominates mainstream thinking. Coastal zones are part of the broader ecological horizons that include inland areas and waters. Activities in these have direct implications for the coast. The inter-relationships between agricultural activities and marine activities were discussed and recognized. In Bangladesh, although agriculture is predominantly a flood-plain activity, it is directly connected to the coastal ecosystem through major rivers and tributaries leading to the sea. Thus rice and fish is produced from the same agricultural land when flood waters enter the fields. Interconnections of a similar nature between rivers, canals, lagoon and the sea are a vital component in the fishery production cycle in parts of Sri Lanka and India. It is such relationships within the totality of water bodies, which account for the high diversity of fish species in the South Asian region. Thus Bangladesh with some 400 fish species, has one of the richest inland fisheries in the world.

Despite the enormous significance of inland fisheries in Bangladesh and the importance of the flood-plain ecology to the wider agricultural system, international donors are spending millions of dollars implementing the Flood Action Plan. This project plans to turn the flood plains into dry land to promote a 'green revolution' in the rice fields, and 'blue revolution' in the water. As a result one-third of Bangladesh's flood plain areas, along with the complex flood-plain ecosystem will vanish in only two decades.

Coastal Area Issues

A major challenge for coastal area management is the maintenance and enhancement of the ecological diversity of the region. Achieving this will contribute to the general economic prosperity of the region, and the livelihoods of the coastal communities, in particular. However, economic activities and government policies must recognize the customary rights, especially of women, to land and other resources, as well as the vitality of traditional practices and indigenous knowledge of communities, if this is to happen.

The rapid development of coastal areas, fuelled largely by macroeconomic policies supporting industrialization as well as by the pressure to generate foreign currency through the mass production of goods for global export markets, is, therefore, a matter of concern. Such unplanned and unsustainable development is generating huge profits for relatively few people at the expense of the many who are left with a degraded and polluted environment. The communities' rights to livelihoods are being overridden by the commercial rights of developers.

Thus, in Sri Lanka and India, fishing communities are under threat from their own governments which are trying to sell off their deep sea fishery resources to joint ventures with foreign companies. In Bangladesh, national mangrove forest reserves in the Chokoria-Sunderban (a total of 8,500 ha) have been handed over from the Ministry of Forestry to the Ministry of Fisheries (2,834 ha) and the Ministry of Land (5,666 ha) for leasing out for shrimp aquaculture. As a consequence large tracts of mangrove forests have already been completely destroyed.

Fishing communities are increasingly having to compete with other resource users in the coastal area. Coastal shipping, construction of harbours, sea bed mining, the development of industry and tourism, and urban development, are all impacting on coastal communities. Tourism in

coastal areas, for instance, is displacing traditional fishing communities and disrupting their access to fishery resources and to beach space. The livelihoods of fisherpeople, and women fish processors are consequently under threat. Fishing grounds and the habitats of fishing communities are being encroached upon. Displaced from their traditional activities in fish processing and marketing, women are increasingly exploited as factory workers in processing plants. They are being forced to migrate in search of work. For instance, women workers from Sri Lanka form the bulk of the labour force in the fish processing plants of Maldives.

In the face of such threats it is crucial that the right to livelihood be afforded a higher priority than the right to profit from commercial activities. Moreover, it is necessary to encourage collective and democratic initiatives at the level of the local communities. This will encourage using, caring for and managing the coastal environment and resources in ways which incorporate principles and responsibilities of common property, understood as community ownership. Coastal area management must include in equal measure human, ecological and economic elements. The participation of the coastal communities must be ensured from the beginning in the formulation and implementation of policies regarding coastal area management. Institutions of the local government must be given proper authority and a clear role in community development as well as in conserving, maintaining and enhancing biodiversity. Local-level institutions need to be supported by, and should work in cooperation with, appropriate decision-making bodies at the State/provincial and national levels.

The meeting, therefore, highlighted the importance of participation in, and decentralization of, decision-making processes and management as desirable objectives in their own right. Management needs to be oriented towards actually controlling and guiding the development process in a manner which benefits coastal communities. There is a need to recognize the advantages of allocating responsibilities at different levels.

Initiatives in Coastal Area Management

Coastal area degradation, particularly in Sri Lanka, Bangladesh and India, is acute. In Maldives, the problem is evident only near populated islands, such as Malé. In most other atolls the only concern is on the issue of global warming and associated climatic changes and rises in sea level.

Several initiatives in coastal area management have been taken by the governments in the South Asian region. In the context of Maldives, however, the concept of coastal area management is not considered appropriate. The emphasis is on the integrated management of reef resources, since the country depends on these for its survival. In Sri Lanka coastal area management has a history of fifteen years. However, numerous loopholes in the legislation and in its implementation have provided scope for violations and for possible misuse of the coastal zone. A second-generation programme for the comprehensive management and development of coastal resources is being finalized.

India has recently issued a notification for the management of coastal areas. However, the dynamic nature of the land and sea interface is not recognized. Arbitrary boundaries drawn around the coast are inappropriate in areas where the tidal patterns vary, where the shape and structure of the beach areas is constantly changing, and where the paths and profiles of inland waters flood and recede seasonally. A flexible approach to defining boundaries and planning development, based on the unique geographical features, as well as the specific resource management issues present, is required. Moreover, the impact of activities in inland and marine areas on coastal waters, needs to be taken into consideration.

With respect to the Indian Coastal Regulation Zone notification, the National Fishworkers' Forum (NFF) pointed to some lacunae in the notification. They will nevertheless press for its implementation in its present form, because it recognizes the traditional and customary rights

of fishing communities to their habitat, and places checks on the anarchic expansion of large-scale coastal tourism and industrial developments. Alert interventions by public interest groups and the positive attitude of the judiciary can play a crucial role in curbing violations. Instilling an awareness among coastal fishing communities to utilize the notification to their advantage is required in India.

It was recognized that as well as needing to actively campaign to stop harmful activities in the coastal areas, fishworker and producer groups need to actively research and promote viable alternatives. Such alternatives need to be based on human and ecological values, rather than purely motivated by the profit potential of the global market.

Polluters must be penalized for the damage they cause. The burden of proof should be on the developers (including government agencies) to show that their activities will not cause harm to the coastal environment or to the coastal communities.

Environmental as well as social impact assessment should be a compulsory part of the procedures in the approval process of potential development activity. Provisions for a public review process should be made mandatory. Further, environmental impact assessments (EIAs) of new developments must be prepared in the context of existing activity in the area and their burden on the ecosystem. EIAs need to take traditional as well as 'modern' scientific knowledge into consideration. Where the information base is poor, or the likely adverse impact cannot be predicted with any certainty, the 'precautionary approach' must be adopted, and development activities should not be undertaken.

All environmental impact assessments should account for the social and economic costs which environmental degradation causes to local communities. There must also be ways and means for accounting for the costs to be borne by future generations whose rights may be jeopardized by current developments. Once such costs are internalised, the economic rationale to pursue many 'development' policies or projects may cease to exist.

Many formal acts pertaining to natural resource access and use in the coastal zone have been introduced in most of the countries of the region, over different points in time. In the context of integrated coastal area management, there is a need to examine and harmonize these different acts to ensure that there is coherence between them. It is also necessary that national and State/provincial Governments ensure that there is clarity between different departments on the allocation of responsibility and accountability.

While many characteristics and needs of fisheries are unique, there are several aspects which need to be integrated into a broader approach to coastal area management. In particular, there is a need to harmonize policy objectives between different natural resource users, and to establish mechanisms for conflict resolution. Wherever possible, different stakeholders need to be brought together to plan and prioritize the uses to which coastal areas are put. There are clearly many areas where harmonious development is possible, and these areas need to be identified and prioritized.

Industrial Shrimp Aquaculture

The debate on industrial shrimp aquaculture highlighted the history of its development in the region. South Asian governments have yielded to the pressures of international funding agencies, multinational companies and local industrialists. They have turned a deaf ear to the problems which this industry has already created in other Asian countries. As a result of this, extensive land alienation, especially of agricultural land, has taken place in Bangladesh, both for intensive and extensive forms of shrimp aquaculture. In Sri Lanka, the government is implementing plans to develop shrimp aquaculture in the South of the country, despite

evidence of the harmful effects of aquaculture in the northwest. In both Bangladesh and India there has been substantial loss of biodiversity and destruction of coastal habitats, such as mangroves. Aquacultural growth has also led to groundwater depletion and land salinization. This has threatened both local food security and the livelihoods of many coastal communities, in particular of small-scale fishers, farmers and landless labourers. The impacts of the 'predatory expansion' of aquaculture in Bangladesh and India have resulted in immense human costs in the form of physical harm and violence, especially against the women of coastal communities.

In Bangladesh and India, people's movements opposing this type of aquaculture have sprung up. They have been met with strong resistance from the investors. Public interest litigations in India and appeal to international forums, have helped focus attention on the issue. Despite this, new areas continue to be brought under aquaculture.

Aquaculture is being promoted as a major earner of foreign exchange. However, environmental impact assessment studies conducted in India have revealed that the social and environmental costs associated with aquaculture far outweigh these benefits. The profits from intensive aquaculture as compared to the use values of unspoilt mangroves have also been grossly exaggerated. In this context, it is important to note the findings of a recent South East Asian Fisheries Development Cooperation (SEAFDEC) study, which has shown that the market value of the harvested resources from a well managed hectare of mangroves (valued in the range of some US\$10,000) is only a little less than the net profits from a hectare of intensive shrimp aquaculture.

In the context of falling marine fish production, aquaculture has been advocated as a viable, alternative source of fish supply. However, the feed for intensive shrimp aquaculture is primarily from the harvest of industrial fisheries converted into fish meal. It is estimated that by year 2000 about 570,000 tonnes of cultured shrimp will be produced in Asia. The fish feed requirement for this will be of the order of one million tonnes (dry weight). This represents a staggering 3.5 million tonnes wet-weight of fish, more than the total marine fish harvested in India today. This is clearly unsustainable, with an unknown impact on marine biodiversity and the food chain. It has negative implications for the livelihoods of small-scale fishers. Additionally, the diversion of fish to fish meal manufacture not only deprives the local population of inexpensive fish protein, it also displaces women whose livelihood was earlier derived from fish processing using traditional methods, as recently witnessed in West Bengal, India.

All this points to the link between industrial aquaculture and industrial fisheries both of which are detrimental to the interests of artisanal fishing communities. The demands, therefore, to ban shrimp monoculture, industrial fisheries and to strictly regulate trawl fisheries, are intrinsically related if coastal management is to be oriented towards sustaining coastal communities and fishery resources.

Fisheries Management

Many of the fishery resources of the countries of the region are heavily exploited, particularly in the coastal waters. As a consequence, these resources are more susceptible to adverse environmental impacts caused by degradation of fishery habitats and pollution. Further, the economic and social benefits derived from the marine resources are significantly lower than they could be if more effective fisheries management measures were implemented. These require stricter limits, reductions of the fishing capacities of industrial fishing vessels, expansion and effective enforcement of zoning arrangements to protect the fishing activities of small-scale fishers, as well as the establishment of community-based fishery management regimes for the small-scale sector. There is a need to recognize customary and cultural rights to fish resources

and to revive and strengthen traditional systems of fisheries management. These are essential functions of fisheries administrators. In Maldives, for instance, the government strictly regulates the type of gear used within its waters, both by domestic and foreign fishing vessels. Only the use of pole-and-line for tuna fishery is permitted. Similarly, State legislation in India provides for zoning regulations and sometimes imposes seasonal bans on non-selective fishing activities in coastal waters.

International Instruments

The workshop had the opportunity to discuss the relevance of important international instruments related to fisheries, in particular the United Nations Convention on the Law of the Sea (UNCLOS) and the related UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, the Rio Declaration and Agenda 21, International Maritime Organization's (IMO) instruments regarding pollution and safety at sea, as well as the FAO's Code of Conduct for Responsible Fisheries.

The relevance of these instruments to artisanal fisheries and to coastal fishing communities was examined. All these documents take into consideration the importance of coastal communities. FAO's Code of Conduct, for instance, recognizes the importance of coastal communities in the planning, management and development of coastal resources.

It was also indicated that there has been a misinterpretation of articles 61 and 62 of the Law of the Sea on the possible claims by another State with regard to the use of marine resources considered as not fully utilised by the Coastal State. Under UNCLOS, Coastal States have the sovereign right and obligation for the utilisation, conservation and management of the living marine resources of the EEZ for use by its present and future generations.

Conclusion

This report is the result of a conscious pedagogy of learning. It has fused together the life experiences and struggles of coastal people, with a distilled analysis of issues pertaining to natural resource use, management and related property regimes. It has enabled participants to locate their own personal perspectives in the context of the newly emerging regime of coastal area management. It provides some firm foundations to construct future partnerships and regional linkages for sustainable use of coastal resources and for promoting the livelihood rights of coastal communities.

Noting all the above, the meeting concluded by endorsing a commitment to continue the process of learning, campaign, struggle, sharing and mutual support initiated and fostered by this workshop.

Addendum I

WORKSHOP PROGRAMME

South Asia Workshop on Fisheries and Coastal Area Management: Institutional, Legal and Policy Dimensions

26 to 29 September, 1996
Madras, India

Day 1: Thursday, 26 September 1996

- 09: 00 - 09: 30 Registration
09: 30 - 10:00 Welcome
 Background to the Workshop (Sebastian Mathew)
 Introduction to the Workshop and Symposium (John Kurien)
- 10: 00 - 11: 15 Participants on Personal Background and Expectations from the Workshop
- 11: 15 - 11: 30 Tea Break
- 11: 30 - 13: 00 Overview of Country Contexts by Representatives from
 Bangladesh, Maldives, Sri Lanka and India
- 13:00 - 15: 00 Lunch
- 15: 00 onwards Situation Reports by Fishworker Representatives
 and Others
- 20:30 - 21:30 Dinner

Day 2: Friday, 27 September 1996

Session 1: Fisheries and Coastal Zone Interactions

- 08: 15 - 08: 30 Plenary Session
08: 30 - 09: 30 Group Discussions
09: 30 - 10: 15 Plenary: Consolidation of Issues Raised in the Group Discussions
- 10: 15 - 10: 30 Tea Break
- 10: 30 - 12: 30 Plenary: Evolving a Framework for Understanding
 the Interactions (John Kurien and Rolf Willmann)
- 12: 30 - 14: 00 Lunch

Session 2: Natural Resources and Property Rights

- 14: 00 - 16: 00 Presentation (John Kurien)

16: 00 - 16:30 Tea Break
16: 30 - 17: 30 Group Discussions
19: 30 - 20: 30 Dinner
20: 30 onwards Cultural Programme by Participants

Day 3: Saturday, 28 September 1996

Session 3: Fisheries Management and Integrated Coastal Area Management

08: 30 - 10: 30 Presentation (Rolf Willmann)
10: 30 - 11: 00 Tea Break
11: 00 - 12: 30 Plenary: Discussions
12: 30 - 14: 00 Lunch

**Session 4: Integrated Coastal Area Management in South Asia:
A Comparative Perspective**

14: 00 - 15: 30 Presentation and Discussion (Chandrika Sharma)
15: 30 - 16: 00 Tea Break

Session 5: Aquaculture and Coastal Area Management

16: 00 - 18: 00 Presentations by Participants from Bangladesh, Sri Lanka and India
19: 30 - 20: 30 Dinner

Day 4: Sunday, 29 September 1996

**Session 6: Institutional, Legal and Policy Dimensions of
Integrated Coastal Area Management**

10: 00 - 12: 30 Plenary Session
12: 30 - 14: 00 Lunch
14:00 onwards Informal Discussions on Regional Co-operation,
Aquaculture, TEDs

Addendum II

SYMPOSIUM PROGRAMME

South Asia Symposium on Fisheries and Coastal Area Management: Institutional, Legal and Policy Dimensions

30 September to 1 October 1996

Madras, India

Day 1: Monday, 30 September 1996

09:00—10:30 Inaugural Session

Chair: V.Vivekanandan, Co-ordinator, Animation Team, ICSF

Welcome: Sebastian Mathew, Executive Secretary, ICSF

Inauguration: M. Raman, Secretary to Government,
Animal Husbandry and Fisheries
Government of Tamil Nadu

Keynote Address: Margarita Lizárraga, Senior Fisheries Liaison Officer
Food and Agriculture Organization of the UN
“Code of Conduct for Responsible Fisheries”

Vote of Thanks: John Kurien
Member, ICSF and Associate Fellow,
Centre for Development Studies, Trivandrum, India

10:30—11:00 Tea Break

Session 1: Indices of Success of Integrated Coastal Area Management

11:00—12:00 Chair: B. R. Subramanian
Director, Department of Ocean Development
Government of India

Presentation: Donna J. Nickerson
Coastal Zone Management Adviser
Bay of Bengal Programme, FAO

12:00—14:00 Lunch

Session 2: Country Reports on Coastal Area Management

14:00—17:00 Chair: R. Rajagopalan, IOI, IIT Madras

- Reports :
1. India (B.R. Subramanian, Dept. of Ocean Development)
 2. Sri Lanka (R .A .D .B. Samaranayake, Manager, Coastal Resources Development, Coast Conservation Department)

17: 00—17: 30 Tea Break

17: 30—18: 30 Report : Maldives (Maizan Hassan Maniku,
Director-General of ishery Research)

19: 30-20: 30 Dinner

Day 2: Tuesday, 1 October 1996

Session 2: Country Reports on Coastal Area Management (Contd.)

08:30—09:30 Report: India (Subba Rao,
Joint Director, Ministry of Environment and Forests)

Session 3: Defending Fishing Communities' Interests in Coastal Zones

10:30—12:00 Panel Discussion: Harekrishna Debnath, B. L. D. Boniface Denzil,
Rafiqul Haq Tito, Jesurethinam

Conclusion: Statement of the Workshop

12:00—13:00 Presentation: Herman Kumara

13:00—13:30 Summing-up
and
Vote of Thanks: Pierre Gillet

Addendum III

SOUTH ASIA WORKSHOP AND SYMPOSIUM ON FISHERIES AND COASTAL AREA MANAGEMENT: INSTITUTIONAL, LEGAL, AND POLICY DIMENSIONS

26 September - 1 October 1996

Madras, India

Prospectus

Introduction

The artisanal and small-scale sector contributes up to 25 per cent of the world marine production, and almost the entire catch is taken from the coastal waters. The health of the coastal marine environment, therefore, is inextricably linked to the livelihood of over 120 million people who are directly or indirectly dependent on this sector. Two-thirds of marine fish production come from stocks which pass the first and most vulnerable stages of their life cycles in coastal areas.

In addition to overfishing from non-selective fishing gears, like trawling, and other destructive fishing methods, like dynamiting and cyanide poisoning, the coastal environment is threatened by pollution from land-based sources, coral reef destruction and mangrove deforestation. The degradation of the coastal environment, in turn, critically affects the livelihood rights, particularly of marginalized fishers, in several countries and often leads to social conflicts.

Rationale

Given the scarcity of, and competition for, resources, it is important to develop understanding about the interdependence of various ecosystems, and to develop institutional and legal frameworks that would enable sustainable as well as equitable utilization of coastal resources.

While negative externalities from fisheries to other sectors are normally insignificant, those from non-fishing activities to fisheries are formidable, a factor yet to be reckoned with in many countries. Although fisheries do not pose any threat to agriculture or industry, the environmental impact that agriculture or industry is capable of inflicting upon fish habitats, can be damaging. Likewise, destructive and non-selective fishing methods and practices as well as indiscriminate growth in fishing capacities, both in the exclusive economic zones and in the high seas, have a negative impact on fish habitats. These activities have adverse implications for the life and livelihood of coastal fishing communities as well, particularly in several low-income food-deficit countries where the fisheries sector is the employer of last resort. This further emphasizes the critical importance of integrating fisheries into coastal area management.

The coexistence of various kinds of property regimes (private ownership, State ownership, community-controlled, etc.), and the varying degree of priority attached to the concept of coastal zone management by different user-groups, could add difficulty to its implementation. Fishworkers' organizations should look systematically into major coastal resources

management issues and draw up an action programme that would, at the outset, address the fisheries issues in the littoral area. This could eventually be expanded to animate fisheries sector institutions to defend the interests of fishing communities in the coastal zone against marginalization by other user groups and interested parties.

Structure

The six-day programme will be split into two parts: a four-day interactive workshop from 26 to 29 September and a two-day symposium from 30 September to 1 October. The aim of the workshop is to share experiences, to learn concepts and to discuss the institutional and policy framework in relation to fisheries and coastal area management. The aim of the symposium is to facilitate a dialogue on this between policymakers and fishworkers, and to arrive at a common statement of concern.

Objectives

The following are the objectives of the workshop:

- to document coastal area degradation issues of concern to small-scale fishing communities;
- to review legislation, guidelines and other instruments of direct relevance to fisheries and coastal area management; and
- to educate fishworkers' organizations and other interested groups on natural resources management with special reference to coastal fisheries.

The objectives of these symposium are:

- to examine the initiatives of the State in coastal area management in South Asia; and
- to discuss how fisheries sector institutions can defend the interests of fishing communities in the coastal zone.

Programme

Background material will be prepared by the secretariat on major coastal resources management issues in all the above countries. This would include review of legislation of direct relevance to integrated coastal area management (ICAM), for example, the Coastal Regulation Zone notification in India; the Supreme Court of India's verdict with regard to coastal aquaculture; flood control and shrimp culture in Bangladesh; tourism and coral reef mining in Sri Lanka and Maldives; and coastal zone management legislation in Sri Lanka. Presentations will be made at the Workshop by fishworker participants, focusing on important issues relevant to the coastal area and fisheries in their localities (about 1,200 words).

Various guidelines for fisheries and coastal area management as well as institutional and legal aspects of relevance to ICAM will be presented by resource persons at the Workshop. The resource persons will also help fishworker participants to understand important concepts in natural resource management.

The Workshop will obtain the views of the participants on coastal area management with regard to:

- defending fisheries interests and community livelihood interests;
- the role of fishworkers' organizations at the local, national, and regional levels;

- contacts/exchanges with producers' organizations from other sectors;
- expectations vis-a-vis government policy and legislation as well as enforcement of existing laws at local, provincial and national levels;
- infra-sectoral and inter-sectoral conflict resolution mechanisms;
- nature of awareness/educational activities needed among the fishing community and other coastal resource users on ICAM issues; and
- the future role of ICSF in ICAM.

The Symposium will help to arrive at a consensus on how fisheries sector institutions can defend the interests of fishing communities in the coastal zone.

Guidelines for Reports by Fishworkers

presentations will be made by fishworker participants on aspects of coastal zone degradation in selected localities from their respective countries. Instances of pollution from industrial activities that discharge chemical waste into the coastal zone; untreated sewage from urban centres; agricultural run-off from farms and forests; oil spillage from tankers and rigs; and sand and coral mining, are some examples. The impact of tourism on fishing operations in the form of restricted access to beaches and open land near the sea, is another example.

Similarly, problems posed by indiscriminate development of shrimp aquaculture, like clear-felling of mangroves and associated problems; salinity incursion; obstructions to fishing operations; suspected spread of culture-borne diseases into the wild; decreased availability of shrimp and fish as a result of excessive removal of gravid females and shrimp/fish larvae for aquaculture, are some issues that can be addressed.

Further, inter-gear and inter-sectoral conflicts and traditional conflict resolution mechanisms, the impact of destructive fishing practices like dynamiting and cyanide poisoning, violation of fisheries regulations by fishing vessels from foreign countries that have an adverse impact on fish stocks, could be topics for consideration.

Traditional management practices for conservation and allocation of fisheries resources should also be regarded as an important area for preparing presentations. It would also be worthwhile to suggest to what extent these practices can be adapted into new management practices.

Willingness, or otherwise, to join hands with other user groups (for example, aquaculture farmers, industry, forestry and farming groups) and relevant government agencies, for coastal area management, may also be dealt with in the paper. Also, whatever initiatives are taken with or without government co-operation to safeguard fisheries resources are worth mentioning.

Participant Characteristics

The participants at the workshop will be mainly fishworkers' representatives from India, Bangladesh, Maldives and Sri Lanka, and resource persons. The participants at the symposium will be policymakers and officials from the international, national and State levels, as well as with resource persons and fishworkers' representatives.

Addendum IV

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Addendum V

COUNTRY REPORTS

(i) INDIA

Presentation on Coastal Area Management in India

by
Dr. B.R. Subramanian

(The points below are reproduced from the transparencies used in the presentation.)

Marine Environment in India

- 7,500 km coastline
- 20 per cent of country's population live in coastal areas (estimated to be 190 million)
- ecologically sensitive areas like mangroves, tidal flats, coral reefs, wild life sanctuaries, turtle breeding grounds, salt pans
- Rich in fishery resources (estimated potential 3.9 million tonnes, mt)
- Islands
- Tourist beaches

India's Ocean Resources

Exclusive Economic Zone

- Area equivalent to 2.02 million sq km
- Two-thirds of land area of the country
- Estimated brackishwater area = 900,000 ha
- Area for aquaculture / Area under culture = 60,000 ha

Living Resources

FISH	2.5 mt from sea out of 4.2 mt total catch Exploitable potential 0-50 m depth: 2.2 mt Beyond 200 m depth: 1.7 mt Demand for 2000 AD: 12.5 mt
SHRIMP	Production: 30,000 tonnes 72 per cent by value of total seafood exports
OTHERS	Seaweeds, crabs, squids, lobsters

Non-living Resources

PETROLEUM RESOURCES 62 per cent of total crude from offshore
1991-92 data on quantity:
 Onshore: 11.4 mt
 Offshore: 19.0 mt
 Consumption: 56.8 mt

Seawater as a Source of Potable Water, Potassium, Phosphorus, Iodine

Deep seabed's polymetallic nodules

Potential yield	380 mt in 'pioneer investor areas'
Manganese	73 mt
Nickel	3.2 mt
Copper	3.0 mt
Cobalt	0.5 mt

Ocean Energy

- Wave energy
- Tidal energy
- Wind energy
- Ocean thermal energy conversion

Ecologically Sensitive Areas

Mangroves : Sundarbans, Koringa, Mahanadi, Pitchavaram, Gulf of Kutch, Andaman Islands

Coral Reefs : Lakshadweep, Andaman & Nicobar group, Gulf of Mannar, Malvan, Gulf of Kutch

Biosphere Reserves : Gulf of Mannar

Marine wildlife sanctuaries : Jamnagar, Malvan

National parks : Wandoor

Bird sanctuaries : Chilika, Pulicat, Point Calimere

Turtle nursery grounds : Gahirmata (Orissa)

Mangroves

Total mangrove area : 681,976 ha

Sundarbans : 418,888 ha

Andaman & Nicobar : 115,000 ha

Rest in Krishna, Cauveri, Godavari, and Mahanadi delta and in a few areas along the west coast.

- 45 species of mangrove plants reported
- Crabs, fishes and mollusc use mangrove as living habitat
- Spawning and breeding grounds for marine organisms
- Mangroves are coastal stabilizers and protect the landward part of the coast from erosion and cyclonic destruction.

Coral Reefs

Coral formations found in Palk Bay, Gulf of Mannar, Gulf of Kutch, Malvan, Lakshadweep and Andaman & Nicobar

- 342 genera reported so far
- Lakshadweep and Nicobar Group Islands are coral islands with large coral formations
- Coral reefs form habitat for number of marine organisms, including ornamental fish
- Coral reefs support coastal and offshore fisheries in the form of habitat for bait fish
- Natural defence against cyclone and coastal erosion

The Estimated Fishery Potential in the Indian EEZ (in '000 tonnes)

Region	0-50m depth	Beyond 50m	Oceanic	Total
North-west coast	866.7	567.0		1,433.7
South-west coast	565.5	357.3		922.8
Lower east coast	401.3	100.9		502.2
Upper east coast	423.7	164.2		587.9
Andaman & Nicobar		139.0		161.5
Lakshadweep		63.0		63.0
Residual in 300-500 m depth		4.0		4.0
Total	2,279.7	1,395.4	246.0	3,921.1

Activities in Marine Environment

- Human settlement
- Waste disposal from domestic and industrial sources
- Port, harbours and shipping
- Mining
- Oil exploration and exploitation
- Fishing
- Tourism

Human Settlements

- Population explosion
- Pressure on land
- Economic prosperity in coastal cities

Impacts

- increased generation of wastes
- loss of coastal habitats due to urbanization
- reclamation of coastal land causing erosion in adjacent areas
- overexploitation of resources

Management

- Control of population
- ban on land reclamation in coastal areas and other ecosystems
- waste management

Developmental Activities

Ports, Harbours and Shipping

- Essential for economic development
- Pollution due to solid and liquid waste disposal; potential for accidents
- Erosion
- Dumping of dredging wastes
- Tanker traffic close to ecologically sensitive areas

Management

- Planning traffic
- Reception facilities for wastes and ban on waste dumping
- EIA before planning new ports as well as expansion
- Avoidance of locating ports near ecologically sensitive areas
- Contingency plans and infrastructure

Offshore Oil Platforms

- Essential
- Blow-outs causing oil pollution
- Pipeline ruptures
- Water- and oil-based releases causing oil pollution

Management

- Avoidance of oil wells & pipelines close to ecologically sensitive areas
- Monitoring
- Regulated waste disposal
- Contingency plans and infrastructure

Pollution

- 18240 MLD of domestic sewage
- 670 million cubic meter industrial waste
- River run-off agricultural waste
- Oil tanker route carrying 434 mt of oil: Offshore production 30 mt / year
- Cities like Bombay, Madras, Cochin, Vizag generate domestic wastes and no adequate treatment
- Major industries treat effluents, medium and small do not
- Sea off Bombay with low dissolved oxygen and contaminated sediments
- Sea beyond 0.5-1 km fairly clean
- Estuaries and creeks contaminated

Impacts

- Decrease in biodiversity in polluted areas
- Unaesthetic appearance of beaches and foul smell

Management

- Water Act 1974
- Environment Protection Act
- Installation of treatment plants, common treatment plants and clustering of industries
- Strict enforcement & EIA

Mining

Economics

Source of minerals and rare earths

Impacts

Excessive mining of beach sand and shallow water areas cause erosion in adjoining areas and displacement of inhabitants

Management

EIA studies and optimum mining

Shipbreaking

Cheapest source of high-grade steel scrap

Impact

Pollution

- Paints containing lead
- Oily residues
- Solid wastes disposal

Coastal area becomes unaesthetic

Management

- Avoidance of shipbreaking activities near ecologically sensitive areas
- Ban on disposal of solid and other wastes

Critical Habitats

Mangroves

Uses

- Habitat for a wide variety of terrestrial, aerial and aquatic animals and plants
- Act as a buffer zone against storms, and protects human settlements in low-lying areas, e.g. littoral strip
- Mangroves planted in Bangladesh in 1980s acted as buffer zone and protected life and property in 1991 cyclone
- Nursery ground for commercially important species of prawns and fish

Damage to mangroves

- Excessive siltation, sedimentation, etc., reduce respiration, leading to decrease in density
- Used as aquaculture land, resulting in change in biodiversity
- Land reclamation for various developmental purposes
- Pollution

Management

- Prevention of deforestation
- Control of silting by inland water management
- Rational use of mangrove areas

Coral Reef Systems

- Environmental needs for coral reef development:
tropics, shallow, clean, clear and warm

Benefits

- Contribute to reef fisheries
- Contribute to fisheries of surrounding ecosystem through food webs

- Prevents shoreline erosion
- Prevent shore from storm storages; act as buffer
- Tourism

Damages

- Coral mining
- Overexploitation of ornamental fishes, leading to depletion of symbionts like parrot fish and sea urchins
- Dynamite fishing
- Crown-of-thorns and diseases

Management

- Legislation
- Ban on coral exploitation of fish
- Controlled tourism

Sandy Beaches

Benefits

- Protect coastal land
- Tourism
- Landing place for fishing boats
- Habitat for animals; support avians

Damages

- Destabilizing by sand mining
- Erosion/accretion due to developmental activities adjacent to beaches
- Ill-designed and constructed shore protection walls
- Pollution

Management

- Ban of sand mining
- EIA studies before commencing developmental activities and establishment of shore protection walls
- Mitigation of pollution

Coastal Lakes, Lagoons, Mudflats, Estuaries and Brackish Waters

Benefits

- Support wildlife, bird sanctuaries and breeding grounds of turtles
- Fisheries
- High biodiversity
- Navigation and ports
- Enrich nearshore areas

Damages

- Pollution
- Land reclamation and ill-planned land-use patterns
- Siltation and sand bar formation leading to poor exchange of sea-water loss of bio-diversity
- Erosion

Management

- Complex
- Mitigating pollution

- Upstream controls
- Ecofriendly navigation
- EIA before deciding land-use patterns

Functions of Government Departments on Marine Environment Pollution

Ministry of Environment and Forests

- Control of land-based sources of marine pollution
- Cleaning of beaches during oil spills

Department of Ocean Development

- Scientific monitoring of marine pollution all over the sea

Ministry of Surface Transport

- Prevention and control of oil pollution from ships and offshore platforms
- Monitoring and combating of oil pollution in major ports

Ministry of Defence

- Combating of oil pollution all over the sea, except port limits

Ministry of Petroleum and Natural Gas

- Monitoring and combating of oil pollution around coastal refineries and offshore oil platforms

Functions of Government Departments on Marine Environment

Living Resources

- Ministry of Agriculture and Fisheries
- Ministry of Food Processing
- Department of Ocean Development

Non-living Resources

- Ministry of Mines
- Ministry of Petroleum and Natural Gas
- Department of Ocean Development

Energy

- Department of Ocean Development
- Ministry of Non-Conventional Energy Resources

Sea Erosion

- Ministry of Water Resources

Dept. of Ocean Development's Monitoring of the Health of the Seas

Problem Areas

- Untreated domestic and industrial wastes—major source of pollution
- Oil pollution due to high oil tanker traffic in Western EEZ of India

Coastal Ocean Monitoring and Prediction System

- Aims to scientifically monitor health of the seas
- Collection of data on pollutants at 77 locations along coast

Parameters

PHYSICAL

- (1) Tide level
- (2) Temperature
- (3) Depth
- (4) Salinity, and
- (5) Suspended solids

CHEMICAL

- (1) pH
- (2) Dissolved oxygen
- (3) Biochemical oxygen demand
- (4) Ammonia
- (5) Nitrate
- (6) Nitrite
- (7) Phosphate
- (8) Total nitrogen
- (9) Total phosphorus
- (10) Dissolved petroleum hydrocarbons
- (11) Lead
- (12) Cadmium
- (13) Mercury
- (14) HCH
- (15) DDT

BIOLOGICAL

- (1) Phytoplankton standing crop
- (2) Zooplankton standing crop
- (3) Benthos standing stock
- (4) Pathogenic bacteria

National Legislation

Maritime Zones Act 1976 delineates different zones:

- Territorial waters
- Exclusive Economic Zone (EEZ)
- Continental shelf

Environmental Legislation

- EPA 1986—an umbrella act for provisions of anti-pollution and preventive measures
- Disposal standards for 61 types of industries specified, 434 hazardous substances notified
- Guidelines stipulated for storage, processing, transport and handling of hazardous substances and genetically engineered organisms
- Special rules for coastal areas
- EIAs mandatory for all coastal and offshore development projects
- Penalties for violation include five years imprisonment or fine of Rs 100,000 or both; for non-compliance, seven years imprisonment, along with fine
- Water Act 1974 deals with specific provisions of pollution prevention, control and powers to central and State pollution control boards

Status of CZM

- Rules under EPA (1956) in 1991
- 500 m from HTL towards landward and intertidal area designated as Coastal Regulation Zone (CRZ). Four categories:
 - CRZ I Ecologically sensitive areas prone to level rise
 - CRZ II Already developed areas
 - CRZ III Underdeveloped and no-development area
 - CRZ IV Andaman and Nicobar islands & Lakshadweep
- Coastal States to prepare CZM plans indicating 4 categories
- All States have drawn up draft plans; they are being finalized

Coastal Regulation Zone (CRZ)

Category I

- Ecologically sensitive areas
- Areas close to breeding and spawning grounds of fish, etc.
- Areas of historical importance
- Areas likely to be inundated due to sea level rise upon global warming

Category II

- Areas already developed close to shore, e.g. urban areas

Category III

- Relatively undisturbed areas and those that do not belong to Category I and II, i.e. coastal rural areas, substantially not built up
- Construction between 200-500 m permitted, provided that total number of dwelling units is not more than twice number of existing units
- Total covered area not to exceed 33 per cent of plot size
- Overall height of construction not to exceed 9 m and construction shall not be more than two floors (ground floor plus one)

Category IV

Andaman & Nicobar Islands

- Construction rules same as Category III, but construction area not to exceed 50 per cent of plot size
- Ban on coral mining, corals and beach sand not to be used for construction
- Application of rules of Category I & II to islands belonging to these categories
- Dredging and underwater blasting around coral formation not permitted

Lakshadweep and Small Islands

- Limit of 500 m zone HTL be determined by size of each island
- Other aspects similar to Andaman & Nicobar islands.

Category I: No new construction with 500 m, except pipelines for carrying treated effluents, etc.

Category II: No developmental activities, including buildings on seaward side; landward side only with local regulations

Category III: Area up to 200 m from HTL is no-development zone. No activities, except agriculture gardens, pastures, parks, play fields

Prohibited Activities

- Setting up of new or expansion of existing industries, except those requiring water fronts
- Manufacture or handling of hazardous substances
- No fish processing industry
- No units for processing wastes and no dumping of wastes—existing practices to be phased out
- No land reclamation or bunding, except structures for coastal erosion, storm water drains
- Mining of sand and rock banned, except for rare minerals not available outside 500 m zone
- No alteration of hills, sand dunes for beautification, etc.
- Any construction activity except for carrying waste water, discharges through pipelines

Regulation of Permissible Activities

- Clearance to activities requiring water front
- Following activities permitted after environmental clearance
 - Defence constructions requiring foreshore facilities (e.g. jetties, slipways, etc., but not establishments)
 - Operational constructions for ports, harbours, etc., which require water frontage
 - Cooling water intake facilities for thermal power plants
- All other activities with investments exceeding Rs 5 crore.

Regulations for Beach Hotels

- Permitted in Category III
- Construction rules same as Category III
- No tapping of groundwater within 200 m zone or HTL
- No digging for dredging of sand within 500 m zone, except for building and swimming pool construction
- All effluents be treated before disposal
- No hotels in ecosensitive areas
- Wide public access gap between hotels
- Construction in last 100 m of HTL permitted, subject to condition

Co-ordination and Integrated Management Plans

- Need for coordination among development and conservation agencies
- Ideal method to ensure co-ordination is adoption of concept of Integrated Coastal and Marine Area Management (ICMAM) and development of ICMAM plans
- Need for political commitment to implement ICMAM plans

Coastal Zone Management Issues in Porbandar, Gujarat, India

by
Premjibhai Khokhri, NFF, India

Pollution from Industrial Activities

At present, the following industrial units directly discharge their effluents into the sea along the Saurashtra coast:

- Saurashtra Chemicals, Porbandar: This factory is a soda ash / caustic soda unit which throws out effluents directly into the sea near Porbandar. This considerably affects the fish population off Porbandar. There have been instances of large numbers of dead fishes floating near the area of effluent discharge. The Gujarat State Pollution Control Board is very silent, even though there has been a hue and cry over this issue several times.
- Indian Rayon Industries, Veravel: This factory also discharges its effluents into the sea near Veravel.
- Gujarat Heavy Chemicals, near Sutrapada, is another soda ash/caustic soda unit which is polluting the sea.

Instances have been reported of chemical industries situated elsewhere in the State bringing their toxic effluents in tankers or containers and dumping them into the sea near the Saurashtra coast. No town or city in Saurashtra has sewage treatment facilities. Ultimately, the sewage reaches the sea through rivers during the monsoon. The use of pesticides is widespread in Saurashtra. Naturally, the run-off during the monsoon enters the sea.

Impact of Tourism

The impact of tourism is also increasing. However, it is still not as adverse as chemical and sewage pollution. The plastic throwaway containers and packaging, used for consumable articles like food and beverages, are a major source of pollution.

Aquaculture and Allied Activities

Aquaculture and allied activities are very limited in Saurashtra because of the high salinity and temperature existing in the area.

Inter-gear Conflicts

So far this problem has not come to the forefront. However, the incursion of large chartered fishing vessels has been objected to by local fishermen. There is clearly a need to demarcate areas of operation for gill-netters and trawlers, as these problems are bound to intensify very soon.

Fishery Management Practices

There is no fishery legislation existing in the State and nor are there any fishery management practices worth mentioning.

If we need to ensure a sustainable fishery for the future, there is a need to demarcate areas of operation for different categories of fishing vessels, declare closed seasons and closed areas, as well as restrictions on mesh size for nets.

Coastal Zone Management Issues in Maharashtra, India

by
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Erosion and siltation of India's coastal areas have been occurring in different ways. This has had considerable adverse effects on fishing and fisheries. The fisherpeople and the fishing trade have to face several difficulties on account of pollution, construction, development of *khar* lands (areas made unproductive due to incursion of salt water), fish ponds, salt pans, excavation of sand, construction of large and small dams on rivers, etc. In this presentation, I propose to deal with problems affecting fisheries sector due to *khar* land development.

High and low tides occur daily on the seas. At least for two or three days in each fortnight, the intensity of these tides increases. During high tide, the water enters the *khar* land located in the interior of the creeks. This water subsequently recedes. Since the velocity of the water is considerable during the high and low tides, the silt accumulated at the entrance to the creek is washed out into the sea. This process repeats itself every fortnight. As a result, the depth of the creek is maintained. This facilitates the passage of fishing vessels.

During high tide, the sea water moves rapidly from south to north. This movement of the high tide transports the dried sand to the northern end of the creek. The sand settles at the entrance to the creek, thus causing siltation there. However, in the *khar* lands located along the inner side of the creek, the high tide recedes speedily, thus removing the silt so accumulated. This helps maintain the depth of the creek there. But if the movement of water in the *khar* lands gets hampered by industrial activities resulting from, for example, salt pans and fish ponds, no water would be available to recede into the sea during low tide. As a result, the silt accumulated at the entrance to the creek will not get removed. Such a consolidation of silt creates sand bars at the entrance to the creeks. This also ultimately reduces the depth of the creek. Furthermore, the sand bars divert the water current and this sometimes results in the erosion of the coast of fishing villages. In Maharashtra, this process has occurred in almost all the creeks, for example, Zai Bordi, Dahanu Satpati, Vadrai, Kelva Dativare, Arnala, Bessein and Valsora.

Even though fishing villages situated where the rivers join the sea do not have large *khar* lands nearby, over a period, the silt accumulated in the creek is washed away by floods during the monsoon. This helps maintain the depth of the creek which, in turn, facilitates fishing operations. With the construction of small and large dams on rivers and their tributaries, the process of flood waters receding into the sea has been hampered. Consequently, the accumulation of silt at the river mouths has increasingly rendered harbours inefficient for fishing operations. Examples of harbours in Maharashtra thus affected are Arnala, Dativare, Deogarh, Dabhol and Vengurla.

The shallowness of the creeks prevents fishing boats from reaching the seashore. This means that a lot of time is consumed by the fishermen to land the fish they catch, as they are forced to wait for the high tide to come in. The net result is a reduction in the number of manhours available for fishing operations and financial losses for fishermen.

Development of *khar* lands, as well as construction of large dams, should not be permitted. In no way should we disturb the environment of the coastal zone.

(ii) BANGLADESH

Coastal Fisheries in Bangladesh: A Note on the Situation in Cox's Bazar Area

by
Rafiqul Huq Tito, UBINIG

[In the Cox's Bazar area one of the major activities of UBINIG has been the campaign against the export-oriented aquaculture that has totally destroyed the ecology and the livelihood of coastal communities. The massive devastation of the 1991 cyclone is linked to the destruction of the mangrove forests for shrimp farming. The violence and the cruelty of the export oriented economy is less in degree compared to the Khulna zone, mainly because the land in Cox's Bazar originally belonged to the government. The scenario is different for the Khulna-Satkhira region. Nevertheless, the social destabilization and the destruction of livelihoods is equally pronounced.]

Apart from campaign and advocacy, UBINIG is directly involved with the community in their efforts to regenerate mangrove forests. The success of regenerating 5 km of mangrove forests has become quite inspirational for the community. Nayakrishi Andolon, the movement of farmers not to use pesticides and fertilizers and exploring ways for sustainable food production, is fairly strong in the Badarkhalii union. The broader interest of the community to take command over their life and life support systems has brought them to closely collaborate with the marine fisherfolk. Together, the community is struggling to evolve agricultural and fishing methods that are responsive to coastal and marine ecology, in which mangrove forests play a very significant role. UBINIG constantly monitors the state of aquaculture in the area. This note is to provide some facts and figures about the area.]

General Introduction to Fishery Activities in Bangladesh

Bangladesh, landlocked on three sides, has a 480 km long coast line and approximately one million ha of territorial waters extending 18 km into the sea. The coast of Bangladesh forms a part of the massive Ganga-Brahmaputra-Meghna delta and supports a wide range of activities. The coastal zone is characterized by sprawling estuaries, dense mangrove forests, islands and coral reefs. The rivers empty into the large estuary at the apex of the Bay of Bengal, carrying large quantities of nutrients as well as an alarming amount of pesticides, chemicals and Pollutants from different sources: these are 'gifts' of modern agriculture and urban civilization. The country is otherwise endowed with a warm tropical climate and high rainfall. Consequently, the coastal waters are generally rich in nutrients derived from land. The rich waters are able to support a wide range of biotic diversity and rare endemic genetic material. The multispecies coastal fisheries, harvested by both the artisanal and commercial fleets, comprise 120 species of brackishwater and estuarine fish with crustaceans accounting for a sizeable proportion of the annual biomass harvested.

The water resources of Bangladesh may be broadly divided into inland and marine. The inland water resources are very rich both in area and in the multiplicity of the aquatic life they generate, support and maintain. The total area of perennial waters is estimated to be 1.45 million ha, while the inundated crop fields and other low-lying areas that retain monsoon water for four to six months are estimated to be 2.83 million of water surface. According to official statistics, inland fisheries contribute more than 72 per cent to the total fish catch in Bangladesh, which is largely consumed domestically.

There are three main sources of fish from inland water bodies:

- (a) *Confined, locked or impounded, natural or artificial water bodies:* Ponds, *dighis* and tanks are scattered all over Bangladesh. There are an estimated 1.28 million ponds in the country, covering an area of 0.15 million ha. These ponds or confined water bodies often play a significant role in farming households. Of the total ponds, 55 per cent are under culture, 36 per cent is 'cultivable', according to the policymakers and planners who are eager to bring the 'blue revolution' to Bangladesh. The remaining 15 per cent are considered unusable.
- (b) *Inundated crop fields:* The low-lying crop fields are extraordinarily significant in agro-ecological terms, mainly for biotic life forms. They provide temporary feeding and breeding grounds for various species of fresh-water fish and shrimp. The rice-fish combination is one of the oldest and varied methods of agriculture in Bangladesh, which, now, in the post-green revolution phase, has obtained a fashionable status. For thousands of years, the ingenuity of farmers and fisherfolk has maintained a dynamic relationship between the farm fields and the water flows to efficiently manage the resources of nature. Water is the blood-line that links farms, water bodies, rivers and the ocean to nourish the community with crops and fish. Despite the unique role that flood and rain water plays in Bangladesh, very little has been done to understand the floodplain ecology of Bangladesh, where it is impossible to conceive of a fishery outside the general practice of agriculture. The word *krishi* or *chashabad* in Bengali literally means 'cultivation'. But the notion is not confined to mean 'crop' production only. It is fish production as well or fish culture. In the same way, agriculture also means livestock rearing, poultry raising, etc.
- (c) *Open waters:* These include rivers and their tributaries, beels and baors and estuaries. The total area of inland open waters is estimated to be a 4.05 million ha, of which about 25 per cent is rivers. The 480-km coastal belt is the site of marine fishing activities. Various exploratory surveys conducted in the continental shelf up to 100 m depth indicated four major fishing grounds. The artisanal fishery extends up to a depth of 40 m in the Bay and harvests about 95 per cent of the total marine landings.

Inland fishery is crucial for Bangladesh as a source of food as well as livelihood. There are inland fishing communities dependent on fishing for their livelihood. Nevertheless, fishing is common for the farming households. The agricultural practice of Bangladesh has the unique feature of being a combination of crop production and fishing.

The green revolution and associated massive use of pesticides and chemical have had severe negative consequences for fisheries, inland fisheries in particular. On top of that, the recent interference with the water regime in order to control floods by taming rivers and erecting mud embankments will have devastating effects on aquatic biodiversity, apart from blocking the normal water flow. This so-called Flood Action Plan is aimed at intensifying both 'green revolution' in crop fields and the 'blue revolution' in water bodies. By their inability in comprehending the agro-ecological features of Bangladesh and the role of water, in particular, the policymakers and development agencies have already caused great harm to inland fisheries. The government admits that the performance of this sector for the third five year plan period has suffered shortfalls. Indeed, the inland fishery is suffering serious setbacks mainly because of government policy and irresponsible 'development' projects.

The rise of coastal aquaculture is directly linked to the export-oriented industrialisation policies of the government dictated by the World Bank and the IMF. To solve its balance of payments problem, Bangladesh started to export non-traditional items such as frog legs, turtles, monitor lizards, tortoises and shrimp. As demand for shrimp increased, the mangrove forests of the coastal belts, which took more than a thousand years to grow, have been destroyed in only 7-10 years.

Fishing and Aquaculture on the Coast

Traditional craft were used in estuarine and coastal waters until the mid-1960s. Mechanization in marine fisheries was introduced into Bangladesh in 1966 by the Bangladesh Fisheries Development Corporation (BFDC) and the Bangladesh Jatiya Matsyajibi Samabay Samity (BJMSS). At present, in the district of Cox's Bazar alone, the number of mechanized boats in operation is 2,706 and the number of artisanal craft is 928. Three hundred boats have been registered, employing around 4,500 fisherfolk.

In a month, the boats go out thrice, each time for a period of eight days. The duration is determined by the fish-hold capacity of the boat and its capacity for storing ice. In each boats, there are about 17 to 18 crew, including fishers and technical persons. They go up to a distance of 500 km to catch fish.

They use *bhasa* net (gill-net), which is about 3,000 'hands' long and 80 feet deep. The fish caught with this net are different varieties of *chanda*, *maitta*, *korat*, *chapa*, *gang koi*, *hangar*, *keta*, *khoua*, *lakkua*, *tutia* and *hilsha*. Among these, *hilsa* and *rupchanda* comprise the bulk of the catch.

Fish is mostly available in the months of Bhadra to Kartik and in Chaitra to Jaista. *Hilsa* can be found throughout the nine months.

During the trip, the fish is stored in the ice. The catch is then delivered to the BFDC fish landing centre. Fish traders collect the fish from here for supply all over Bangladesh.

The season for trawl fishing is Bhadra to Baishak (see glossary below for the Bengali words used), i.e. nine months. The three months, i.e. Jaista to Sraban, is the rainy season, which is not a very safe period for trawl fishing.

Shrimp Culture

Shrimp export is among Bangladesh's most important foreign exchange earning activities. The unplanned and uncontrolled growth of shrimp aquaculture has destroyed mangrove forest areas, reduced foliage and non-exportable species of fish, due to the methods of shrimp larva collection. It has also made water management in polders more difficult and has weakened embankments, thus setting the stage for a natural disaster.

Shrimp culture used to be carried out in traditional *gher* fisheries, where encirclement of land along the banks of tidal rivers with small earthen dykes to control the free entry of saline water was practised. During the season, sluice gates were opened to allow in salt water carrying juveniles of various salt-water species of fish and post-larva of shrimp which breed in the sea and estuarine waters. The young fish and shrimp thus trapped inside the enclosures were allowed to grow until they attained harvestable size. In the traditional types of *ghers*, where juveniles of fish and shrimp were allowed to enter during spring tides through sluices, a number of shrimp and fish would be available inside the *ghers*. This practice of natural stocking of the *ghers* with the young of the desired species of shrimp, i.e. the *bagda chingri* (*Penaeus monodon*) has been replaced by artificial stocking of the *ghers*. The methods used are called modified, semi-intensive and improved extensive methods of shrimp cultivation. In Cox's Bazar District, shrimp cultivation started in the early 1980s. Shrimp cultivation is being done in all the *thanas* of Cox's Bazar.

Shrimp Cultivation in Cox's Bazar

<i>Thana</i>	No. of Shrimp Farms	Area (ha)	Av. Production (kg/ha)
Cox's Bazar sadar	226	3,330.14	302.93
Chokoria	1,148	12,551.41	131.45
Moheshkhali	309	9,664.20	108.40
Ramu	22	58.61	109.03
Ukhia	105	1,011.54	197.15
Teknaf	225	1,771.20	137.71
Kutubdia	5	80.00	90.00

The Fisheries Department has acquired 2,835 ha of land for shrimp cultivation. The other 1,215 ha of land is under private ownership. *Bagda* shrimp can be cultivated where tidal waters are available. Improved methods of cultivation call for new considerations, like fertility of land, availability of electricity, sources of saline water, climate, transport and communication, and marketing facilities. The *doash bele* soil is very suitable for shrimp farming because it retains water, and embankments made with this soil are strong.

In Cox's Bazar District, shrimp farming started off in the salt pans. These extended from Banskhali *thana* of Chittagong District to Teknaf of Cox's Bazar District. They are now concentrated in Maheshkhali and Teknaf in about 14,000 ha of tidal land. Crude salt is produced from December to April. Approximately 10,000 ha of these salt pans culture shrimp and fish from May to November. The private landowners combine shrimp and salt cultivation. The government-owned land is, however, used only for shrimp cultivation.

Land is allocated for shrimp farming through the District Commissioner. Ten acres of land per shrimp farmer are leased out for a period of ten years at Tk 1,500 per acre. The land allocation system suffers from many inadequacies, leading to malpractices and allocation to non-farmers who then subcontract the land to small shrimp farmers.

The land owned by the Directorate of Fisheries (DOF) is also leased out. The DOF is carrying out a project funded by the International Development Agency (IDA) and the Asian Development Bank (ADB) for shrimp culture. The IDA made an agreement with the DOF in 1986. Under this agreement, the Forest Department handed over 7,000 acres of land to DOF. The plots of land were allocated to private owners for shrimp cultivation. Immediately, they made embankments to protect their land from saline water. Then they cut and burnt the extensive mangrove belt of the Chakaria Sunderban.

Given below is an example of a typical plot:

Name of the polder:	Rampura under Chakaria thana
Total number of 10-acre plots:	468
Number of leasees:	371
Number of 10-acre plot recipients:	336

Number of 30-acre plot recipients: 34
 Number of 300-acre plot recipients: 1 (Grameen Bank)

In order to encourage shrimp cultivation, a few departments of the government, as well as NGOs, got involved. They included the Water Development Board, the Forest Department, UNDP and CARITAS.

The activities of IDA in shrimp culture include training of farmers on improved methods; demonstrating modern shrimp culture technology; setting up model shrimp farms, using appropriate technology; infrastructure building and maintenance; and, extension works.

Besides Rampur, there are three other areas under IDA shrimp culture projects. These are Gomatali, under Cox's Bazar Sadar THANA, Boholtali, under Chakaria THANA, and Dholghata under Moheshkhali THANA. There are 39 shrimp farms in these areas in a total land of 3,917 ha. These are the private land of the shrimp farmers. The farmers pay rent to the revenue department. DOF only provides training to them. The government earns about Tk72 lakhs per year as rent from the shrimp farmers.

IDA has stopped giving money to this project. The training programme for the farmers has also been postponed. The demonstration farms are not in operation. There are about 154 staff members in the IDA project in the Dhaka, Chittagong and Khulna offices. At present, staff salaries are not being paid. However, the actual owners of the land are not losing anything. They have plundered what they could in a short period of the 'rape and run' phase. The land was allocated to rich and influential people, who then leased them out to small farmers. IDA has built a large office beside the river Matamuhuri in Rampur. The project has encouraged people of the area to catch fry from the river. Later on, the project was taken over by Beximco, a private company which rose to prominence through import-export activities.

The newer methods of shrimp cultivation include semi-intensive and improved methods.

Semi-intensive Shrimp Farming in Cox's Bazar

<i>Thana</i>	No. of Shrimp Farms	Area (ha)	Av. Production (kg/ha)
Cox's Bazar sadar	18	132.08	1,117.00
Chokoria	5	73.70	750.00
Moheshkhali	2	153.23	525.00
Ukhia	3	9.25	3,493.07
Teknaf	2	22.00	3,272.70
Total	30	390.00	90.00

About 80 per cent of the total shrimp post-larvae is collected from natural sources. Only 20 per cent is supplied from the hatcheries. There are nine hatcheries in Cox's Bazar District and

another five are under construction. IDA has constructed one hatchery. Stocking of shrimp post-larvae commences in December-January and continues up to June/July. The peak season is February to March. During this season, and particularly in the full and new moon period, there is an abundance of post-larvae in tidal rivers.

Post-larvae of *Penaeus monodon* is collected from tidal rivers and canals. This is done under the extensive method. Demand for shrimp post-larvae has given rise to a large-scale shrimp collection industry. Men, women and children are involved in collecting post-larvae twice a day. It is important to note that in the process of collecting post-larva, 200 other species are destroyed.

Amount of Shrimp Post-larvae Collected Using Push-net

Area	No. of Persons	Collection (Approx. Million)
Cox's Bazar sadar	16,235	600
Chakaria thana	10,340	250
Maheshkhali thana	4,980	140
Ramu thana	265	10
Ukhia thana	2,025	50
Teknaf thana	7,090	240
Kutubdia thana	2,536	10

Source: IDA, Cox's Bazar

Total number of shrimp fry collectors: 43,471
 Total post-larvae collected: 1,310 million

Nets Used by the Fishing Community in Cox's Bazar

Jakhi Net

The jakhi net, among the older types, is used in depths of 10-30 ft. The deep-water fish caught by the jakhi net are *chour*, *koir*, *bol*, *pangash*, *galda* etc. and in shallower waters, the fish caught are *guilla*, *bata*, *khroil*, *datina* etc.

During the rainy season, the net is used in deeper waters, while, in winter, it is used in shallow waters. The fisherfolk make the nets at home. Their mesh sizes are determined according to the type of fish targeted. Usually, they make five different sizes of nets. At present, the use of jakhi net is less frequent, due to the excessive use of the 'current' net.

Bata Net

This net, made of cotton yarn, weighted by bricks, and buoyed by plastic floats on the top, is used to catch the bata fish. It is 200 'hands' long and two 'hands' wide. It is mostly used in the four-month period between Kartik-Agrahayan and Falgun-Chaitra. Besides bata fish, other kinds of fish such as *tailla*, *guilla*, *bailla*, etc can be caught with this net. .

Current Net

The current net is made of synthetic nylon yarn. It is very strong and the fish are caught as if caught in an electric current. It is smuggled into the country from Thailand. Usually of one mesh size, it is used to catch *guilla* and other fish which are found on the surface level. *Tailla*, *bata*, *bailla* and undura are also caught with this net.

size, it is used to catch *guilla* and other fish which are found on the surface level. *Tailla*, *bata*, *bailla* and *undura* are also caught with this net.

The great disadvantage of the net is that it even catches the juveniles of the bigger fish. This, however, leads to a shortage of such fish. For this reason, the department of fisheries has prohibited the use of this net. Yet, because it is cheap, the fishermen continue to use the net.

Bhasa Net

The bhasa or floating net is made with nylon yarn. It is found in two different sizes; one is 500 'hands' long and 18 'hands' wide, and the other is 2,000 'hands' long and 30 'hands' deep. The mesh size is three inches for both. The net is used in the months of Bhadra-Agrahayan and Baisakh-Ashar, i.e. for seven months a year. During Bhadra-Agrahayan, the net catches *hilsa*, *bour* etc. During Bhisakh-Ashar, the net catches pangash, boga, keda etc. The net is used in deep waters and catches big fish. In the sea, it is used to catch hilsa fish.

Behundi net

The behundi or set-bag net is very well-known in Bangladesh. This net captures species such as ribbon fish, shad, prawns, anchovies, pomfrets and Bombay duck in estuarine and marine inshore waters all along the coast line. Fishing with the set-bag net requires a boat and a crew of five.

The setbag nets are fixed tapering nets, which are set in tidal currents by attaching them to stakes. A behundi net has a rectangular mouth opening. It is made up of four panels. Two wings extend the sides of the mouth to increase the effective fishing width of the net and to herd fish into the mouth opening. The mesh sizes decrease from three inches at the mouth to half an inch at the cod-end.

To keep the mouth of the net open, two vertical bamboo poles are fastened to the forward corners of the upper and lower panels which are reinforced by gussets of netting. The length of the bamboo poles ranges from 12-16 cm. The net is held in its fishing position against the current by attaching its wings to stakes by means of long bamboo poles and steel wires. The set bag-net catches species of fish which drift with the current or do not swim fast enough. With each change of tide, the net surfaces. It is emptied and reversed in the opposite direction, ready for fishing. Due to the difficulties of embedding the wooden stakes in the seabed, this method of fishing is restricted to waters about 20 m in depth.

Behundi fishing is carried out in river estuaries, in the sea close to the shore, or further out in the sea. The depth of water and the distance from the shore determine whether small, medium or large units of behundi are operated, as well as the number and size of boats and nets. A small unit consists of one country craft, locally called dinghy, operating one or two small behundi nets in a river. A medium-unit has one or two country crafts and one or two medium size behundi nets which are set in inshore waters close to the shore. A large unit consists of one large country craft or motorized carrier boat, propelled by a small (22 hp) diesel engine, plus one or more country crafts, and operates 4 to 10 large behundi nets in inshore waters at some distance from the shore.

Large units usually stay out in the sea throughout the fishing season, except during rough weather or when faced with net or boat damages other calamities, while a carrier boat takes the catch ashore and returns with supplies for the crew members. The carrier boat is also used for changing the crew.

The operation of set-bag nets in the sea requires calm weather. Therefore, large units operate generally from September to February, while medium and small units setting their nets in estuarine areas operate throughout the year.

The crew size varies according to the size of the fishing unit which is operated. Large behundis are operated by large fishing units comprising two or more larger motorized and unmotorized boats, each operating about four large behundi nets. The average crew size for large units is 26.3, and the number of crew members per large behundi net, 4.8. Small and medium units consist of one or two small country craft, operating one or two small or medium behundi nets in a river mouth or very close to the shore. An average of Tk75,000 is invested for buying boats and net. A unit of set-bag net can be owned by one individual fisherman or by a set of shareholders.

During Poush and Magh, the set-bag net is used in the sea when the fish swim out to sea in search of food. During these months, set-bag nets are not used in the rivers or in the channels. In the beginning of Falgun, the set-bag net is used in the rivers and channels. During the rainy season, set-bag net is also used in the *char* areas.

During a month, setbag net is used according to the lunar calendar. On these days, fish is caught six times during high and low tide times. The setbag net must be fixed against the current. On other days, the net is cleaned and dried in the sun. This net virtually catches all kinds of fish, therefore it is considered as harmful for environmental reasons.

Tangua net

This net is used in the *char* areas at water level of 1-1.5 'hands' deep, between high and low tides. This net is locally called as *thela* or push-net, because it has to be pushed in the water. The net is framed with bamboo on three sides, in the shape of a triangle. It is used for 10 months in a year, except in the months of Poush and Magh. This net catches a variety of species of small fish including small *chingri*, *loilla summa*, *kainda*, *khorkoicha*, *chowa*, etc.

Charjal (Char net)

The net is fixed in the *char* areas, which is why it is called charjal or char net. Its length is 600 'hands' and depth is 8 'hands', and has a mesh size of half an inch. It is set in the water at the time of high tide. The fish which come with the high tide water are caught in this net. The fish is then collected at the time of low tide. Since the net is long and covers a big area, it is usually operated by a group of 15-20 fishermen and owned by at least 6-7 shareholders.

Fish is caught in the days of 'jo' and not during the days of 'dala'. With this net, only those fish are caught which eat the grass grown in the *char* as food. These are *bata*, *khuroil*, *bour*, *koir*, *datina*, and *pangash*. *Pangash* fish eat the seeds of mangroves, therefore they are found more in *char* areas and can be caught by charjal.

Kum Net

Kum net is the net which is fixed at a depth of 25 'hands'. The net is 500 'hands' long and 22 'hands' deep. The mesh size is one inch. It requires many crewhands to operate. It is used during the months of Jaista to Ashwin, that is, for five months. The net is set at the time of low tide. *Guilla*, *bour*, *boal*, *koir*, and *hilsa* fish are caught in this net.

Tana net (pull-net)

Except during the months of Poush and Magh, the tana net is used for ten months in a year. It is not related to the 'jo' and 'dala' seasons. It is 500 'hands' long and 18 'hands' deep. The mesh size is half an inch. It requires 12 to 15 persons to operate. It is operated by pulling. Since the net is pulled along the river bank, it catches all kinds of fish species, including crabs and small

fish. The small fish are often killed during the pulling of the net. The fisherfolk believe that the tana net is harmful for fish production in general. The tana net catches *alua*, *ichori*, *bata*, *faissha*, *bailla*, and *icha*.

Kainda net

Kainda net is set around the side of the river bank. Kainda, in the local language, means 'side'. The net is 30 'hands' long and seven 'hands' deep. The mesh size is half an inch. The net is small enough to be operated by one person. But there are other preparations which are required before using the kainda net. In order to attract fish on the sides of the river, a few branches of trees are cast in. This is called *jag*. Fish comes in the *jag* during high tide, while, at low tide, the fish are caught in the kainda net.

Glossary

Jal	— net
'Hand'	— equivalent to 1.5 ft
Jo	— tide level during the waxing phase of the moon
Dala	— tide level during the waning phase of the moon

Bengali months

Baishakh:	April—May
Jaista	May—June
Ashar:	June—July
Sraban:	July—August
Bhadra:	August—September
Ashwin:	September—October
Kartik:	October—November
Agrahayan:	November—December
Poush:	December—January
Magh:	January—February
Falgun:	February—March
Chaitra:	March—April

(iii) SRI LANKA

Integrated Coastal Zone Management in Sri Lanka

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Introduction

Sri Lanka is an island, situated between 5° 55' and 9° 51' N and 79° 74' and 71° 54' E between the Tropic of Cancer and the Equator, lying off the southern tip of India. It has a land area of 64,000 sq km and 1,585 km long coastline. The coastline itself consists of a wide range of geomorphological features such as headlands, bays, lagoons, peninsulas, spits bars and islets. It encompasses a variety of tropical habitats including coral reefs (about 32 linear km) seagrass beds, mangroves, salt marshes, lagoons and estuaries (about 120,000 ha) and coastal sand dunes, barrier beaches, and spits. Most of the major urban centres, including the capital city of Colombo and the nation's principal transportation infrastructure, are situated in the coastal region. Coastal Administrative Divisions represent 24 per cent of the land area and contain 33 per cent of the present population, which is over 17 million. Approximately 80 per cent of the tourism-related infrastructure, the manufacturing units providing 67 per cent of industrial output and the fisheries that produce about 30 per cent of the animal protein of the diet of the populace and nearly 80 per cent of the total fish production, are taken from the coastal region of Sri Lanka.

Coastal Management Issues

The benefits of economic development have brought problems in their wake, increasing conflicts over coastal uses, and the depletion and degradation of coastal resources. Major issues in coastal management are:

Coastal Erosion

The impact of coastal erosion is most severe along Sri Lanka's western and southwestern coasts. It has been estimated that along the coastal segment extending about 685 km from Kalpitiya to Yala about 175,000 to 285,000 sq m of coastal land are lost each year. Of this amount, 95,000 to 160,000 sq m are lost annually from the mouth of Kelani river.

Natural processes such as storms, waves, currents and sea level rise cause the coastal degradation. Sea level rise would, no doubt, have disastrous effects on low-lying coastal areas, resulting in shoreline retreat, erosion, flooding, and salt water intrusion. Migration of river outlets due to changes in discharge causes erosion of land on one bank and deposition on the other. While coastal erosion is caused by natural processes, a variety of human activities may add to the problem. Human activities that have contributed to the coastal erosion include sand mining, coral mining, improper location or construction of maritime structures, removal of coastal vegetation, and dredging or reclamation.

Overexploitation of Coastal Habitats

The important Coastal habitats of Sri Lanka are vulnerable to degradation. The extent of biologically productive mangroves, coral reefs, seagrasses, salt marshes, sand dunes and estuaries, is decreasing. Mangroves are cut for timber and fuel wood. Coral reefs are mined for lime in several nearshore areas along the south, southwest and east coasts. The natural supply

of sand to nourish the beaches is reduced significantly by extraction of river sand for the building industry and by the building of dams across rivers to create reservoirs. Destructive fishing methods are also diminishing the coral reefs and sea grass beds. Current trends in the fishery are not sustainable.

Degradation of Water Quality

Estuaries and coastal waters around the country receive the majority of pollutants introduced into the marine environment and their overall health is declining. Oil pollution in lagoons and estuaries has increased and this has badly affected the productivity of the water bodies. The most common source of water pollution comes from city garbage and sewage from human wastes. With increased industrialization, coastal waters are highly affected by industrial and agricultural wastes.

Conversion of Habitats

Coastal habitats, such as productive mangrove areas and some of the salt marshes, have been converted into aquaculture ponds and salterns or salt-pans. Some of the habitats have been reclaimed for housing projects. *Ad hoc* land reclamation projects in the coastal region have also aggravated the coastal management problem.

Use Conflicts

Beaches were mainly used for traditional uses such as fishing. But with the development taking place in the world, beaches are used for tourism and other recreational activities. This has led to some use conflicts.

Legislation Related to CAM in Sri Lanka

With the realization that a comprehensive approach to coastal resources management was required, the Coast Conservation Division was established under the Ministry of Fisheries in 1978. This division was upgraded to a department, the Coast Conservation Department (CCD), in 1984.

Coast Conservation Act

In 1981, the parliament enacted the Coast Conservation Act No. 57 of 1981. This Act decreed the appointment of a Director of Coast Conservation, with the following responsibilities:

1. administration and implementation of the provisions of the Act;
2. formulation and execution of schemes of work for coastal conservation within the Coastal Zone; and
3. conduct of research, in collaboration with other departments, agencies and institutions, for purposes of coast conservation.

The coastal zone is defined in the Coast Conservation Act as that area lying within a limit of 300 m landward of the Mean High Water Line and a limit of two km seaward of the Mean Low Water Line. In the case of rivers, streams, lagoons, or any other body of water connected to the sea, either permanently or periodically, the coastal zone is defined as the landward boundary to a limit of two km, measured perpendicular to the straight base line drawn between the natural entrance points thereof and also including waters of such rivers, streams and lagoons or any other body of water so connected to the sea.

The Coast Conservation Act required the Director of Coast Conservation to have a survey made of the Coastal Zone and, on the basis of the results of the survey, to prepare a comprehensive Coastal Zone Management Plan.

It also established the Coast Conservation Advisory Council, which reviews the coastal management problems of significant concern and advises the Minister in charge of the subject of Coast Conservation.

Coastal Zone Management Plan

The legal frame work for this plan is provided by the Coast Conservation Act No. 57 of 1981 and the Coast Conservation Act (Amendment) No. 64 of 1988. The plan has received the assent of Cabinet Ministers in April 1990. The objectives of the plan are to:

- identify coastal problems that need to be addressed;
- indicate why these problems are important
- present the Coast Conservation Department's Management plan to address these problems;
- identify what should be done by the government, NGOs and the public to reduce the scope and magnitude of the coastal problems; and
- identify research activities of immediate importance to the management of coastal resources.

The Coastal Zone Management Plan deals with the coastal problems, erosion, loss and degradation of natural coastal habitats, and, loss and degradation of archaeological, historical and cultural monuments and sites, and recreational and scenic areas, It describes the nature, scope, severity and causes associated with each of these problems. Objectives and policies for the management of each problem are identified along with specific management techniques. In particular, the rationale and procedures for continuing the coastal permit system are outlined in detail.

Implementing actions in this plan are of several types: regulation; direct developments; research; co-ordination; education; and, plan and policy development.

Regulation

The regulation of various types of coastal activities constitutes the primary type of implementing action in the Coastal Zone Management Plan. The principal means of regulation is the appraisal of proposed development activities in the designated coastal zone by the Coast Conservation Department Staff prior to issuance of a permit. Based on this appraisal, the Coast Conservation Department issues or denies a permit for the proposed development activity.

A permit is required for all development activities that are likely to alter the physical nature of the coastal zone. But fishing, cultivation of crops, planting of trees and other vegetation, and construction and maintenance of coastal protection works by the Coast Conservation Department, may be engaged in without a permit. Activities within the coastal zone prohibited by the Coast Conservation Department are:

- removal of coral other than for research purposes;
- mining of sand, except in areas identified by the Coast Conservation Department;
- development within 200 m of designated archaeological sites; and
- any development activity that will significantly degrade the quality of a designated natural area of exceptional value.

All the other development activities within the coastal zone may require permits. The permits are issued for construction activities on the basis of the designated setback standards listed in the Coastal Zone Management Plan. In case of development activities that are considered to have significant impacts on the Coastal Environment, Environment Impact Assessment (EIA) reports are called and evaluated by the department (see chart).

Direct Development

The major type of direct development is the construction of shoreline protection works. The Coast Conservation Department is responsible for the design, construction and maintenance of coast protection works, including groynes, revetments, and offshore breakwaters, and the implementation and maintenance of beach nourishment schemes. In 1986, the Coast Conservation Department prepared a Coastal Erosion Management Plan, and this is now being implemented.

Conduct of Research

Research is necessary because, often, good management is precluded due to some coastal problems and/or phenomena being inadequately understood. Since research is expensive and time-consuming, the main focus is on research that is critical to effective planning and management. The CZMP includes several research activities that have been identified as important. The Coast Conservation Department conducts some of this research, while certain research activities are sponsored by the department and carried out by other agencies.

Co-ordination

Many agencies are responsible for the management of coastal resources or activities affecting those resources. In certain cases, responsibilities overlap, resulting in actual or potential conflicts among agencies. In other cases, it is not clear which agency or agencies are responsible for the management of some activities that result in adverse impacts on coastal resources.

Due to these jurisdictional gaps and overlaps, there is a continuing need for co-ordination among agencies. The Coast Conservation Department routinely consults with the Urban Development Authority, the Board of Investment of Sri Lanka, the Ceylon Tourist Board and other agencies which are directly involved in the approval of development projects. When particularly large or complex development projects are being considered, meetings involving representatives from relevant agencies, such as the Central Environmental Authority (CEA), the National Aquatic Resources Agency (NARA) and the Ministry of Fisheries and Aquatic Resources, are convened.

Education

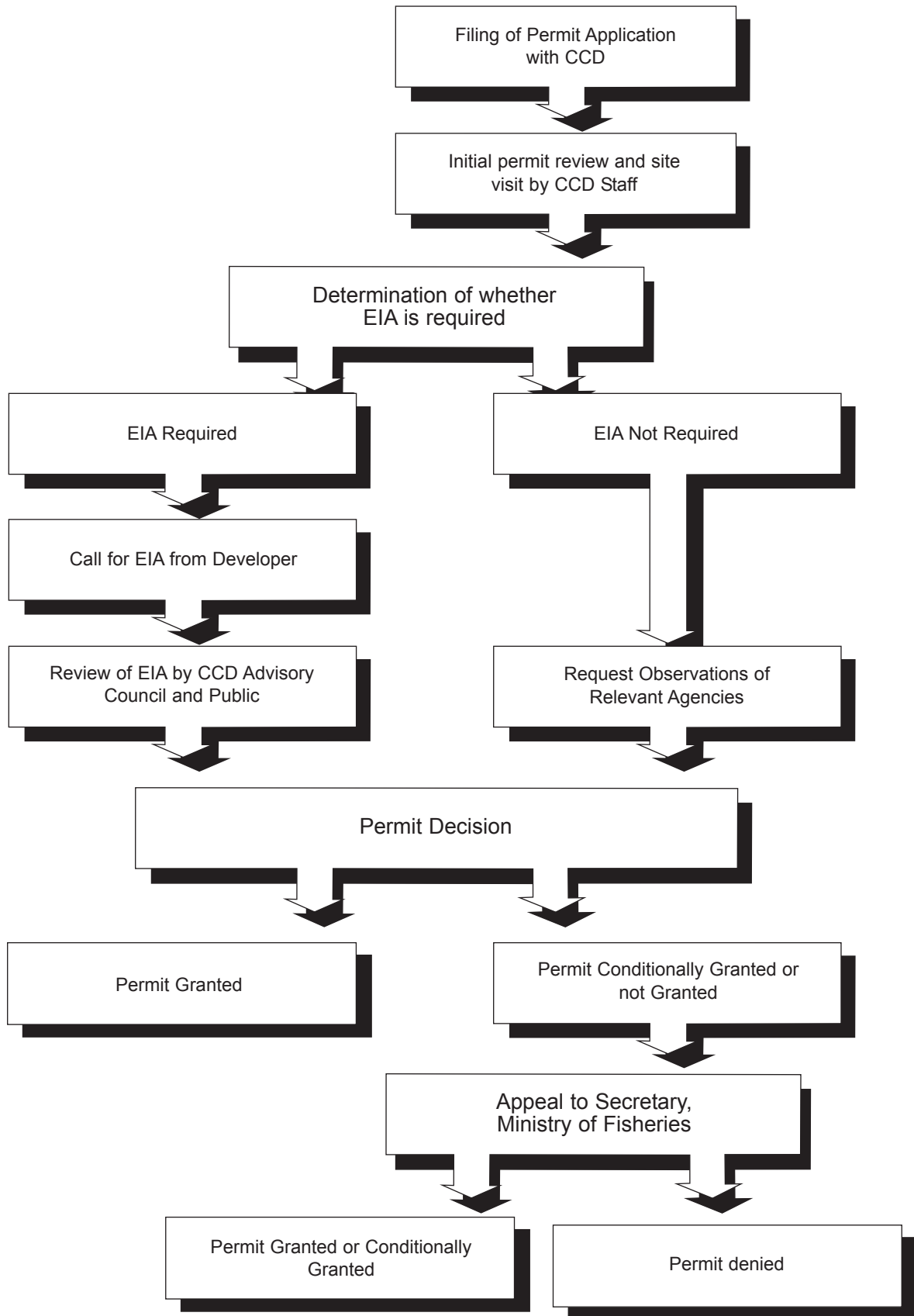
The management of coastal resources and activities will have an impact on the lives of many people. In the short-term, management of activities would appear to restrict development and curtail employment of some people. The benefits of such management, however, are widespread and accrue over a longer period. Therefore, a continuing education programme to mobilize public support for such management initiatives is a major programme.

Plan and Policy Development

The CZMP represents the first stage in developing a management programme for Sri Lanka's coastal areas. Planning efforts focus on developing objectives and implementing actions for other coastal problems. Area-specific management plans, refinement of existing management guidelines and of legislation, is a continuous process of the programme.

Role of Local-level Bodies in Coastal Zone Management

The CZMP recognizes the need to devolve resource management responsibilities to local government authorities and NGOs. As a first step, the Coast Conservation Department



CCD Procedure for Reviewing and Issuing Permits

decentralized several functions to the Divisional Secretaries under the terms of Public Administration Circular No. 21/92 in 1992. This delegation of administrative authority is being made under Section 5 of the CCA. The delegation of authority has been designed to improve the coastal management programme by allowing local authorities to:

- issue minor permits for removal of 2 cubic m of sand from specified areas of the coastal zone, designated by the CCD; and
- issue minor permits for small houses and commercial establishments with floor areas not exceeding 1,000 sq ft outside set-back areas defined in the CZMP.

Special Area Management

'Coastal 2000: Recommendations for a Resource Management Strategy for Sri Lanka's Region' highlighted the need for a more integrated approach to coastal zone management, for local-level involvement and collaboration, and for focusing management efforts in 'special areas' which have a recognized set of issues within defined and manageable boundaries.

Special Area Management (SAM) is a locally based, geographically specific planning process. It involves the affected communities and provincial agencies in the process of resource management by building community-level support through a highly participatory process and creating community-based management groups. Two SAM sites have been chosen on the south coast, Hikkaduwa and Rekawa. The role of the Coast Conservation Department in the SAM process is that of a catalyst.

The overall planning process and plan implementation in Rekawa is co-ordinated by the Rekawa Special Area Management Co-ordinating Committee. There is an institutional framework for planning and implementing the Rekawa Special Area Management Plan. A similar co-ordinating committee and an institutional framework for planning and implementing the Hikkaduwa plan are also in existence.

In the Sri Lankan context, SAM is a joint effort of national and local governments working collaboratively with community groups. It appears that neither, alone, can improve the management of coastal resources such as reefs, fisheries and beaches. Joint efforts are essential.

The lessons learnt in the implementation of ICZM in Sri Lanka include:

- Coastal resource management issues are inter-related and require more than one agency and a variety of management techniques.
- Single agency and sectoral approaches must be replaced by a more comprehensive perspective and approach.
- The present narrow geographic definition of the coastal zone has proved inadequate for even a basic management of shorefront erosion and construction.
- The emphasis on regulation needs to be revised.
- Local and provincial officials and coastal communities must be involved in formulating plans and strategies.
- The information available on the use and condition of ecosystems and natural resources is inadequate for planning purposes.

Since the CCA requires that the CZMP be revised once in every four-year period, the department, with the assistance of the CRM project, initiated the revision of the CZMP, based on the experience and lessons learnt in the implementation of the first CZMP. Recognizing the need for locally based collaborative management, a separate chapter on SAM has been included in the revised CZMP. The second CZMP will be submitted to the cabinet at the end of the year.

Sri Lanka's ICZM programme is not a blueprint for coastal management in other countries. But it offers useful experiences that can enrich coastal management efforts in other countries in the region.

Addendum VI

KEYNOTE ADDRESS

The Code of Conduct for Responsible Fisheries: Towards Implementation

By
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Allow me to express my satisfaction for the opportunity to continue and strengthen the fruitful dialogue started two years ago in Cebu, Philippines, at the June 1994 Conference of the International Collective in Support of Fishworkers, entitled 'The Struggle of Fishworkers: New Concerns for Support'. I had then the opportunity to present the elaboration of the Code of Conduct for Responsible Fisheries and the importance of your involvement in the process of its formulation. During this period of intensive and collaborative work, several meetings were held in Rome in which NGOs played a very active role. FAO was much rewarded by the recognition of the participants, of the transparency of the process which facilitated the dialogue and building up of confidence among State members, Inter-Government Organizations and NGOs to reach agreement on the text of the Code which, though not perfect, has all the necessary tools to contribute to ensure responsible fisheries.

The FAO Conference, at its Twenty-eighth Session, adopted the Code of Conduct for Responsible Fisheries on 31 October 1995. It also adopted Resolution 4/95 and 5/95 requiring FAO, States and international organizations, whether governmental or non-governmental, and all those involved in fisheries to implement the Code, including relevant actions, to achieve responsible fisheries.

In this regard, let me share with you the analysis of relevant parts of the Code in order to reiterate the importance of your decisive involvement in its implementation. I will also provide information regarding the steps which the FAO secretariat has undertaken to fulfil its obligations regarding the implementation of the Code.

The introductory paragraph of the Code clearly shows the broad scope and the sectoral nature of the Code, and explains why this instrument had to be formulated as a non-compulsory binding agreement. It states: "Fisheries, including aquaculture, provide a vital source of food, employment, recreation, trade and economic well-being for people throughout the world, both for present and future generations and should therefore be conducted in a responsible manner." The Code sets out principles and international standards of behaviour for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity. The Code recognizes the nutritional, economic, social, environmental and cultural importance of fisheries, and the interests of all those concerned with the fishery sector. The Code takes into account the biological characteristics of the resources and their environment and the interests of consumers and other users.

The Code is voluntary. However, certain parts of it are based on relevant rules of international law. It, therefore, constitutes an important contribution to the implementation of relevant

international instruments, because it was formulated to be interpreted and applied in conformity with such relevant rules of international law, as reflected in the 1982 United Nations Convention on the Law of the Sea, the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling fish Stocks and Highly Migratory Fish Stocks, and in the light of, *inter alia*, the 1992 Declaration of Cancún, the 1992 Rio Declaration on Environment and Development and, in particular, Chapter 17 of Agenda 21.

The Code consists of five introductory articles: Nature and Scope; Objectives; Relationship with Other International Instruments; Implementation, Monitoring and Updating; and Special Requirements of Developing Countries. These introductory articles are followed by an article on General Principles which precede the six thematic articles on: Fisheries Management, Fishing Operations, Aquaculture Development, Integration of Fisheries into Coastal Area Management, Post-harvest Practices and Trade and Fisheries Research. The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, forms an integral part of the Code.

Until now, I have briefly described the importance of the first three introductory articles of the Code. Article 1 sets the scope and nature of the Code, which shows the sectoral character because it addresses all fisheries and those involved in the sector, the overall objectives, which are directed to a change of behaviour to ensure the sustainable use of the resources for present and future generations, including social and economic considerations. The Code also has a relationship with other international instruments which give it a legal framework. Although the Code is voluntary, it also contains binding provisions.

Now, I would like to focus on the general principles and the thematic articles of the Code. With regard to the General Principles contained in Article 6 of the Code, the FAO Conference decided that these had to be formulated, as a first step, to orient the further development of the thematic articles. This gives an indication of the character and the weight of each of the 19 general principles. The first of these general principles states that “the right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation of the living aquatic resources”. The same principle clearly addresses such responsibility stating, in its first part, that “States and users of living aquatic resources should conserve aquatic ecosystems.”

There has been some discussion on whether the focus of the Code was mainly addressed to States, but it has to be recognized that governments are directly responsible for the application of laws and regulations. The Code thus recalls the principle of stewardship through governments. However, throughout the Code, and, in particular, as stated in Article 1.2, the Code is global in scope and is directed towards members and non-members of FAO, fishing entities, sub-regional, regional and global organizations, whether governmental or non-governmental, and all persons concerned with the conservation of the fishery resources and management and development of fisheries, such as fishers, those engaged in processing and marketing of fish and fishery products, and other users of the aquatic environment in relation to fisheries. This provision sets the framework for the entire Code. Obviously, throughout the process of negotiation, it was felt convenient to reiterate certain assertions in the provisions of the Code.

The general principles, in fact, address all the elements embodied in the scope of the Code regarding the resources and the environment, focusing on an ecosystem approach. It also addresses the problems of overfishing, excess fishing capacity, selectivity, the importance of fisheries in food security and welfare, including provisions regarding economic and social factors. In summary, it lists all the elements which will be further developed in the respective thematic articles.

The thematic articles of the Code were structured in a way to set the general institutional frame at the beginning, and thematic subtitles framing relevant groupings of principles, according to the nature of each of these. For example, Article 7, 'Fisheries Management' includes subheads, namely General; Management Objectives; Management Framework and Procedures; Data Gathering and Management Advice; Precautionary Approach; and Management Measures. In most cases, the first provision is also drafted as an introductory *chapeau*, "States and all those engaged in fisheries management should, through an appropriate policy, legal and institutional framework, adopt measures for the long-term conservation and sustainable use of fisheries resources. Conservation and management measures, whether at local, national, sub-regional or regional levels, should be based on the best scientific evidence available and be designed to ensure the long-term sustainability of fishery resources at levels which promote the objective of their optimum utilization and maintain their availability for present and future generations; short-term considerations should not compromise these objectives." However, throughout the text of the article, all the elements to be considered, including the recognition to traditional knowledge, consultation with users, etc., are developed.

I will not describe all thematic articles of the Code, since it would be too long and boring. What I have tried to show you is the flexibility of the Code and the practicality for its different users, who could accordingly focus on thematic articles relevant to their activities. For instance, aquaculturists will refer to Article 9, 'Aquaculture Development', also recalling the various general principles, such as 6.1, 6.7, 6.8, 6.9, 6.13, 6.16, 6.18¹ and in particular 6.19: "States should consider aquaculture, including culture-based fisheries, as a means to promote diversification of income and diet. In so doing, States should ensure that resources are used responsibly and adverse impacts on the environment and on local communities are minimized." Finally, aquaculturists should also take into account the framework provided in the introductory articles. Obviously, governments will have to take into account the Code in its totality.

After having analyzed the general features of the Code, I would like to stress the importance of Article 5 which is devoted to special requirements of developing countries. Article 5.2 states that "in order to achieve the objectives of this Code and to support its effective implementation, countries, relevant international organizations, whether governmental or non-governmental, and financial institutions should give full recognition to the special circumstances and requirements of developing countries, including in particular the least-developed among them, and small island developing countries." The Article further recalls on the necessity to provide the necessary technical and financial support to enhance developing countries' ability to develop their own fisheries.

FAO, in compliance with Article 5 of the Code, and the Conference Resolution (C 4/95), included, in the Programme of Work and Budget of the Fisheries Department, has developed a series of elements devoted to the implementation of the Code in the current biennium. FAO is also engaged in the elaboration of technical guidelines in support of relevant thematic articles of the Code and is also taking actions to strengthen regional fishery bodies in order to ensure closer and more effective regional co-operation and co-ordination in the implementation of the Code and other relevant international instruments.

A circular letter promoting implementation of the Code has also been circulated through the FAO representatives, addressed to Governments and relevant IGOs and NGOs suggesting that activities that countries/organizations would normally undertake in the promotion and development of fisheries should highlight the importance of implementing the Code by

1 See Annexure

focusing on the important of ensuring the sustainability of fisheries of through responsible fishing and emphasizing the vital contribution which fisheries make to food security and welfare. It also calls on owners of fishing boats and plants, fishers and fishworkers as well as trade or research and management authorities, to take into consideration the contribution of fisheries to food production and the adoption of responsible harvest, post-harvest and aquaculture practices, which are key elements in the observance of the Code.

This Circular Letter also indicated that while promotional activities may vary a great deal according to the country or region in which they take place, it provides a number of suggestions that could be undertaken including:

- organization, publication and dissemination of the Code or relevant parts of it through pamphlets, posters, fairs, the awarding of prizes, etc.; and
- information/educational/public awareness activities, which could include the organization of talks, conferences, seminars, special publications, activities with schools (youth) colleges and universities, visits to projects, training courses, media supplements, etc.

It is further suggested that these activities should highlight the need for actions to eliminate overfishing, rebuild and enhance fish stocks, minimize wasteful fishing practices, develop sustainable aquaculture, rehabilitate fish habitats, develop fisheries for new and alternative species based on principles of scientific sustainability and responsible management, and to adopt responsible fishing practices.

Involvement of the fishing communities, co-operatives and the private sector to adopt responsible fishing and aquaculture practices, and the involvement of the post-harvest and trade sectors in producing more and better quality fish and food, could have a tremendous impact on food and nutrition as well as on achieving responsible fisheries as required by the Code.

It is also noted that the institutional and legal framework including appropriate research to be related to the decision-making process, was a key element, considering that governments are accountable for the long-term sustainability of the natural/fisheries resources and their environment.

Article 4 is devoted to implementation, monitoring and reporting. It states that all members and non-members of FAO, fishing entities and relevant sub-regional, regional and global organizations, whether governmental or non-governmental, and all persons concerned with the conservation, management and utilization of fisheries resources and trade in fish and fishery products should collaborate in the fulfilment and implementation of the objectives and principles contained in the Code. They are also requested to actively cooperate with FAO in monitoring the application and implementation of the Code and its effects on fisheries, since the Secretariat is requested to report accordingly to the Committee on Fisheries.

In this context, FAO through its regional fishery bodies is examining the implementation of the Code by States and different users of fisheries resources and fisheries. An instrument, in fact, can only be evaluated if we have the proof that its application works or not. Currently, we have information on the implementation of the Code by some States like Canada or Mexico, which have incorporated the Code into their national plans for fisheries. Furthermore, Canada has undertaken a number of activities, in particular in the area of fishing operations. We are also being informed of the use of the Code by different NGOs and the private sector which have taken some initiative *inter alia* the use of the Code in promoting responsible fisheries agreements and,

recently, in the joint initiative of WWF and Unilever on the establishment of the Marine Stewardship Council.

This provision for monitoring implementation is particularly important because, notwithstanding that the Code would be implemented by States and relevant organizations and other users on a voluntary basis, due to the special features contained in the provisions which may be given, or which have already been given binding effect, and the provisions established in Article 4.3 which states that "FAO, through its competent bodies, may revise the Code, taking into account developments in fisheries as well as reports to FAO's Committee on Fisheries (COFI) on the implementation of the Code." This makes the Code a flexible instrument capable of being revised as needed, to ensure the results for which the Code was developed.

I hope that this analysis has been clear and convenient enough to encourage all of you to implement the Code in your areas of activity as well as in promoting its implementation by other users by other users in order to ensure that fisheries continue to contribute to food security and welfare of present and future generations.

Annexure

States and users of living aquatic resources should conserve aquatic ecosystems. The right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources. The harvesting, handling, processing and distribution of fish and fishery products should be carried out in a manner which will maintain the nutritional value, quality and safety of the products, reduce waste and minimize negative impacts on the environment.

All critical fisheries habitats in marine and fresh water ecosystems, such as wetlands, mangroves, reefs, lagoons, nursery and spawning areas, should be protected and rehabilitated as far as possible and where necessary. Particular effort should be made to protect such habitats from destruction, degradation, pollution and other significant impacts resulting from human activities that threaten the health and viability of the fishery resources.

States should ensure that their fisheries interests, including the need for conservation of the resources, are taken into account in the multiple uses of the coastal zone and are integrated into coastal area management, planning and development. States should, to the extent permitted by national laws and regulations, ensure that decision making processes are transparent and achieve timely solutions to urgent matters. States, in accordance with appropriate procedures, should facilitate consultation and the effective participation of industry, fishworkers, environmental and other interested organizations in decision making with respect to the development of laws and policies related to fisheries management, development, international lending and aid.

States, recognising the paramount importance to fishers and fishfarmers of understanding the conservation and management of the fishery resources on which they depend, should promote awareness of responsible fisheries through education and training. They should ensure that fishers and fishfarmers are involved in the policy formulation and implementation process, also with a view to facilitating the implementation of the Code.

Recognizing the important contributions of artisanal and small-scale fisheries to employment, income and food security, States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction.

Addendum VII

PRESENTATION 1

Natural Resource Management and Property Rights Regimes: Towards Defining a New Inter-relationship in Global Marine Fisheries *

by
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Today there is an increasing acceptance and appreciation of the close interaction between successful management of natural resources and the regime of property rights pertaining to them. Given other factors like technology, markets and the knowledge base, the clearer the definition of rights, the greater the scope for sustainable harvest of the natural resource. Ill-defined property rights to a resource can lead to a breakdown in its management.

Having said this, one must hasten to add that there is no specific rights regime which is inherently suited to any particular natural resource. Nor can a single type of property rights regime be prescribed as a remedy for problems of natural resource use and management. There is also a growing consensus that while the general principles of property rights regimes are applicable across contexts, the specific details of the resource and the human context are critical to success in particular applications.

Quite contrary to this, we notice that international agencies which have considerable clout in moulding decision making are propagating the inevitability of private property rights over natural resources as the *sine qua non* for efficiency of resource use and management. This has a pernicious influence on questions of public choice in this realm. The proposition is all the more powerful in the context of the collapse of socialism in the erstwhile USSR and the eastern European countries, which has brought discredit to collective state and common property rights as viable regimes to ensure planned and sustainable use and management of natural resources.

In this background, any discussion on natural resources and property rights, particularly where it goes against current fashions in thought, calls for some degree of cautious tightrope walking. Our attempt is made up of four composite parts:

1. Clarity about terms
2. The specifics of marine resources
3. The evolution of rights
4. The proposal for a different frame work

* This paper was first presented at the Conference on Local, Regional and Global Management and Distribution of Marine Resources, organized by EUROSTEP and Norwegian People's Aid, at Vega, Norway, 21-22 June 1990.

1. Clarity about Terms

Only through clarity about the terms used can we hope to achieve a common understanding for discussion. Natural resources are materials found in nature which have the propensity to renew /regenerate themselves in varying periods of time. Basically, these are nature's capital which display dimensions of stock and flow which we normally seem to associate only with financial capital.

The word resource is derived from the Latin word *resurgere*, meaning 'to rise again and again,' a phenomenon particularly true of renewable natural resources. Clearly, therefore, if sustainable consumption is to be achieved, humans must peg the rate at which they consume these resources to the rate at which the resources renew themselves. Unfortunately, for most resources, this rate is very low. This fact lies at the root of the problem of resource depletion.

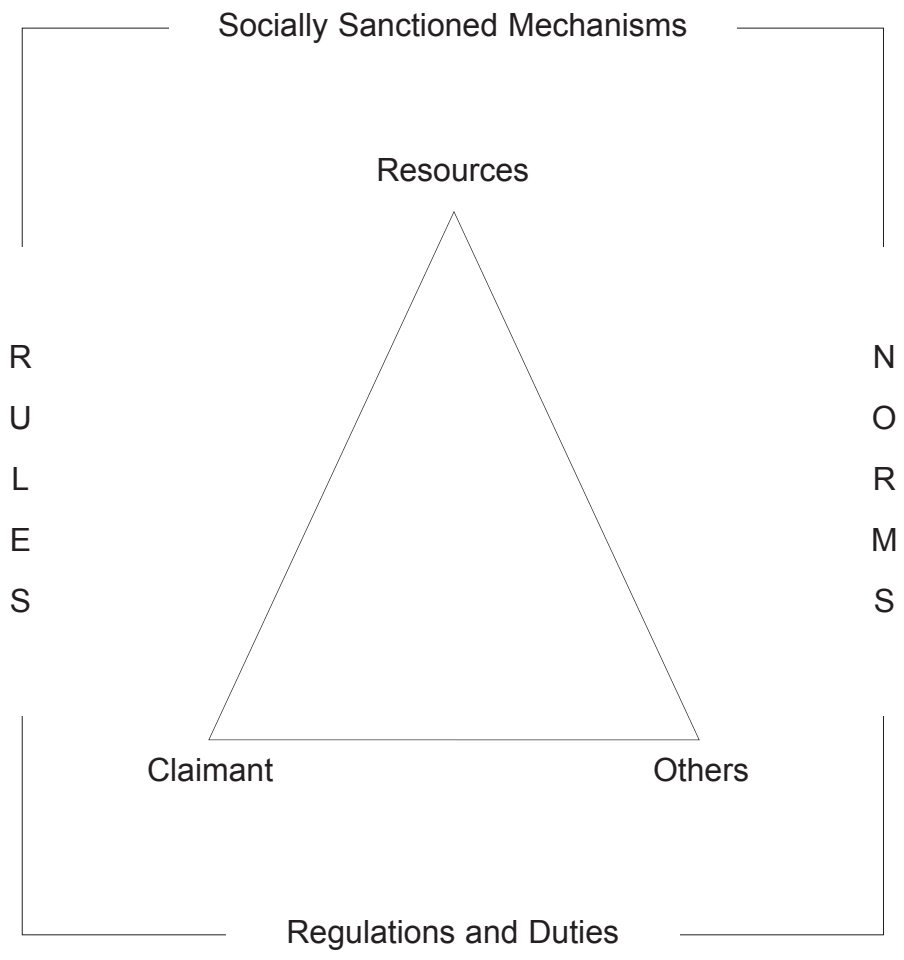
Management is an exclusive human activity, something not performed in the animal kingdom. It pertains to the task of nurturing, conservation, regulation and allocation of resources. 'Nurturing', an addition to the otherwise standard list of management activities, reflects our concern for stocks of natural resources. The other three aspects of management relate only to the modulation of flows of a resource. This limited perspective leads to too inadequate a concern for management to be truly humane.

When we talk of property, we allude not to the thing or object of our interest—in this case natural resources—but primarily to the benefit streams which accrue from it. By rights we imply the capacity to call upon others to stand behind our claim or interest in something. Regimes, which may also be called institutions, are humanly devised norms or constraints which shape and structure interactions.

Taking these three terms together, a property right regime is, therefore, a triadic relationship involving (a) the resource (benefit stream), (b) the claimant and (c) the others who are duty-bound to respect the claim being made. Over time, socially sanctioned mechanisms—rules, regulations, norms and duties—surround the triad to ensure the sustenance of the relationships and thus become a regime. If the triad can not be completed—usually because of the lack of the 'other'—then no property right exists. We then have a situation of 'open access', where there exists only access and possession rights but no property rights (see figure).

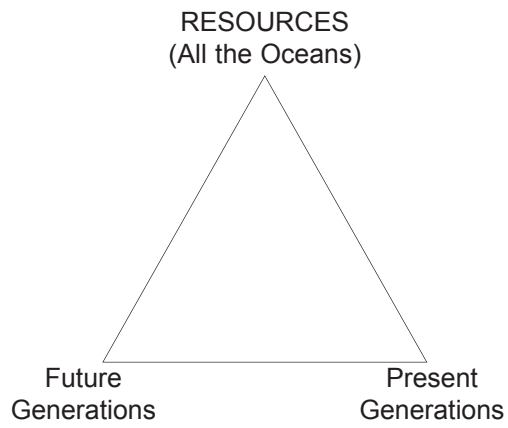
Basically, therefore, there exists a spectrum of property right regimes for natural resources: state property; common property; private property and no property (open access). State property and private property regimes are well-defined and need no elaboration. In the oft-quoted popular literature on resource management, the greatest source of confusion is with regard to the mix-up between common property regimes and open-access regimes. For example, the renowned piece by biologist Garret Hardin, entitled 'Tragedy of the Commons' should rightly have been titled 'Tragedy of Open Access', where the triadic structure of relationships necessary to establish rights does not exist. Common property is basically the private property of a group of co-owners, who have both rights and duties with respect to use rates and management of the resource claimed by them. The 'others' in this triad are those excluded from using the resource (see figure).

Property right regimes are not static. They evolve, but not necessarily along any linear trajectory. Individuals, communities or the State can all decide, for a variety of reasons, to restructure their claims over a resource. The State may wish to hand over some of its resources to private agents. Resources in an open-access regime may be claimed by the State for purposes of managing

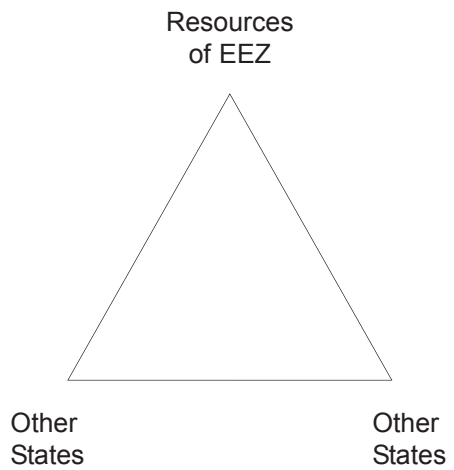


The Spectrum of Property Right Regimes (PPR)

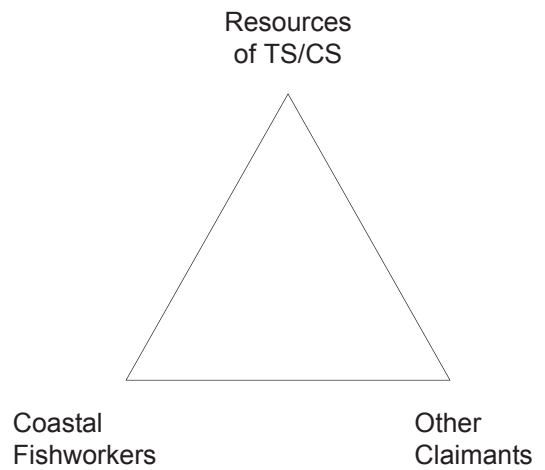
State PPR Common PPR Private PPR No PPR



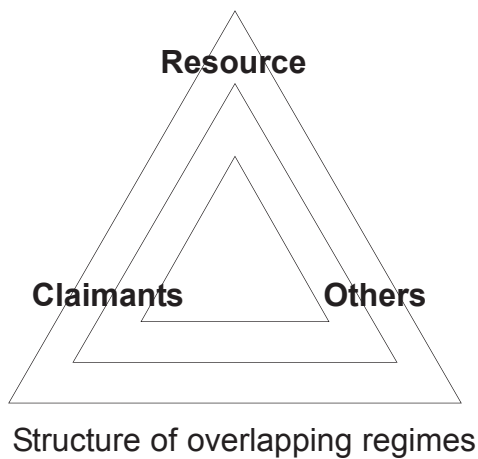
(i) Common Heritage of Humankind Regime



(ii) State Property Regime



(iii) Common Property Regime



them. These may then be handed over to a small community to be managed as common property. The community, in turn, may confer private rights to its individual members.

From these definitions themselves, it becomes clear that any analysis should primarily revolve around the interactions between the stocks and flows of nature capital and human claims over the benefits which accrue from them for a variety of reasons.

2. The Species of Marine Resources

The marine fishery resources of the world are estimated to yield about 100-120 million tonnes on a sustainable basis. They are located in 360 million sq km of aquatic milieu, composed of oceans and seas, which account for about three-quarters of the surface of the earth. These resources are by no means evenly distributed in this aquatic space. About 65 per cent are found in just six per cent of this terrain, from the coastline until the edge of the continental shelf—generally over a water depth of 200 m. The aquatic zone from this depth until the 320 km (200 nautical mile) boundary of the national Exclusive Economic Zones (EEZs), which accounts for a little over a quarter of the area, is the habitat for another 20 per cent of the resource. The remaining 15 per cent is found in the vast expanse of what is termed the high seas that account for the remaining two-thirds of the area (see Table 1).

Table 1: The Distribution of Fishery Resources in the Oceans

Zone of Ocean	Upto Shelf end (200m depth)	Shelf end to EEZ (320 km from the shore)	High Seas
Area of ocean (%)	6	26	68
Resource potential	65	20	15

Note: These are estimates based on a review of data from several sources.

As far as global marine fisheries are concerned, issues of resource management and property rights regimes interact in very special ways. This is for rather simple, yet little recognized, reasons.

First, unlike most other natural resources, global marine fisheries’ resources are located in a fluid milieu and the resources themselves are mobile and can not be seen. One implication of this is that property rights over small areas without reference to the specific physical geography and the nature of the resource has little meaning. Furthermore, property rights over an aquatic terrain may only amount to transient rights over all the fishery resources which pass through it. Co-operation among rights holders may, therefore, be a necessary condition for resource management. Consequently, the inevitability of overlapping rights regimes may merit consideration.

Secondly, the pattern of resource distribution in the vast aquatic milieu of this planet is very skewed—a substantial portion of the resource is concentrated in a very small area of the milieu closest to the land. This implies that management and the property rights regimes which start from the land and move outwards to sea, merit greater attention (see Table 1).

Thirdly, the resource is viewed in different ways by different claimants. Some see it as a material existing in nature, waiting to be strip-mined by human ingenuity, solely for maximizing

short-run profit or for other economic considerations. To this group, management boils down to a managerial fix of conservation through regulation and allocation, achieved either through market mechanisms or State fiat.

Some others see the resource as an ever-renewing regenerative gift of nature, with which humans enter into a relationship of responsibility, restraint and reciprocity, in order to foster a decent livelihood. To this group, the impetus of nurturing comes more intuitively and naturally, though their ability to give expression to this may be greatly constrained by the earlier class of claimants exercising their power through the State and/or market. If sustainable resource use and management is the aim, then, clearly, priority in establishing property rights should be given to the latter claimants.

Given these specifics about the resource, it will be worth examining the history of the evolution of property rights over ocean space and the resources in them.

3. The Evolution of Rights

It will not be historically accurate to talk about a linear evolution of rights regimes in the oceans. The structure, perception and actual implementation of these rights were temporally and spatially specific, being determined by the nature of the use of the aquatic terrain as a medium of transport and a source of food. Some evidence clearly suggests that freedom of navigation was the norm in the Indian Ocean, when flourishing maritime trade links between India and Babylon were at their zenith in 600 BC. Asian coastal fishing communities have considered the sea and its living resources as “belonging to the dead, the living and those yet to be born.”

Some centuries later, the Roman Emperor Antonious, probably referring to the Mediterranean Sea, claimed, “I am the master of the land, but the law is the master of the sea.” Much later, in the beginning of the colonial era, Spain and Portugal divided the oceans between themselves, the former taking western Atlantic and the Pacific, and the latter the South Atlantic and Indian Ocean. The Dutch, in order to overcome the barriers of control over the seas, engaged a legal consultant, Hugo Grotius, to prepare an argument to establish the right of the Dutch to partake in the East Indian trade. As a good consultant, Grotius spent time in the archives, where he was inspired by the existing rights regimes and maritime traditions in the Indian Ocean, to formulate in the early 17th Century the doctrine of *mare liberum*, challenging the *mare liberum* policies of the other European nations. Grotius asked passionately:

Is it not vastly more just that the benefits from the enjoyment of common things should be given to the entire human race, rather than to one nation alone?

The contemporaneous development of ballistic technology brought with it the ‘cannon-shot’ rule, which defined the limits of the length of the territorial sea from the coast. In the 18th Century, it increased from one to three miles. By the end of the 19th Century, other considerations, including control over fish stocks, contributed to raise this limit to six and then, 12 miles. The question as to whether these were claims of jurisdiction or sovereignty remained unresolved.

The North Sea Overfishing Convention of 1882, the founding of the International Council for the Exploration of the Seas (ICES) in 1902, and the 1911 Behring Sea Fur Seals Convention, among others, contributed to convening the League of Nations Conference on the Law of the Sea in 1930. Though the conference failed to agree on a draft convention, one of its rapporteurs, Sr. Suarez, made some interesting comments, which are worthy of consideration even today. He argued for a new jurisprudence for the oceans, because the regulations of his time disregarded the “biological-geographical solidarity of the oceans.” He argued that since fish are

internationalists ignorant of jurisdictional frontiers, the sea for them is a single realm. He was, therefore, of the opinion that all this calls for a counterpart in legal solidarity in international law.

After World War II, the UN General Assembly instructed the International Law Commission, in 1950, to prepare draft articles and conventions on the Law of the Sea. Four conventions were drafted (Territorial Sea Convention; High Seas Convention; Continental Shelf Convention; and, Fishing and Conservation of the Living Resources of the High Seas Convention), all of which were adopted, entered into and remained in force. While all the conventions address the issue of rights, only the Conservation Convention imposes any obligation to conserve marine living resources.

This was followed by UNCLOS I and II in 1958 and 1960, both of which failed to adopt a settled definition regarding the breadth of the territorial sea or a definition of the continental shelf. But it raised an interesting question of rights, the concept of a 'preferential right' to coastal States vis-a-vis other States.

The Latin American States argued that if meaningful conservation (management) of fishery resources is to materialize, the food situation of the human populations living nearest the resource must be the first to benefit from it, since, otherwise, the whole programme of conservation would be doomed to failure

Philippines and Vietnam argued that this preferential right may be applied when an element of acute dependence upon such fisheries exists. Their submission stated that

if the inhabitants of a coastal State who engage in fishing do so mainly on the coasts of that State, and derive their subsistence as well as that of other inhabitants largely from such fishing, they shall have a preferential right to fish in any area

The proposal of Iceland at the Geneva Conferences also backed the position of those coastal States with overwhelming dependence on fishery resources by stating that

where a people are overwhelmingly dependent upon their coastal fisheries for their livelihood or economic development and it becomes necessary to limit the total catch of a stock or stocks of fish ... the coastal State shall have preferential rights under such limitations to the extent rendered necessary by its dependence upon the fishery

Though neither of the conferences adopted any of these proposals in toto, in the 1960 conference, the concept of preferential rights was embodied in the following manner:

the coastal State has the faculty of claiming preferential rights when it is scientifically established that a special situation or conditions makes the exploitation of the living resources of fundamental importance to the economic development of the coastal State or the feeding of its population.

UNCLOS I and II failed. This was followed by a spate of declarations by Latin American and Caribbean countries unilaterally expanding their sovereign rights beyond the territorial sea into what they called the 'patrimonial sea.' Under the concept, the main emphasis was again placed on the notion of 'sovereign rights' and 'economic jurisdiction.' This led to UNCLOS III, which began in 1973 and ended nine years later, with two of the most far-reaching concepts which have a bearing on property rights: the Exclusive Economic Zone (EEZ) and common heritage of humankind.

UNCLOS III was by no means only a legal conference. Although it was conducted during the peak of the Cold War, the hallmark of the conference was the lack of alliances along conventionally accepted ideological postures. Instead, it was nature's resources and physical

geography that formed the basis for the alliances among nations. The conference thus became one long debate over resources, their management and property rights over them. As mentioned by one commentator, UNCLOS III might have more informatively been titled the United Nations Conference on the Uses, Management and Ownership of the Ocean and its Resources.

UNCLOS III took 14 years to get sufficient ratification for the Convention to enter international law. So far, it is still mainly the developing countries which have done so, the exception being Ireland. Under UNCLOS III, the oceans and seas of our planet have been demarcated into a mosaic of State property rights regimes—the EEZs—and a large open-access regime—the high seas. Though this radical rearrangement of the structure of rights in the oceans was not entirely a matter of transfer of resources from the rich to the poor, it certainly placed a larger share of the planet's resources under the control of developing countries. As regards fisheries, it is estimated that as much as 60 per cent of the potential yield of the oceans is now well within the sovereign rights of the developing States.

One of the major weaknesses of UNCLOS III was its inability to adequately consider the management of the living resources which straddled and migrated back and forth from the open-access high seas into the EEZs of nation States. This issue was raised at the UNCED at Rio in 1992. A subsequent UN General Assembly passed a resolution to convene an intergovernmental conference on the issue. A UN Conference on Straddling Stocks and Highly Migratory Stocks was convened in 1993. The conference witnessed a polarization of interests over rights over resources and ocean space between coastal States and distant-water fishing States. The conference produced a convention which, in principle, stressed the co-responsibility of both coastal and distant-water fishing nations to ensure management of these resources. A precautionary approach to management has been made mandatory. Though the convention covers about 15 per cent of the living resources, it can lay claim to being a watershed in the history of international fishery legislation. It provides a good basis for national legislation within EEZs, since several species of fish harvested by different groupings of fishing units straddle back and forth from the outer edge of the EEZ and into the coastal waters.

4. Towards a Different Framework

To develop a framework for integrating resource management and property rights in the context of marine fisheries, it is useful to start from the 'macro' (global) level and then move down through the 'mezzo' (national) level to the 'micro' (community) level.

The Macro Global Level

Life on this planet owes its past, present and future existence to the oceans. It is the oceans which unite peoples, while land masses indeed divide us. Also, given the 'biogeographical solidarity' of the aquatic realm and the nature of the living resources within it, it makes ecological, economic, social and political sense to subscribe to the primary principle of common heritage of humankind as the all-encompassing property right.

The triad is composed of the ocean and its resources at the apex and, in a reversal of roles, the future generations as the 'claimants of rights' and the present generation as the 'others', who will stand behind this claim (see figure). This reversal of roles in the proposed overarching triad is very significant. This is the only possible way to create a regime that will ensure sustainable management of the living resources of the oceans. But who in the present generation should take the lead role for this?

As long as future generations do not vote in the political arena or the market, the role of traditional statesmen, politicians, international civil servants and economists in crafting the

norms for this regime is indeed highly circumscribed. Keeping in mind the global polarization between rich and poor nations, the governments and institutions of the First World certainly can not be given a dominating role. That would run the risk of the planet's ocean resources being bequeathed by the rich to their yet-to-be-born rich grandchildren.

The onus of responsibility of upholding and developing the common heritage of humankind and property rights regime falls squarely on the vast sections of civil society in all our countries. The leadership on this matter should be taken by those with the greatest 'connectedness' with the oceans and the living resources in them. It is the working women and men in the coastal communities the world over, who as 'beacons of the ocean' shoulder this great responsibility. They need to be actively and creatively supported in this task by solidarity groups and networks of concerned citizens.

The Mezzo National Level

At the mezzo level lies the reality of the nation State. Despite talk of the global village, no one can really wish away the reality of national boundaries. In the context of oceans, we have seen how these boundaries have expanded after UNCLOS III. The promulgation of EEZs has given nation States sovereignty over this ocean space and the resources therein. This is the realm of a State property rights regime: the fishery resources of the EEZ are the apex of the triad, the State is the claimant of the resource and all the other nation States and other entities, by virtue of UNCLOS III, stand by this claim (see Figure 2).

This mosaic of State property rights accounts for a third of the space and a phenomenal four-fifths of the resources of our common heritage. It has been pointed out by legal experts that a closer reading of the relevant articles of UNCLOS III shows that the Convention actually limits and transforms the concept of sovereignty of States over the EEZ in a variety of ways. It limits sovereignty by subjecting rights to the duty of conservation, the need to share and the duty to co-operate with other States on matters such as resource management, research, etc. It transforms sovereignty by disaggregating the concept into a bundle of rights (sovereign rights, exclusive rights and jurisdiction).

In our framework, by situating State property rights within the common heritage of humankind, we also transcend the concept of sovereignty by making nation States stewards and custodians of this big share of the common heritage. Consequently, we need to view their sovereignty more as functional sovereignty or sovereignty for sustainable use. To operationalize this concept will require greater regional co-operation between contiguous States to accommodate the reality of fish being 'internationalists', paying scant regard to boundaries of the nation State so sacrosanct to humans.

The Micro Community Level

At the micro-level, which is within the State property rights regime described above, there is scope for a radical proposal. Many countries have traditional coastal fishing communities scattered along the coast who have a close economic, social and cultural 'connectedness' to the fishery resource. These communities claimed their priority rights over the coastal resource as a collective community of worker-owners. They also fought hard to preserve these rights from being usurped by others. In their struggle, they obtained the empathy and support of the public and the politicians.

A digression on this struggle of the coastal fishworkers to establish their rights over the coastal fishery resources is instructive to understand the close links they perceived between technology choice, environmental destruction and the structure and nature of rights. For instance, in Norway, when opposing the ingress of the trawlers owned by Norwegian industrial interests

into the coastal waters, the fishworkers' organizations forwarded three inter-related reasons for doing so. They said that allowing this would result in:

- excessive fishing of the cod stock;
- affect the cod brood; and
- introduce capitalist relations into the fishery

The rationale for the first two reasons is now well understood. Experiences in developed and developing countries only go to reinforce this argument of the fishworkers, based on their intricate understanding of fishery resource dynamics. The rationale for the third reason must be seen as their opposition to the establishment of market relations and private property rights—the hallmark of capitalist relations—from taking root in the fishery.

The third reason is an increasingly important dimension of the struggles of the coastal fishing communities the world over. Opposition to fish harvesting technologies which jeopardize the fishery resource and its rejuvenative capacities are closely linked to the claim over the resource as a community asset to be managed by a community of co-workers within the framework of a well-articulated common property rights regime.

Given this background, and invoking the concepts of 'special interests' and 'preferential rights' evolved during the first and second Geneva Conventions (on the Law of the Sea) of 1958 and 1960, but applying them to coastal fishing communities within a nation State, we would argue that the resources in the territorial sea or over the continental shelf up to a depth of 200 m (whichever is convenient or appropriate) should be managed under a common property regime, with the coastal fishworkers as the co-owners of the fishery resources therein. The 'others' in the triad are all the competing interests in the coastal fishery (see Figure 3). This regime would account for the smallest share of total ocean space (five to six per cent), but for two-thirds of the living resources.

It is easy to see that this proposal is not consistent with much of the popular economic theory on fishery resource management, which is dominated by resource allocation issues. The autonomy of the individual to make atomistic decisions without the need to consult another agent is the cause celebre of this strand of economics. By definition, a common property regime requires co-owners to engage in mutual and community consultation and participation to seek common approval of certain actions which they may agree to undertake individually.

Consequently, common property rights regimes do not usurp the crucial role played by individuals. They only circumscribe it within the confines of collective norms. To privatize such a resource within the framework of a private property regime will only go to deprive vast masses of people of their rights to livelihood in an economic and social-cultural sense. This would definitely be true in Norway, in many traditional maritime countries in Europe and, without doubt, in the developing world, where anywhere between 15-20 million people are involved directly in fisheries and aquaculture and another 25-30 million in the post-harvest and marketing activities.

In this context, an interesting post-UNCLOS III feature in some developing Asian countries—Philippines, Indonesia and India, for example—deserves highlighting. On the one hand, in these developing maritime States, the context of the UNCLOS III negotiations provided the basis for claiming *de facto* (and now *de jure*) rights to resources over a vastly extended area of the oceans. On the other, we saw a simultaneous re-emphasis on the small-scale fishery,

which concentrated largely on the resources of the territorial sea. In our understanding, while both measures were right, they suffered major inadequacies.

Establishing sovereignty (State property rights) over a large sea area and continental shelf pre-empted, to a considerable extent, the pillage of these resources by others. This measure, however, did not result in commensurate increases in overall welfare, largely due to the lack of technology for harvesting, processing and surveillance, and the inadequacy of proper institutions for implementation. Supporting the small-scale fishery was probably a socially and economically correct step.

The small-scale fishworkers were reasonably well equipped technologically to harvest the resources of the coastal waters, but the new concerns did not bring the full measure of returns in the form of management of these coastal resources or improvement of the socioeconomic conditions of these communities. The most important reason for this was the inability to recognize and institute a regime of property rights for these small-scale fishing communities vis-a-vis the coastal fishery resources. In many developing countries, there was a notional understanding that a 3-5 mile zone be reserved for small-scale fishers. But this was not adequate because such zones were, at best, rather weak usufruct rights within the larger context of the State property rights regime of the EEZ.

There have been systematic efforts by fishworkers' organizations, and the networks of organizations and individuals who support their cause, to argue for such a common property rights regime in the coastal waters. The concept of an Exclusive Economic Zone for small-scale fishers was voiced at the International Conference of Fishworkers and their Supporters in Rome in 1984. Continued efforts were made to achieve this by the International Collective in Support of Fishworkers (ICSF) during the UNCED at Rio in 1992 and the negotiations of the FAO Code of Conduct for Responsible Fisheries. In the UNCED process, the proposal for "reserving inshore fishing grounds for the use of small-scale fisheries" was rejected at the third PrepCom, as several delegations had difficulties in agreeing on a common limit.

In the FAO Code, an ICSF formulated statement, which received endorsement by several country delegations, was modified and incorporated into the General Principles to state that:

recognizing the important contribution of artisanal and small-scale fisheries to employment, income and food security, States should protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction (emphasis added)

Even this is rather inadequate, because it is still only about "access" and to be applied by States "where appropriate". Despite these limitations, the adoption of this principle in the FAO Code is proof that pressure from fishworkers and their supporters does play a significant role in influencing global opinion. Now, the task must devolve downwards to the State and community levels to translate this voluntary, moral commitment of the FAO Code into a legally binding common property rights regime.

Granting a common property right to a community of co-owners must be accompanied by norms which are applicable to the individuals who will be given the rights of access to the resource. The most important of this should be that those who own fishing crafts should necessarily be at sea on them. It is only such a collective community of owner-workers who can exercise both precaution and responsibility in managing the fishery resource.

Conclusion

If our concerns about natural resource management, in general, and the fishery resources, in particular, must move beyond the realm of economic efficiency considerations alone into the domain of social equity and sustainability as well, we need to think aloud about several alternatives. One of these is the need to recognize that there can be several efficient solutions based upon different property rights regimes. Therefore, we must not be fixed to any particular regime of rights, but choose those which are appropriate to the resource and to the concerns of the human beings who relate to it. If we wish to work to build a new framework, we must have a vision about it and then struggle against the waves of resistance to reach our goal.

PRESENTATION 2

Fisheries Management within the Framework of Integrated Coastal Area Management

by
Rolf Willmann¹

Introduction²

Fisheries management has been traditionally concerned with problems generated within the fishery sector. At the forefront of these have been the over-exploitation of target species, overcapitalisation and the related economic waste, and conflicts, in particular the conflict which frequently occurs between small-scale fishers and industrial fishing vessels using more powerful means of production. These and other internally generated problems continue to remain at the forefront of the concerns of fishers and fisheries administrations around the world.

During the last two decades in particular, a new set of problems has become apparent in fisheries which, with the important exception of coastal aquaculture, mostly have their origin outside the sector. These are man-made environmental changes which have toxic or otherwise damaging effects on fish stocks and their habitats. These changes adversely affect, respectively, the quality of fish as a consumer good, and the productivity and abundance of resources. The geographic origins of these damaging effects can reach far inland, not infrequently straddling national boundaries, and their sources commonly include many different economic activities such as different industries, agriculture, forestry, and human settlements. Added to these harmful effects are adverse impacts on the quality of life of fishing communities caused by direct competition over coastal space and the use of resources therein. Dislocations of fishing villages caused by the siting of large-scale industrial, tourism and military ventures in the coastal zone are reported throughout the world.

As populations in coastal areas continue to increase and concentrate and economic activities within them to grow and diversify, those factors which affect the fishery sector and originate outside it are likely to become much worse unless governments and resource users take appropriate action. Already, in some areas (e.g. Black Sea), the environmental changes taking place have seriously impaired species productivity and diversity. In doing so, they can affect fishing incomes and fish food supplies to an equal or greater extent than excessive exploitation rates. These two types of problems will be found together in many situations, each reinforcing the other's damaging effects on fish and people alike.

The above concerns form part of the wider consciousness of the linkages between the environment and development. Chapter 17 of UNCED Agenda 21, *Protection of the oceans, all kinds of seas including enclosed and semi-enclosed seas, coastal areas and the protection, rational use and development of their living resources*, includes the commitment of coastal nations to integrated management and sustainable development of coastal areas and the marine environment under

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2 The introduction is largely taken from Willmann and Insull (1993)

their jurisdiction. The challenge is to translate this commitment into concrete action guided by a good understanding of the reasons why unsustainable use patterns continue to persist in fisheries and coastal areas, and in fact the economies at large. These will form part of the succeeding section of this paper and provide the rationale for the management policies and techniques to be discussed in section three. As will become clear throughout the paper, major institutional changes are needed to achieve sustainable development which with regard to the agricultural and rural sector has been defined by FAO as "... the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) concerns land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable, and socially acceptable."

The paper will conclude with some lessons on the roles which fisheries sector institutions may play in coastal area management programmes.

SECTION I

Principal Causes of Unsustainable Resource Use Patterns

It is no trivial question to ask why people should engage in activities which harm themselves, if not immediately and directly, then indirectly and in the long run. One of the possible answers to this question is ignorance about the harmful effects of certain types of activities or products. This explanation does not sound very satisfactory if one thinks of the persistence of some personal consumption habits whose obnoxious health impacts have been well established (e.g. smoking). However, if we consider the complexities of the interactions between human interventions and environmental changes and the latter's feedback on human well-being, there is ample scope for ignorance and erring for the bad. The coastal zone is one of the most complex and most productive environments on our earth. Alterations to the ways and intensities in which we use resources have complex short-term as well as long-term repercussions on the coastal ecosystems and beyond. In turn, they influence the kinds of benefits present and future generations can derive from these ecosystems.

Another possible answer why people often engage in harmful activities is that those who cause the harm do not carry the burden or consequences of their doing. They use resources or certain properties of resources without covering the costs this entails or, in other words, without paying a price for their resource use. Instead, the costs are shouldered by others, and thus there is no incentive for those causing the damage to cease or alter their activities. The others' may hereby include people who are still to be born and who have no way to express their disagreement and resistance to what present generations are inflicting upon them. It should be clear that those doing the harm are usually not specially malicious people rather they engage in activities to make a living or to make a profit. They may not even be aware of their damaging impact on others, or, if aware, their own individual contribution to the total damage may be so small that it would not greatly matter if they individually ceased the harming activity.

In economics, the term external cost (of an asymmetric nature) has been coined to depict the above situation and we shall discuss below measures which can be taken to provide an incentive for people or alter their behaviour.

A further reason why people may engage in harmful activities is the absence of a mechanism of co-ordinating their behaviour either through a market exchange or through collective action. Its economic basis is again the occurrence of external costs but in this particular case they are of a symmetric nature in the sense that each user of the resource does harm to all others and all others do harm to her/him. The situation is such that no individual has an incentive to alter her/his behaviour as long as others do not also change theirs. The intricate nature of this

situation is that even once an agreement of cooperation has been reached, every individual has an economic incentive to cheat on its terms.

To clarify the mechanics of this situation, let us first assume that a fish stock is exploited by just one fisherman. Over the years he would gain a thorough understanding of how abundant the fishes are in response to environmental conditions such as the amount of rainfall or the timing of the monsoon on the one hand, and in response to the amount of fish he currently catches, on the other. He would realise that if he takes too many fishes this year, his harvest next year and the following years may be small.

Now let us assume that other fishermen begin to exploit this fish stock. Some of them reside in the same village as our fisherman and others in more distant places. A first consequence of the entry of new fishermen is that our fisherman loses his ability to accurately assess the reason why the abundance of the fishes in the water is changing. Is it because of environmental factors? Or is it because of the catches taken by other fishermen? While he may be able to actually observe or obtain second hand information on the catches of those fishermen who live in his own village, he has no information on the catches of those who live in distant places. From this follows a second consequence that he will change his strategy and cease to limit his catches this year for the benefit of catches in future years. This he does because now he has no guarantee that the fishes which he does not take today will be able to contribute to good catches in future years. A third consequence is that for each unit of effort (or costs) his catch has become lower because the abundance of the fishes is now reduced by the catches of the new fishermen. Thus, his net income is lower and he will start thinking of ways how he could again attain his former income level. One solution he may adopt is to fish for more hours to make up for the income lost. Another strategy he may adopt is to take a loan and buy additional nets so that he can regain his former catch level. Both of his individual solutions, however, will affect the catches of the other fishermen who then may react in the same manner to maintain their own catches and incomes. As this unco-ordinated behaviour continues, the exploitation level of the fish stock becomes higher and higher until it may collapse or until catches become so low that fishermen cannot meet any more their fishing costs.

As is evident from this highly simplified example, the behaviour of our fisherman changes profoundly as he loses his exclusive control over the amount of fish to be taken each year from the fish stock. As the new fishermen enter the fishery, they impose a cost on him in terms of reduced catches per unit of effort, and thus net income, and they impose on him a change in his behaviour towards the fish stock: as one among many fishermen, he cannot afford anymore to be concerned about how many fishes to leave in the water for future years. He, and all other fishermen who exploit the same fish stock, would need to co-ordinate their harvesting activities. Such co-ordination would incur costs as the fishermen would need to meet and agree upon the amount of fishes each one can harvest and they would need to have some monitoring system in place to ensure that no one cheats. So then the question arises who is going to cover such costs, especially the initial costs of identifying all fishermen who exploit the fish stock and obtaining an agreement among all of them to meet. No individual fisherman may be able to afford to cover alone these initial costs to start co-operation, especially when there are many fishermen and they live in distant places.

In summary, in combination with increasing demand and consumption, the principal causes of the over-exploitation and degradation of natural resources and of conflicts between different resource users are related to the occurrence of cost externalities in production activities, the lack of co-ordination or collective action, and inadequate knowledge or information about the consequences of human interventions. In the following section, we shall discuss different approaches on addressing these problems.

SECTION II

Alternative Management Approaches and Instruments

The Precautionary Approach

The preferred approach to deal with the problem of inadequate knowledge is to acquire more of it. This incurs costs and, more importantly, takes time. Time, however, can be ill afforded in situations where management problems have become very acute and where waiting for a confirmed scientific cause-effect relationship may lead to irreversible damage. Even when time is available for thorough scientific analyses, the new knowledge acquired may still be insufficient to remove all uncertainties about the possible impacts of certain human interventions. In response to such uncertainties, the concept of 'precaution' was developed initially in Germany for pharmaceutical products. The impetus for introducing this concept was not least the occurrence of serious public health disasters brought about by unexpected side-effects of pharmaceutical products in the 1960s. In its most stringent application, the concept of precaution requires that in the absence of reasonable scientific evidence of the harmlessness of a product, it be considered harmful. The introduction of this concept had the important consequence that it became the responsibility of the pharmaceutical and chemical companies, rather than the public health authority, to prove the harmlessness of these products. It reverted the burden of proof from the state (or the consumers) to the producing companies which benefit from the sales of their products.

In its actual applications, the concept of precaution is modified by various considerations, in particular, the weighing of benefits and costs. Some pharmaceutical products, for example, are for most people harmless and may greatly benefit their healing. For very few people, however, they could do great harm. The weighing of benefits and costs in such a case may lead to the conclusion that the risk of harm is acceptably low when compared with the certainty of benefiting large numbers of people.

The precautionary concept was later on applied to many other aspects of public health and safety and, in more recent years, to various aspects of environmental protection and conservation. Regarding the latter, a central concern is that, in the absence of full scientific understanding, irreversible harm may be done to the basic natural processes which sustain all living resources on our planet. A further concern is that we and our offsprings forego forever the option of benefiting from still unknown properties of many natural resources (e.g. pharmaceutical properties of plants, coral reefs, etc.). The precautionary concept has also entered the realm of fisheries and forms part of the recently concluded international agreement on the management of straddling fish stocks and highly migratory fish stocks, and of the international Code of Conduct for Responsible Fisheries.

In many countries, in recent years, legislation has made it mandatory for primarily large private or public development projects to prepare an environmental impact statement prior to their commencement. Environmental Impact Assessment (EIA) procedures are among the most important tools in integrated coastal area management because these are inherently cross-sectoral in spirit, preventive in nature, and specifically concerned with evaluating the linkages between human activities and the environment. EIAs commonly adhere to the principle of the reversal of the burden of proof contained in the precautionary concept. They also acknowledge the principle of preventive action, which is based on the recognition that it is cheaper, safer and more desirable to prevent environmental harm occurring than to rectify it later (if indeed this is possible at all) (Boelaert-Suominen, 1994). It is the responsibility of the developer, and at his cost, to prove that his project does not lead to unacceptable environmental damage. The undertaking of environmental impact assessments, though, does not automatically ensure that the project has no adverse environmental effects. The reasons include the absence of full scientific knowledge, the weighing of the benefits of the project *vis-à-vis* the costs of avoidance of all adverse effects, and the accumulative impact of this project in

combination with others. The latter depicts a situation where each project, if assessed in isolation, could be considered environmentally friendly but where the cumulative impact of many projects is environmentally harmful. Harmful accumulative effects may also arise when many small development activities take place which, because of their size, are not required to undergo an environmental impact assessment. Frequently, the requirement for an EIA only arises with projects which have the potential to significantly affect the environment.

How to Deal with Cost Externalities

Ronald Coase, a Nobel prize-winning economist, in a seminal article has advanced one possible answer to this question (Coase, 1960). He argued that the two parties to the problems, that is, those who do the harm and those who suffer from it, will make a deal in such a manner that either the former pay compensation to the latter or the latter pay the former to cease the harmful activity. In the first case, the suffering party is entitled to receive compensation. It has a right, for example, to a pollution free environment. In the second case, the harming party has a right to pollute the environment. Irrespective of who holds the right or entitlement, the deal will take place and benefit both parties as well as society at large.

There are two important considerations in Coase's proposition. One is that benefits and costs need to be weighed against each other and that where benefits outweigh costs it may be economically worthwhile for the harmful activity to be continued. The second idea is that a private deal among the two parties, that is a market transaction, is able to resolve the problem of cost externalities. Regarding the former, it is quite acceptable that the party which does the harm compensates the harmed party. But why should the reverse apply, that is, for example, that fishermen pay a factory to stop polluting a river which kills the fish? The fishermen, and others who make use of the river, would claim that it is the responsibility of the factory to cease its polluting activity. They would claim to have a right to clean water but this may not be based on written law. The conflict of interest between the factory and the fishermen is thus a conflict over rights to certain properties of the river (e.g. concentration of pollutants; the level of water flow; sediment load; temperature). This situation exemplifies many different issues in the coastal zone whose commonality is the question of the definition and distribution or allocation of rights. Other examples include the right over the water in coastal aquifers, the right of access to beach space and the nature of its use, the right to mine corals for use in construction, the type of use of mangrove forests, etc.

Now let us turn to the idea of a private exchange among the two parties and assume that the fishermen have a collective entitlement to clean water. An advantage of such a market transaction is that the information required for a satisfactory (economically efficient) exchange may be available with the two parties. The factory owner may know how much it would cost him to either cease the activity and forego his profit or to change the technological characteristics of the production process to remove some or all of the outflow of pollutants into the river. He may also know that the cost of the pollution abatement technology increases as the factory's outflow is required to become cleaner. The fishermen, on the other hand, may know how much money they lose from the decline in the number of fish in the river and that, if the decline is smaller, the lower is the level of pollution. The two parties may not wish to reveal their true figures but in a process of negotiation they may finally arrive at a settlement which is acceptable to both of them. The fishermen may accept a certain level of pollution provided that their loss in income due to lower fish catches is fully compensated. The factory owner, on the other hand, may find it advantageous to invest some money in pollution abatement technology and he provides some compensatory payments to the fishers.

The above is again a highly stylised situation and we may ask ourselves how realistic it is that such an exchange would indeed take place. A first consideration is that the characteristics of the two parties greatly differ. One party comprises one person only, i.e. the owner of the factory,

and the other party comprises large numbers of fishermen who live in many different villages along the river. The fishermen would need to collect information on the money lost from each one and agree on a joint negotiation position with the factory owner. This is no easy undertaking and the question would be who is going to cover the initial cost of information collection, the development of a joint negotiation strategy, and the negotiation itself with the factory owner? As there are many fishermen, the income each one loses because of the pollution impact may be small compared to these initial costs, and, therefore, no one may come forward to organize the required co-ordination or collective action. But even assuming that a deal can be struck, the fishermen would need to be able to monitor if the factory owner indeed reduces and maintains pollution at the agreed upon level. If he does not, they would need to seek legal action in the court. Even more complicated would be a situation where there are several factories which pollute the river because, in addition to the need to negotiate with several owners, the fishermen would find it very difficult to detect, and single out, a factory which cheats on the terms of the contract.

As this example makes clear, the costs of entering, monitoring and enforcing such a private contract between the two parties can be very high and the incentive structure may be such that it does not occur even though it would be beneficial not only to the fishermen but for society as a whole. It does not occur because of high transaction costs, that is, the costs of entering, monitoring and enforcing the contract. It may also not occur once there are more than two parties involved.

The State is, therefore, required to intervene but it may only do so in response to complaints by the affected people. The political decision-makers may weigh the political costs and benefits of addressing the issue or not.

Assuming that the policymakers find it in their interest to intervene, what kinds of measures could they take? A first requirement would be to acquire information on the costs and benefits (or avoided costs) of different levels of pollution in the river. If complete information can be obtained, the State can set the optimal permissible level of pollutants in the river, by comparing the costs of the different available pollution abatement technologies with the catches and incomes foregone by fishermen at different pollution levels. If there is only one factory, the determination and enforcement of the permissible limit is quite straightforward. The factory would be required to pay for the required pollution abatement technology but may not be asked to pay compensation to the fishermen for the remaining damage. This could be called a weak application of the 'polluters pay' principle.

If there are several factories of different sizes and production technologies, the problem becomes more difficult because the state is now also required to allocate the total permissible limit of pollutants among the different factories. For economic reasons, the pollution should be first reduced by those companies which can do it at lowest cost but the companies may have no interest to reveal this information. To provide an incentive to companies to act according to their real costs, the state could allocate pollution entitlement shares up to the permissible limit on a *pro rata* basis with present individual pollution levels of the companies. The companies are then free to trade in these entitlements. Companies which can reduce pollution at low cost may then find it advantageous to sell some of their entitlements to those companies for which pollution abatement is costly, and vice versa. Such tradeable pollution permits are being applied to certain air pollutants in the USA but generally their use is not very common (Pearce and Turner, 1990). A principal difficulty of such a system is that the State (or regulatory authority) would need to keep track of all transactions and ensure that each company releases pollutants only up to its entitlement. This is particularly difficult, and costly, if there are many companies.

The State could also levy a tax on the pollutants which would provide a disincentive to companies to release them into the water (or air). The tax to be charged per unit of pollutant would need to reflect the value of its damage done. This would be the 'polluters pay' principle in pure form. The difficulty of implementing such a tax system is to accurately estimate the right level of tax, to measure the release of pollutants of each company and to collect the tax. A way to circumvent some of the measuring problems is to levy the tax on inputs rather than directly on the level of pollutants. A tax on fuel, for example, would provide an incentive to economise on the use of fuel which, in turn, would reduce the release of carbon monoxide, carbon dioxide, sulphur dioxide, particulate matter, and other pollutants.

Another measure the State could take is to offer subsidies to those companies which invest in environmentally friendly production technologies. This is a widespread policy measure but its effectiveness depends on the level of subsidy and on the setting of pollution standards which need to be achieved in a specified time frame. Without the latter, there is no guarantee that the companies will indeed reduce pollution to the desired level. Subsidies may be inefficient in the sense that the same amount of financial assistance is offered to companies whose costs in pollution abatement are very different. Furthermore, subsidies may entirely fail to reach their intended purpose if they increase profitability of the activity and attract other companies to commence it. The result could then be that even though each company individually is less polluting, aggregate pollution level actually increases (Pearce and Turner, 1990).

A further measure the State could take (or an appropriate public utility) is to charge a fee to cover the cost of removing the pollutants from the water. It is especially called for in situations where it is more cost effective to construct a central facility for, say sewage treatment, than separate facilities by individual companies or households. The fee is usually set at a level to cover the capital and running costs of the facility. A common system in the case of household sewage is to levy the charge on the amount of water used because the amount of sewage is difficult to measure.

The most common measures how States presently deal with external costs are not based on economic incentives as discussed above. They are largely based on the setting of standards which firms and private households need to follow in their activities. The standards can either be specified in terms of the concentration of pollutants in the air or water (e.g. carbon dioxide per cubic meter of air) or in terms of the applied production or building technology. The former usually are set according to public health considerations and the latter according to the best available technology at affordable cost. On a theoretical level, the setting of standards does not address the problem of external costs in the most efficient manner. The reason is that the same standard is applied to all firms and households even though the costs to reach the required standard is different for different production or consumption activities. Furthermore, the setting of the standard is not directly based on the economic damage caused. For historical, practical and political reasons, however, standards continue to be the preferred measure. Regulatory authorities are used to systems of standards which, in Europe, go back to the formulation of health laws in the nineteenth century (Pearce and Turner, 1990). The political advantage is that standards provide a sense of fairness because they apply to everybody in the same manner. As regards practicality in implementation, the setting, monitoring and enforcement of standards are institutionally well established.

The above measures of how to deal with the problem of external costs attempted to explain the basic principles which may be applied to resolve the often much more complex management problems found in coastal areas. The issues are more complex because many resources are used concurrently in manifold ways. The water in the river does not only provide habitat for fish but also serves households, agriculture, transportation, etc.. Furthermore, the flow and quality of the water is not only affected by industrial companies but also by forestry and agriculture. The

problem of external costs is thus all pervasive and many resource users are concurrently the originators of some externalities and the sufferers of others. Coastal fisheries and fishing communities, however, are mostly at the receiving end and that makes their condition especially precarious.

The basic principles advanced above relate first to the rights of the different users of coastal resources. The rights are usually overlapping, of a customary rather than legal basis, and their specification is subject to continuous change in response to technological, economic and political developments. Some customary rights are amenable to formal legislation but this may not occur without collective pressure being exerted by those claiming them (e.g. the right to the land on which fishing communities reside). Once legalized, rights can become subject to market exchange (e.g. the sale of nearshore fishing grounds by Japanese fisheries co-operatives for land reclamation and development).

Other rights can not be formally legalized for reasons of practicality or costs (e.g. the right to breathe clean air) but they still can be defended and fought for, and can become the subject of compensation when serious harm occurs. They normally can not become the subject of market transactions (but note the opening of commercial oxygen bars in Beijing, China). Legal rights (wrongs) can be established on the principal substances which pollute air or water. The tradability of such rights may be desirable for reasons of economic efficiency.

We have seen that the existence of a tradable right (the fishermen's right to clean river water) is not a sufficient condition to assure that the market mechanism can resolve the problem of external costs. The reason is that the cost of transaction between the two parties may be too high. High transaction costs and the existence of non-tradable rights may require the state to intervene. This it can do through various measures including the legalisation of certain rights (pollution permits) which acquire a price through market exchange, through the levying of taxes or fees, or through the setting of regulatory standards. While the latter is the most commonly applied measure, it is the former which create appropriate economic incentives to internalise cost externalities and which follow the polluter's pay principle. While all measures require adequate monitoring and enforcement mechanisms, present administrations are oriented towards the implementation of systems of regulatory standards rather than systems of economic incentives. However, the countries of the European Union, for example, are moving towards the more widespread application of economic incentive systems to address environmental issues.

What is the Economic Value of Resources?

In the above discussion, we have assumed implicitly that it is possible to unambiguously determine the economic value of resources. We have assumed that either the state or the participants in the market transactions can correctly assess the economic damage done by external costs. This is an oversimplification. Market participants would usually assess the damage on the basis of the benefit they draw from the use of the resource in question. In the case of the fishermen, they would wish to be compensated for the income loss which they incur because of the decline in the number of fishes. Their loss in income, however, is unlikely to amount to the full damage done by water pollution. First, the fish may become carriers of low levels of toxic substances which may affect the health of some fish consumers, if not immediately, then possibly in some distant future. Second, the toxic substances may in the long term affect the genetic capacity of the fish to reproduce leading to the disappearance of the fish the disappearance of the fish stock may, as a consequence, deprive other fish of their food. Fourth, as the fish stock disappears, those organisms which provided its source of food can expand with possible repercussions on still other species.

This simple example demonstrates the difficulties of assessing the full damage or value of resources. These include the tracing of the short term and long term effects of pollution through all layers of complex ecosystems and to make predictions on how future generations may value the resource or an unaltered ecosystem. To the extent that some present or future users of the resource, or of some of its properties, are not participants of present market exchanges, the market price does not provide a correct measure of the economic value of the resource.

Once the market fails can the state replace its function of adequately valuing resources? Yes and no. Assuming a benevolent state which represents the various interests and preferences of its people, then it can at least attempt to account for all the benefits which today's users draw from the resources. To the extent that scientific knowledge is incomplete, the state may apply the concept of precaution as discussed above and include a certain safety margin in its assessment. The final outcome of such a valuation exercise may amount to some kind of compromise between the different values attached to the resources by the various users. Many would feel satisfied with the result while some may feel unhappy with it but nevertheless accept it as a reasonable compromise.

An alternative procedure would be that the valuation process takes place in some forums where people with different interests (or stakes) in the resources get together and express their views on the resources' values to them. Except for very localized and small resources, not all users or beneficiaries of a resource could meet. The different interest groups or stakeholders, therefore, would need to elect representatives who argue their case. To the extent that the information available to the different groups is incomplete and varies across the groups, there is no certainty that the final outcome of such an exercise is the optimal one for society at large. But it may be the only one which is politically feasible at the point in time.

In recent years, the concept of an intrinsic value of resources is gaining increasing importance in Western countries even though the moral and ethical basis for such a concept is well established in ancient religions such as Hinduism or Buddhism. The intrinsic value of resources lies in their real nature and is unassociated with their actual use. The resources have value independently from, and beyond, the existence of humans. Their value is in their own right (Pearce, 1993). While all resources may contain an intrinsic value, the concept is mostly applied to animals, here especially to terrestrial and marine mammals which are genetically closest to human beings.

The setting of any monetary measure for the intrinsic value of resources is almost a contradiction in itself. Nevertheless, some economists suggest that the total economic value of resources comprises the aggregate of the actual use value, the option value (i.e. the possible present or future use) and the intrinsic value (or existence value).

How to Deal with the Problem of Uncoordinated Exploitation of Common Resources?

We have presented above the problem of the occurrence of cost externalities in the case of the exploitation of a common resource such as fisheries. We have noted that one of the problems our fisherman faces when other fishermen start exploiting the fish stock is that he is not any more able to judge the cause why the abundance of fishes changes in the water. The reason is

1 Various techniques have been developed to undertake a monetary valuation of resources. These include market approaches (e.g. change in market output; cost of replacing or restoring damaged resources), estimation of household production functions (e.g. avertive / preventive expenditures; travel cost method to assess recreational values); hedonic price methods (e.g. hedonic house or land prices), and experimental methods (e.g. eliciting values through contingent valuation method or eliciting rankings of preferences) (on valuation techniques see, for example, Pearce, 1993).

that the same fish stock is also exploited by fishermen in distant places. If the extension of the fish stock were geographically more confined, say within the fishing ground off his village, he would be able to observe the catches taken by his fellow fishermen and vice versa. In this case, it is not unreasonable to assume that he, as well as the other fishermen, will notice over the years that there is a relationship between their aggregate catch in one year and what they catch in succeeding years. They may also realize that it is economically wasteful to use too many fishing boats and gear. As they gain and exchange this knowledge among themselves, they may realise that it is in the interest of each of them to set some limit on the catch which each should take in a year or season. Thus, they may set some limit each year, and adjust their fishing capacity accordingly, taking into account the amount of rainfall, the onset of the monsoon and other factors which they believe affect the abundance of the fish stock. As they can observe each other's catches, they feel assured that no one takes more than the agreed-upon limit.

This stylized example shows how co-operation may develop in the exploitation of a common resource. The basic principles include the development of an understanding of the human-resource interaction through observation and the exchange of knowledge, a joint decision on the harvesting limit, and the assurance that each one adheres to the decision. In the case of many resources which are used in common in geographically confined areas, especially forest, land and water resources, we can observe that historically such co-operation has emerged without the intervention of an outside actor such as the state. Many of these traditional management regimes were based on much more complex arrangements than indicated above, including specifications when and with what means to harvest, how much to contribute to common tasks, the designation of guards to monitor that all users adhere to the rules, the specification and execution of sanctions for different types of trespasses, and others¹.

Also, in several fisheries, traditional management systems have emerged but, because of the extension of many fish stocks over large geographical areas, the development of an understanding of the human-nature interaction was more difficult. Management measures may have included the protection of juvenile and egg-bearing fish through closed seasons and gear regulations, but they may not have laid down direct limits on fishing effort or on the catch each one can take. The measures rather would have served the purpose to equitably distribute access to the resources, thereby preventing or resolving conflict among the fishers. Indirectly, such access regulations (e.g. zoning and rotation) may have also contributed to limit the overall catch of the group or community of fishers.

Many of the traditional management systems have broken down in the course of commercialization, rapid population growth, and, not least, because of intervention by colonial powers and by states which, directly or indirectly, led to the expropriation of the resources from their users. Only in some countries have states provided legal entitlements to local communities for the use of common resources. More widespread has been the policy to divide up common resources and establish individual rights over their use.

During the last decade, in particular, the awareness, first among social scientists and then governments, has clearly indicated that many common property resources can not be primarily managed through government bureaucracies. The primary reasons for governmental failure or deficiency include the difficulty of acquiring all relevant information for management decisions, the fact that resource users are not, or insufficiently, consulted and, therefore, do not support the management decisions, inflexibility of government staff to changes in

1 Many case studies of traditional management systems are reported in the Proceedings of the Conference on Common Property Resources Management (1986), Ostrom (1990) and Balland and Platteau (1996).

environmental or economic conditions, inadequate co-ordination among the policies of different government agencies, insufficient financial resources to monitor and enforce management decisions, and corrupt practices. In spite of failures and deficiencies, governmental involvement in fisheries management, and especially in the complex management of coastal areas remains indispensable. However, institutional changes have to take place to make government involvement more effective. Some elements of such institutional changes will be presented in the following section. Prior to that we shall present the advantages and disadvantages of different fisheries management techniques.

SECTION III

Fisheries Management Techniques¹

The underlying principles of the various fisheries management techniques are similar to the ones discussed above when dealing with an external cost caused by pollution. In economic jargon, the problem is one of internalising cost externalities. This can be achieved through a tax on fish catches or fishing effort. This method is, however, nowhere used, at least not in isolation. The primary reason for this is that fluctuations in fish abundance call for regulations which have a quick and predictable effect. A tax works mainly in the long run by discouraging overinvestment in fishing vessels but may, in fact, be counterproductive in the short run by enticing fishermen to work harder to make up for the income lost through the tax. It should be noted that a subsidy, often requested by fishermen once the fishery hits a crisis, has the opposite effect. It encourages further investments in redundant fishing vessels and gear.

In some cases, fisheries have been regulated through the setting of a total quota. Once the aggregate catch of the fishermen reaches the total quota, fishing needs to be suspended. While a total quota may adequately protect the fish stock from overharvesting, it leads to a wasteful race among fishermen to take as much as possible before the quota limit is reached. As a consequence, investment and operating costs are wasted as fishermen buy larger boats and more powerful fishing equipment, and their number gets ever larger. In the US Pacific halibut fishery, this regulation led to a situation where fishing capacity became so large that the fishery needed to be closed sooner and sooner in the year until it remained open for just a few days in a year.

One way to overcome the economic waste associated with a quota system is to divide up the quota into individual shares and allocate them to the different fishing vessels. Various criteria could be applied for this division including the past catches by the vessels, the dependency of the fishermen on fishing income, and others.

Some mechanism would need to be established to allow for the transfer of quotas. One mechanism is through market exchange. Fishermen can buy and sell quotas. This would allow more able or efficient fishermen to buy quota from less able fishermen with the result that the fish can be produced at lowest cost. Fishermen may, however, be forced to sell their quota not because they are less able but because of their inability to obtain a loan from the bank with which to bridge a period of bad luck. Even if they are not strictly required to sell their quota for economic reasons, they may do so because of an irrational emphasis on the short term benefit of such a sale. Once sold, they may not be able to purchase a quota again and are forced to cease fishing.

1 This section draws partly on the lecture notes of Roegnvaldur Hannesson prepared for an FAO/China training course on fisheries management. See also Hannesson, 1993.

Quotas may be transferred through a government agency, such as the fisheries department. Once a fisherman needs to give up fishing, say because of old age, the quota is returned back to the fisheries department which then can allocate it again. In this case, the fisherman may not receive any financial compensation and the fisheries department would need to decide to whom to allocate the quota. It could auction it to the highest bidder which again would favour fishermen with own financial means and / or access to credit. It could also base it on some other criteria such as the need to support poorer fishermen. If no transparent mechanism of quota transfer has been laid down, this may give rise to corrupt practices.

Quotas may also be transferred through inheritance. This may create problems when a fisherman has no son at all, no son who wishes to become a fisherman, or several sons who cannot agree among themselves who should obtain it. In the first two cases, the fisherman could be forced to forego his quota and return it to the fisheries administration. In the latter case, the quota may not be big enough to support all his sons. In this case, one son may come forward to pay the others some amount of money in exchange for receiving the entire quota.

Whatever the system of quota transfers, it is likely that it will involve some monetary exchange because the quota has a value. This monetary exchange can be transparent through a market mechanism, or non-transparent which may then give rise to corrupt practices.

A principal problem of individual quotas, similar to individual pollution entitlements discussed above, is that there needs to be an effective mechanism to monitor that no fisherman takes a bigger catch than his allocated or acquired quota. This is an exceedingly difficult task in a fishery with large numbers of fishing boats and fishermen, who land their catches at many different landing places along the coast. A quota system is easiest to enforce when there exists either a situation of a geographically confined fishing ground exploited by fishermen who can observe each other's activities, or a situation where fishermen need to land their catches in a few harbours even though their fishing operations may extend over a vast area.

A further problem of individual quotas is that it may encourage the so-called highgrading of catches. This occurs when there are price differences between different sizes of the same species, say a low price for small fish and a high price for large fish. Fishermen may then have an incentive to throw away their catches of small fish and keep and land only the large ones with the higher price. This problem could be overcome by specifying the quota in value terms rather than in quantity.

Another criticism of individual quotas is that they lead to the privatization of fishery resources which gives rise to the concentration of quotas in the hand of a few powerful companies or individuals. This is not a problem specific to fisheries but occurs with all types of resources for which private property rights exist or are created. One way to deal with the concentration of ownership is to set a limit on the amount of quotas one company or individual can acquire. This has been applied, for example, in New Zealand. Quota transfers can also be made subject to certain criteria. In Iceland, for example, quotas can be transferred freely between active fishermen (those owning and operating a fishing vessel) while transfers which involve fishing companies need to be approved by the fishermen's union, and those which involve transfer between regions need to be approved by the local authorities. The latter's rationale is to protect the interests of regions whose economies depend greatly on the fisheries sector (FAO 1996). A problem with transfer regulations is that they may not be easy to enforce in all situations. For example, another person or company could be employed to illegally hold quotas on one's own behalf.

Not least because of the above issues, the allocation of transferable quotas to communities or groups of fishers is increasingly being considered by governments. This would have the

advantage that the fishers themselves can decide on the criteria of quota transfers and how to allocate the quotas among themselves.

An alternative technique of fisheries management is to control the amount of fishing inputs such as boats, engines, nets, hooks, and other equipment as well as the frequency and intensity of their use. All of these inputs, as well as the number of employed fishermen contribute, to the generation of fishing effort, which, in turn, results in the catch of fishes. Fishing effort, thus, has multiple dimensions and this characteristic is the primary reason why it is difficult to effectively control it in the long term. In the short term, the intensity of use of an existing fishing fleet can be quite readily limited by, for example, restricting the number of days it can operate.

Long-term effort control typically takes the form of licences. To be effective such licences would ideally need to be quite detailed. Licensing boats, for example, without any further qualification is not a very effective means of controlling fishing effort because one could replace one's old boat with a new one which is twice as large and can carry more fishing gear. Experience with management schemes based on effort regulation show that fishermen are exceedingly inventive in circumventing those dimensions of fishing effort which are subject to regulation. Lastly, detailed specifications of licences run the risk of freezing the technology and prevent desirable technological progress.

The attractiveness of effort controls is that they are easier to enforce and this is the primary reason why they are more widespread than quota systems. Licences can also be made transferable for the reasons discussed above and with the same caveats.

A third technique of fisheries management is to establish territorial use rights (TURFs) which are held in common or individually (Christy 1983). Because of the fugitive character of fishery resources such use rights have their limitations as far as preventing overexploitation of the resources is concerned. Only for sedentary species, or species that are geographically relatively confined, would such rights imply an effective command over the resource. On the other hand, such rights can be important and instrumental in preventing gear collision and other user conflicts, as the distribution of fish is often patchy, even if they move around.

The attractiveness of territorial use rights is that they confer management responsibility to the local communities who then, like in a traditional management system (or based on it), can make their own decisions on how to distribute access to the resources, which management technique to apply, and how to monitor and enforce the system. More importantly, the local communities can decide which objectives the management measures should achieve. These may not primarily relate to economic efficiency but to equitable and fair distribution of benefits and a guaranteed minimum income to every person or household¹.

The difficulties in implementing a system of territorial use rights include the delineation and enforcement of territorial boundaries, the determination of the membership of the user-groups, and the laying down of the rules which govern the decision-making process within the groups. A further difficulty is to equip the groups with the means and information needed to effectively manage their resources. In all these tasks, they may need to receive external assistance either through the state or through non-governmental organizations. The Philippines is a good example where the government and non-governmental organizations are extending assistance to municipalities to implement community-based fisheries management schemes. Many of the

1 See John Kurien (1996) for an excellent account of the special issues and requirements in the management of small-scale fisheries in developing countries.

existing schemes have included the setting-up of fish sanctuaries where no fishing is allowed and adjacent buffer zones where fishing is restricted to certain types of gears and seasons. The objective of these special fisheries management areas is to ensure undisturbed reproduction to at least a part of the fishery resources, and to protect sensitive reef ecosystems. An implicit, and in the long run perhaps even more important objective, is that it can instill a sense of communal care and responsibility over the resources. This may then provide a basis for the establishment of more complex management measures in the future.

SECTION IV

Fisheries within Coastal Area Management: Some Lessons

There are few coastal area management schemes where fisheries are not considered but often with an emphasis on the management of fishery habitats rather than the regulation of fishing effort or the establishment of quota schemes. The reasons are quite clear: fisheries are often an important economic sector in the coastal zone and fishing communities reside therein. More importantly, fishing communities are often the most seriously affected segment of the coastal population by detrimental environmental effects and spatial competition with other economic sectors. However, there is the paradox that as other economic sectors expand in the coastal area, thereby often worsening environmental degradation and spatial competition, the relative economic importance of fisheries declines. This often weakens the influence which fisheries sector institutions can muster in policy decisions.

In Trinidad, for example, the role of fisheries in terms of its contribution to national income and employment is minimal compared to that of other sectors in the coastal zone (in fact the whole island can be considered the coastal zone). Here, a coastal management process could not be headed by the fisheries department even though the latter has taken the initiative of such a process. In Sri Lanka, on the other hand, where fisheries play a relatively more important role in the coastal area, the management programme was initially within the ministry responsible for fisheries, even though the main concern was coastal erosion which threatened wider interests than fisheries. In the Maldives, integrated reef resources management has also been initiated by the ministry responsible for fisheries but tourism interests clearly also weigh heavily.

In the United States, which promulgated a coastal zone management legislation in the early 1970s, while fisheries management measures, such as effort regulations and quotas are normally not dealt with in the coastal zone management programmes of the various states (they are handled through regional fisheries management councils), fisheries benefit from measures to maintain sensitive coastal ecosystems and measures to limit and reduce water pollution. According to the US Coastal Zone Management Act, the coastal management programmes (CMP) of the federal states must include the following: (1) an identification of the boundaries of the coastal zone subject to the programme; (2) a definition of what constitutes permissible land and water uses that have a direct and significant impact on the coastal waters; (3) an inventory of the areas of particular concern; (4) an identification of the means to exert control, including a list of relevant legislation; (5) broad guidelines on priorities of uses in particular areas including specifically those of lowest priority; (6) a description of the organizational structure proposed to implement the program, including responsibilities and inter-relationships of local, area-wide, state, regional and interstate agencies in the management process; (7) a definition of the term beach and a planning process for the protection of, and access to, public beaches and other public coastal areas of environmental, recreational, historical, aesthetic, ecological or cultural value; (8) a planning process for energy facilities likely to be located in, or which may significantly affect, the coastal zone; and (9) a planning process to assess the effects of shoreline erosion, to study, control or lessen the impact of erosion, and to restore areas adversely affected by such erosion (quoted in Boelaert and Suominen, 1994).

For legal reasons, the seaward side of the coastal zone is not comprehensively covered in the US coastal zone management legislation. Coastal states' ownership rights are restricted to the submerged lands and resources in the zone extending three nautical miles from the shore; hence, this is also the maximum seaward boundary of the states' CMPs (Boelaert and Suominen, 1994).

The definition of geographic boundaries of coastal zone management programmes can have important implications for the degree to which fisheries sector interests are recognized, or can be defended, in the management process. Programmes which do not include the seaward side may fail to effectively protect sensitive near-shore fish habitats and nursery areas, and may fail to acknowledge, and possibly legalize, the customary territorial rights which fishers have in the sea. These may be infringed upon by tourism activities, oil and gas installations, etc. Programmes which are confined to a narrow landward boundary may fail to address some significant adverse impacts on fisheries, such as logging in watershed areas, upstream alterations of rivers, etc. On the other hand, the more far-reaching the programme, the smaller could be the relative weight of fisheries interests in the decision-making process.

In the Philippines, fisheries sector institutions and fishing communities play a major role in coastal zone management programmes even though the co-ordination is done largely through intersectoral agencies, such as the National Economic and Development Authority and the Department of Environment. As broad government responsibilities have been decentralised and delegated to local municipalities, in those where fishing communities make up a large percentage of the population, these can exert significant influence. The problem is here, as in many other countries, that the interests of small-scale and large-scale fishermen are often in conflict, and local level interests can be overruled through forces from the centre. Nevertheless, the degree of decentralization and delegation of management authority needs to be an important consideration of any demands fisheries sector participants (such as fishers' organizations) may make on the institutional structure of coastal management programmes.

An important lesson from these examples is that the earlier on in the development process fisheries sector institutions take the initiative to begin, or head, a process of coastal zone management, the more influence they can exert on the nature of future developments. In this regard, an important principle stated in the coastal zone management legislation (or policy) of some countries is to give priority to coast-dependent development. The application of this principle provides a first rationale for allocating scarce coastal resources by giving added weight to uses (or sectors) which, by their very nature, are dependent on inherent attributes of the coastal zone. Fisheries and fishing communities clearly fall within this category whereas many activities of other sectors may not.

Once complex intersectoral management problems arise in the coastal zone, and fisheries play a less important role, the influence of fisheries sector institutions may depend on the kind of alliances they can create with other sectors or segments of the population on issues of common interest. For example, the interest of preserving sensitive ecosystems within the coastal zone such as mangrove forests or wetlands, may be shared between fishing communities and nature conservation groups and opposed by aquaculturists and land developers. The interest in curtailing water pollution may be shared between fishers, the tourism industry, and the public at large but be opposed by industries. On the other hand, fishers and tourism operators may oppose each other in the allocation of coastal land and nearshore waters.

The establishment of alliances requires that fishing communities turn around and look towards the landside of the coastal zone. This comes quite naturally to the women who have manifold interactions on land. For fishermen, though, such a re-orientation of their outlook may not come about easily. One way this certainly can be enhanced is to make it mandatory that organizations

and communities of fishers are represented in any advisory committee or process of public hearings or consultations which governments may set up for the purpose of coastal management. Intersectoral committees, public hearings and consultations are basic features of many coastal zone management programmes and, indeed, they are indispensable.

Government fisheries agencies also need to change their orientation. They need to develop more interest in what other sectors are planning to undertake in the coastal zone. They, furthermore, need to develop or acquire more expertise to be able to evaluate the consequences of these undertakings on the fisheries and fishing communities. In Trinidad, for example, until recently, the fisheries department was not consulted, as a matter of course, for the planning of large coastal developments. It was not separately listed as one of the agencies required to review and comment on the environmental impact statements prepared by the developers of the projects. Its involvement in the development of a land use plan was minor, at best. This is typical for fisheries administrations in many countries. A notable exception to the above is, for example, the creation of a Department of Conservation and Fisheries within the Ministry of Natural Resources and Labour of the British Virgin Islands. The mandate of this department is far more comprehensive than typically observed with fisheries administrations, and includes (1) environmental planning and application review; (2) environmental monitoring; (3) beach maintenance and management; (4) fisheries management, development and extension; (5) environmental awareness and education; and (6) surveillance, enforcement and legislation. This wide mandate is obviously due to the fact that the marine environment plays such an important role for the islands' well-being. On the other hand, it does not appear unreasonable to suggest that wherever coastal fisheries are an important sector, fisheries administration should have a say in all of the above functions as they apply to the coastal zone.

Conclusion

The intricate management issues in the coastal zone are caused by complex human-nature interactions, multiple and interdependent resources use patterns and market failures. These arise because of (1) the unregulated or uncoordinated use of State and common property resources, (2) absence of well-defined property rights over coastal resources, or impossibility or undesirability of their definition and enforcement and (3) high transaction costs. The State is therefore required to intervene. The nature and institutional arrangements of such intervention will greatly impinge on fisheries sector interests, especially those of coastal fishing communities. Management measures based on economic incentives will often be more effective and efficient than regulatory standards but may have undesirable distributional consequences. Community ownership or use rights may offer the best opportunity to combine efficiency and equity objectives.

From a fisheries sector perspective, the most desirable features of a coastal zone management programme include (1) a decentralized and participative decision-making process giving priority to coast-dependent sectors, such as fisheries, (2) geographic boundaries that encompass all areas and sectors which have, or may in future have, a significant adverse impact on fisheries, and all areas over which fishing communities have customary claims over resources use, (3) the widespread application of the principles of precautionary and preventive action and of related management tools, especially EIAs, (4) the proper valuation of resources taking into account all present and future uses as well as their contribution to maintaining basic ecosystem functions, and (5) a significant involvement of governmental and non-governmental fisheries agencies in planning and implementation.

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PRESENTATION 3

Industrial Fisheries and Aquaculture

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Introduction

Industrial fisheries and industrial aquaculture have been occupying space in the media, in sharp disproportion to their small share of between five to seven per cent of global food production. More than the good prospects, it is the problems surrounding the social and ecological disruptions caused by these activities which have caught the attention of the media.

It needs to be reiterated that fisheries and aquaculture are activities which were undertaken by rural communities in Asia from time immemorial, as a source of food and livelihood. What is new and radically different is that, today, we have a sector of the economy where these very activities have been totally commodified, industrialized and marketized for no other purpose than the rush to make quick, easy super-profits. Every other consideration is relegated to the background.

An exhaustive analysis of the social and ecological costs of industrial fisheries and aquaculture, even restricted to one region or country, would essentially be an exercise in saying what has already been said several times over by several persons. Those who wish for details should refer to some of the references which are listed at the end of this paper. It would be, however, useful to highlight some of the common features of industrial fisheries and industrial aquaculture activities, the interrelations and one possible alternative to these activities in the South Asian region.

Common Features

1. Both industrial aquaculture and fisheries must essentially be seen as a part of the process of short-term 'parking' of international capital, in a specific location, for a short duration of time during the race for profits.

The talk of increasing food security, technology transfer, earning foreign exchange for the host country and utilizing skilled manpower are all but alibis. The main purpose behind the concerted efforts by international capital to invest in industrial aquaculture and fisheries is the pursuit of profits. Having elsewhere ruined the coastal zones and the marine ecosystems by adopting what has come to be called the 'rape-and-run' policy, capital is in search of virgin territories. The coastal zones of South Asia and the waters of the Bay of Bengal and Arabian Sea are its most recent victims. These untiring efforts of private international capital are bolstered by the multilateral lending agencies, like the World Bank and the Asian Development Bank, which influence governments and thus legitimize these exploits.

2. They were started largely under export-orientation regimes and, more recently, under liberalization initiated under Structural Adjustment Programmes (SAPs).

In most developing Asian countries, the promotion of industrial fisheries and aquaculture was undertaken as part of the overall package of Structural Adjustment Programmes recommended to countries which found themselves in the debt trap. These were two activities which were considered to be attractive for the new genre of national and transnational investors and

agencies seeking avenues for high profits. Since these activities were promoted under SAP, they were 'cleared' with haste by the respective government agencies, without the necessary social or ecological audits. The low gestation period of the investments and the foreign exchange earning potential of the outputs, provided the rationale both for the haste of approvals and the easy flow of capital into these activities.

3. They are sustained by the international demand for luxury protein, pet foods and animal feeds.

Industrial aquaculture and fisheries are sustained by the insatiable demand for luxury protein and high-income health consciousness. The US became an avid shrimp consumer after World War II. Japan was traditionally a large shrimp consumer. The European Union and Scandinavian countries are later entrants. The rising incomes in many of the Newly Industrializing Countries (NICs) is the latest source of demand. The successful marketing of the black tiger shrimp, and the ability of this species to tolerate low salinity, make it amenable to land-based culture across a broader spectrum of sites. The post-1985 growth of industrial aquaculture in South Asia can be attributed to the above inter-related facts. Greater unexploited stocks of certain high-value tuna species in the Indian Ocean region have been an important attraction for industrial fishing operations in the South Asian region.

Industrial fisheries is additionally sustained by the expanding demand for pet food and animal feeds. The fact is that cats and dogs in the US have greater purchasing power than people in developing countries. A significant share of the industrial tuna fishery is destined for the sophisticated and rapidly growing pet food market in the US and Europe. Much of the harvest of industrial fishery operations are also converted into feeds for chicken, hogs and cattle. Fishmeal has an 'Unidentifiable Growth Factor', which quickens the growth process of poultry, hog and cattle, providing an important profitability consideration in these commercial livestock-raising industries. This gives fishmeal an edge over other substitutes like soyabean meal as a crucial additive into poultry and animal feed.

4. They expand spatially because of an 'enclosure movement', where large areas of State property are turned into virtual private property, ignoring the historical usufruct rights of local communities.

The promotion of industrial aquaculture and fisheries has resulted in substantial changes in the customary institutional arrangements which intervened between people and natural resources. Large tracts of coastal lands and expanses of open sea, which were under the de jure control of the State and/or having some customary historical rights of access to local communities, are being handed over to industrial interests to raise shrimp or harvest fish. This has created the beginnings of a modern enclosure movement, pushing out from the coastal lands and offshore sea, persons who had traditionally made a livelihood from these natural resources.

5. The ownership is controlled largely by those unconnected to persons/groups traditionally involved. They give it a different set of values and adopt a larger scale of activity.

Traditional, small-scale aquaculture and fisheries was pursued as an avenue for livelihood by certain coastal, rural communities. Industrial aquaculture and fisheries are largely owned by local and national elites and multinational investors totally unconnected to those traditionally involved in aquaculture and fisheries. These new investors have greater access to the knowledge and capital necessary to adopt new technologies. They also have the political clout and access to institutional financial resources, which are normally out of reach of those traditionally involved. This ingress of new capital gives these erstwhile low social status activities a 'new respectability' which normally accompanies pursuits that yield super-profits. The activities are undertaken by a small number of corporate concerns, using highly capital-and energy-intensive technologies, largely inappropriate to tropical ecosystems. Once the process starts, it gets 'locked in' to a constant intensification process.

6. *Investments get intensified by a process which is fuelled largely by industrial interests other than the direct investors.*

Investors making the direct investments have a natural stake in making good their sunk costs. The process of intensification of the investments, both in industrial aquaculture and fisheries, though initially a function of short-term super-profits, is soon bolstered by other interests. In the case of industrial aquaculture, it is the feed, hatchery and aquafarm equipment companies which hold the key. In the Asian context, these transnational companies are based in the higher income Asian countries, where they have been significant contributors to the 'boom and bust' of aquaculture. Fuelling and intensifying aquaculture investment in other countries of the region is a *sine qua non* for their own continued profitability and existence.

In industrial fisheries, it is the companies manufacturing the instrumentation and processing equipment fitted on board the fishing vessels which spur investments, promising more efficient means of harvesting and storage. These are multinational firms based in temperate water countries, where industrial fisheries have been in the doldrums, following the depletion of many fish species in those waters. The initial movement of the redundant capital into new ocean territories off developing countries, in the form of fishing vessels, is often assisted by bilateral aid programmes. This is quickly followed by the private investments of the hi-tech equipment firms.

7. *Employment generated in direct activity is small and the conditions of labour leave much to be desired. Added to this, considerable labour displacement takes place.*

The direct employment generation prospects of both industrial aquaculture and fisheries are small, due to the high capital and technology intensity of the activities. A less known fact is that the work and employment conditions of this small labour force is often deplorable. International Labour Organization labour standards exist for crew aboard industrial fishing vessels, but are rarely practised aboard vessels operating in Asian waters. The sordid conditions of the deck-hands and semi-skilled crew often become apparent only when industrial fishing vessels from neighbouring countries are arrested by the coast guards for poaching.

In industrial aquaculture, the concerns have centred around the problems of the labour displaced in the lands occupied by the aquaculture farms (see below). Little attention has been paid to issues like fair wages and health hazards by those directly employed on the aquafarms.

8. *They pose a threat to existing patterns of food production, which imply a direct threat to national and local food security.*

Industrial aquaculture and fisheries, by their very nature of activity, displace others involved in small-scale, domestically oriented food production. Industrial aquaculture is responsible for initially displacing paddy production activity along the coastal zone by competing for, and sometimes usurping, the same plots of low-lying lands. Subsequently, after a few years of shrimp farming, the aquaculturists may leave the area, as a result of declining productivity and / or spread of disease having affected their profits. The land left behind is useless for any agriculture operations because of the ruining of the soil by salinity and toxicity. The groundwater is depleted and what little is left is polluted. Such lands could take decades to regain their original conditions, if at all, leaving behind neither paddy nor prawns.

Industrial fisheries is normally assigned to fish in the deeper waters to avoid competition with coastal fishery operations. However, the highly dispersed nature of fish in the deeper waters and the lower market prices for most of them, induce these operators to head closer to the coast in search of quicker, easier and more valuable harvests. The result is direct and unequal competition between small-scale coastal fishworkers using small, selective, passive, seasonal fish harvesting equipment, which net smaller quantities of fish. These fishers land their harvests in widely dispersed areas and the product moves to domestic consumers, largely in the fresh

or iced form, without excessive or unnecessary value-added processing. This ensures that the product is within the purchasing power of consumers in the rural hinterlands. The large-scale harvesting operations of industrial fishing vessels, on the other hand, are more centralized, as they land in big ports and thus give rise to economies of scale for high-tech processing. Such forms of value addition, in turn, divert the end product to markets with higher purchasing power. This deprives lower income domestic consumers of fish, due to scarcity and higher prices.

Even if industrial fishery operators restrict their operations strictly to the deeper waters, they can still affect the coastal fishery because of the inter-related nature of fish stocks in the ocean. Excessive harvest of a species in the outer sea, which, at some stage of its life, spends time in the coastal waters, can ruin a coastal fishery which caters to local consumers. Complex prey-predator relationships between species that straddle to and from coastal waters imply that the overharvesting, or even underharvesting, of one can affect the dynamics of the other.

9. They jeopardize the right to work and livelihood of coastal agriculture and fishing communities.

The process of hampering domestic food production goes hand in hand with jeopardizing the right to work and livelihood of coastal communities. In this context, the coastal fishing communities are literally caught between the devil and the deep sea. Industrial aquaculture affects them from the landward end by physical displacement, restriction of access to the sea, and pollution of inshore waters. Industrial fisheries closes in from the seaward side by competing often for the same fish stocks and ocean space.

Owners of large tracts of coastal agricultural lands often sell their land to the industrial aquaculturists because of the attractive prices offered. Those who earn a livelihood from the land often resist selling. However, they soon find themselves surrounded by the 'enclosure movement' and are then forced to sell, often at distress prices. Since these lands in the coastal tracts were used for paddy cultivation or salt production, a large number of labour households are also deprived of their only possibilities of wage labour. (Industrial aquaculture has a very low labour absorption capacity—one to two persons per hectare, compared to at least about five times that in agriculture.) The loss of work and livelihood also soon spreads to areas which have not been taken over for aquaculture. This happens because irrigation channels and groundwater utilized by those around the aquafarms get polluted by the wastes from aquaculture operations. The negative effects of these 'downstream unidirectional externalities' are not directly compensated by the aquafarm operators in any way. The impact of these effects on the health, work, livelihood opportunities and larger welfare of coastal communities is, therefore, substantial.

10. Ecological self-destruction is built into their systemic functioning.

The very nature of functioning of industrial aquaculture and industrial fisheries creates a cycle of self-destruction. In aquaculture, this takes two routes: the first is caused by the destruction of the mangroves, which are the habitat of the juvenile shrimp fry which, in turn, are one of the basic inputs for the industry. The second route is via raising stocking densities in the farms in the race to raise productivity. This requires increased inputs (feeds, antibiotics, etc.), which give rise to increased wastes and greater scope for virulent diseases that virtually wipe out the industry, as has happened in many countries. This is the familiar 'boom and bust' phenomenon which, in industrial aquaculture, seems to come in cycles of five to 10 years.

In industrial fisheries, the self-destruction is via the compulsion of overfishing, given that investors want to 'fish down the food chain.' The vast territory of operation, the greater mobility and the fact that direct observation of the marine ecosystem is difficult, tend to make the ecological damage invisible, until too late.

What is important to note is that it is the industry in the specific location which is destroyed—the facilities, the people directly and indirectly involved and the ecosystem. The capital and the capitalists who initiated the process in the location just leave to another to commence another cycle of accumulation for themselves. It is ruin for all else.

Inter-relations

The common factors listed above highlight some of the similarities in the socioeconomic and ecological processes between industrial aquaculture and fisheries. In the context of the coastal zones and marine resources of developing Asian countries, where the industrial aquaculture and fisheries thrive, there is one strong inter-relation between them that link their futures: the feed for the shrimp and fish raised in the aquafarms are primarily the harvest of industrial fisheries.

It is well known that cultured shrimp and fish grow best when fed food with an amino-acid composition similar to their own. Feeding fish with fish and shrimp with shrimp in order to feed humans is no way to achieve food security. Shrimp from intensive aquaculture farms are fed about two to three times their harvested weight. Consider the high total energy cost of producing this feed (ships, nets, processing, transport, etc.). After all this, only a fraction of the protein is effectively used. Eighty per cent (which would be perfectly acceptable for human consumption in its original fresh form) is sacrificed in the transformation process into an expensive luxury protein, which only a few people can afford.

Several observers have pointed to the 'fishmeal trap' facing industrial aquaculture in the near future. Consider these figures. In 1988, global shrimp aquaculture consumed 180,000 tonnes of fishmeal derived from an equivalent of 630,000 tonnes of wet-weight fish. It is further estimated that by 2000, about 570,000 tonnes of cultured shrimp will be produced in Asia. The feed requirement for this will be of the order of 1.1 million tonnes. This is equivalent to a staggering 3.85 million tonnes of wet-weight of fish—more than double the total marine fish harvested in India today. For fish to be used as fishmeal, it must be caught in large volumes and landed in centralized places to facilitate bulk transportation and quick processing. A corollary of this is that fish for manufacture of fishmeal must be harvested using nets which are capable of scooping up large quantities from the sea—trawls or purse-seines—both of which are used on industrial fishing vessels. These fishing gear are notorious for their ability to ruin the demersal marine ecosystem (in the case of trawls) and result in species genocide by netting whole schools of pelagic fish (in the case of purse-seines).

The crucial link between industrial aquaculture and industrial fisheries is thus evident. The insatiable demand for luxury proteins—particularly shrimp—provide the effective demand for high-quality, high-protein fish feeds for which there is yet no substitute other than fish. Large-scale fishing for the stocks of the presently unharvested, demersal and meso-pelagic fish found in the offshore marine waters will thus become economically viable. The ecological impact of such fishing on the stock of the coastal and the deep-sea migratory fish stocks is yet unclear. However, in the short run, the competition which this will create with an expanding coastal fishery is bound to result in physical conflicts at sea and social conflicts on land. In the long run, this excessive harvesting will undoubtedly result in the ruin of the offshore marine ecosystem and the industrial fishery which exploits it. There is thus an inevitable and inextricably intertwined catastrophe facing both industrial aquaculture and industrial fisheries.

An Alternative

The compulsions of globalization and liberalization, imposed upon and accepted by, countries in developing Asia will certainly continue to provide the basis for the expansion of industrial aquaculture and fisheries. Footloose capital in search of investment opportunities which are not curbed by strong regulatory frameworks of the nation State in the form of environmental

or management norms will find in Asia several opportunities for temporary parking. The only factor which will stem this tide will be adversarial collective action by those adversely affected by these activities. This will also have to be linked to pressure from watchful and conscious elements in civil society, who can see the social and environmental abyss which lies beyond the short, steeply rising hillock of promises to earn foreign exchange through shrimp and fish production. The growing opposition from these quarters to both industrial aquaculture and impact of slowing down the pace of growth of these activities. The response of the State in most countries has been to initiate the process of enacting a legal framework for regulation of the activities such that the negative externalities will be minimized. Nowhere has there been a decision to put an end to these activities and search for alternatives.

However, an alternative already exists in the form of the existing (but often declining) traditional, small-scale, coastal aquaculture and coastal fishing operations, which are presently carried on by millions of people in South Asia. These coastal communities, which are today facing the threat of displacement and loss of livelihood, are the human foundation on which an alternative should be built. The numerous low-lying inter-tidal coastal zones and the inshore seas are the ecosystem foundations on which this alternative should be based.

Just consider shrimp, which is the subject of so much controversy in relation to both the issues of industrial aquaculture and industrial fisheries. Here is an animal which, in the course of its short life cycle, spends time in a range of habitats, from the bottom of the continental shelf in the inshore sea through the upwelling zones of the coastal waters to the mangrove and estuarine areas of the coastal zone. An integrated approach to sequential harvesting of shrimp, which ensures that none of its important habitats is polluted or depleted, points to the optimal strategy for obtaining sustainable levels of output. This will be possible if we have in place a judicious combination of (i) a shrimp/rice aquaculture in the inter-tidal coastal zones with a minimal input of natural manure to fertilize the ponds and (ii) a seasonal, coastal upwelling and demersal fishery using small, selective bottom-set drift-nets and trammel nets. Undoubtedly, the bulk of the harvest will be from the latter source. The implication is that both industrial aquaculture and industrial fishing for shrimp must cease, because they do not result in any net addition to the protein or energy balance of the global food system. On the contrary, they create profits for a few and ecosystem damage for all.

The prime aspect of the alternative is to support the cause of the small-scale coastal marine fishery and actively promote its use of harvesting techniques which do not distort ecosystem dynamics. In a sense, it is going back into the future. The experience with industrial aquaculture has highlighted many features of shrimp which go to support the ecological soundness of the proposed alternative: they prefer the natural foods found in the sea; the taste of shrimp improves significantly with increasing salinity; and, they are not prone to disease in their natural saline milieu. These important facts must now be used to 'advertise' the rationale for supporting the small-scale, coastal marine fishery as the future mainstay for shrimp production.

To make this a reality, we must ensure two things: (i) we must bring together the people's movements opposing industrial aquaculture and industrial fisheries in Asia and the rest of the world to work in close co-operation; (ii) we must also ensure broad consumer support in the First World, which will demonstrate a preference for such shrimp, while boycotting shrimp produced in industrial aquafarms or caught using fishing trawlers.

Conclusion

Fisheries and aquaculture, as it is still largely practised in developing Asia, are two of the small but principal ways of food production which continue to depend significantly and directly on natural ecological processes and fluctuations. Human-induced interventions and controls are

necessary to enhance the output of food from these sources. However, when such interventions deform the flow patterns of energy and matter into these natural systems beyond a critical point, they ultimately cause dangerous distortions which result in severe social and ecological problems. To avoid such outcomes, we need to harmonize our strategies for food production with nature's principles of ecosystem dynamics. This is the only sustainable manner for us to maximize the benefits for as large a population as possible, with the minimum possible negative social and ecological effects.

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PRESENTATION 4

Indicators of Successful Integrated Coastal Area Management Approaches

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Introduction

Integrated Coastal Area Management (ICAM) is an approach to resource management that views the ecosystem as a whole, and human societies as part of the ecosystem. ICAM integrates ecological, economic, and social components to reach solutions to the issues of concern. The five essentials of ICAM are public involvement; a comprehensive ecosystem approach to identifying and solving problems; integration of disciplines, skills and knowledge; decision-making by consensus as much as possible; and flexibility.

ICAM is never easy. It is fair to say that it is a process of change that is full of difficult moments. Even in the most successful programmes. It is also an opportunity to achieve successes in coastal management. Successes that are not possible without the coordination and cooperation inherent in ICAM governance approaches.

Indicators of success in ICAM must be able to depict the many subtle and small steps forward in a long-term incremental process of change. The best indicators are those drawn from practical experience. While ICAM is a relatively new discipline, many programmes have been established for over twenty years and are successfully implementing solutions. Some others are more recent and are in the early stages of establishing adaptive management structures. All contribute to an increasing wealth of experience that helps us better understand effective governance of our actions and interactions in complex ecosystems.

Both failures and successes provide insight into ways to improve ICAM programmes. The indicators described in this paper are analyses of both successful and less successful ICAM programmes around the world. What makes programmes successful? Many inter-related factors determine success. But in all programmes, the most salient factors have been hard work and commitment of the participants, an ability to be open to change, and to sense when to change in order to stay on course. Indicators help provide a compass for the participants of ICAM during the many difficult moments, and milestones for future direction towards achievement of ICAM programme objectives.

The Need for Measuring Success in ICAM

A Long-term Incremental Process

The ultimate explicit goal of most ICAM programmes is a better environment. For example, comprehensive improvements in the health and productivity of the coastal ecosystem and natural resources of a specific geographic area. Improvements in social welfare are also often explicit goals of ICAM programmes, but more often social welfare improvements are implicit goals—particularly in developed countries. However, it is a premise of ICAM that ecosystem and social welfare benefits are mutually beneficial.

ICAM is an approach to achieve these goals. In the process of making environmental change, ICAM drives change within the institutions and the public involved in management. ICAM creates new governance approaches that lead to environmental changes. Environmental indicators tell you if the solutions created under ICAM are working. Therefore, monitoring of environmental indicators is an important part of ICAM—it can tell you how and where to redirect the solutions.

ICAM is a long-term incremental process. It can take ten, or maybe even twenty years to achieve the ultimate goals. Therefore, you just can't always wait to see environmental, social or ecosystem changes to find out if the programme is working. You need indicators along the way to tell you if you are moving in the right direction—indicators of progress in the ICAM governance approach.

An Adaptive and Open Governance Process

ICAM is dynamic by design, it is experimental, it is also a new way of governance for most countries. In some countries and communities, it is a return to the more traditional and practical system of the past, one that was based on the 'ecosystem thinking' approach strived for in ICAM. In either case, it is changing the status quo and requires flexibility.

A successful ICAM governance approach is adaptive to the issues of the area, to the area's culture, political system, and geographic characteristics. ICAM programmes must adapt their own unique structures—they will vary between countries and within countries. The process or approach itself must be open to review and analysis by the participants—to regularly refine the program's design and procedures.

Indicators for Measuring Progress and Success

For this reason, indicators can be broken down into two broad groups: those that show progress within the ICAM structure and governance process, and those that show progress in the outputs of the governance process. The output of the ICAM process is a consensus-based management plan or new set of agreements, actions or solutions to address the problems, and the implementation of that plan. It should be noted that the indicators described in this paper are broad-based. Each indicator can be used to guide further development of a set of parameters to monitor changes and progress.

The two groups of indicators—for the process and the outputs—are closely interlinked and mutually dependent, but it is useful to separate them in evaluating progress to help determine where and how to make changes to continue improving ICAM efforts.

Indicators within the ICAM Management Structure or Governance Process

Early Participation by Stakeholders

Bringing stakeholder representation into the management process early achieves the acceptance of solutions that the stakeholders helped develop. This acceptance will mean they will help implement the solutions too, and can see the results of their work. It builds and sustains stewardship. It also helps to ensure ownership of the programme. They should help in problem identification.

Often, public participation in what has historically been government decision-making is thought to result in an 'unruly' process. However, ICAM offers a highly structured approach to join interests, views, user groups and disciplines while being adaptive to the needs of the community, the culture, and political situation of the country. ICAM efforts may begin with a phased approach. Once countries feel more comfortable with the process, more roles and decision-making responsibilities can be given to the local level. Under an organized structure

of ICAM, public participation becomes a positive force for change—one which helps guide action.

ICAM began from a strongly united local public concern about coastal areas. In the US, it was the public that spurred the government to become more active and accountable in its actions affecting coastal resources. The public determined that not enough was being done about their coastal areas, and assumed an active role in helping to solve problems in the coastal zone. Building the foundation in the US for the now solid ICAM programmes came only after a diligent effort by the public over the course of some years. The effort was non-confrontational but persistent—and has changed government and public thinking about management of coastal resources.

Representation of the 'key' stakeholder groups in the management structure

The 'key' stakeholder groups needing representation on the management structure will depend on the initial issues or problems which are identified in the 'profile' or situation analysis stage of ICAM. These issues must be represented by the affected stakeholder groups. The process must also be flexible or adaptive to be able to add representation of stakeholder groups as the issues change and are refined.

Accessibility and use of sound science and other accurate, timely and relevant information by everyone in the decision-making process and the wider public

Keeping science an open part of the management approach will enable the public to participate in identifying and ranking priorities for action. The management approach benefits in many ways. First, the public is a source of knowledge about the ecosystem and the threats to its valuable resources. Second, the public learns from the scientific findings—they often change their original perceptions of the issues. The public has an important stake in the solutions. They become more aware of the issues and causes through participation in the scientific characterization process. This strengthens their ability to contribute as stewards in management of the ecosystem.

ICAM has successfully bridged the gap in many programmes between scientists, managers and the public. Science under ICAM has to have relevance to the managers—it has to be applied to practical questions of decision-makers. It is not meant for scientists alone to understand. Quite the contrary, it is meant for everyone to use and direct.

Scientists share the early results of their findings under the Galveston Bay National Estuary Programme (GBNEP), an ICAM programme in Texas, US. Yearly "State of the Bay" Symposiums, provide the forum for the wider public and GBNEP participants to comment on the findings, redirect scientific efforts if necessary, and exchange information. This type of public awareness seeks to apply sound science to the problems and issues.

Often, the experimental and multi-sectoral nature of ICAM leads participants towards creative approaches to the use of information for management. An institutional and legal review, combined with scientific characterization, helps to identify causes and effects of the problems, and points participants in the right direction in developing solutions to the problems. In Indonesia, the Directorate General of Fisheries and Bay of Bengal Programme (BOBP) of FAO are conducting an institutional and legal review to identify strengths, weaknesses and gaps in the institutions' ability to address the identified problems of the coastal zone. The review focuses on the institutions with jurisdiction in the project site and the rules by which they are governed. Also included is the informal institutional framework found within the project site. These informal 'community codes' and 'customary laws' are often better enforced than the formal legislation. They offer good insight into potential management solutions.

In the Maldives, the scientists of the Marine Research Section (MRS), Ministry of Fisheries and Agriculture, are working closely with the fisherfolk under the BOBP Phase III project 'Integrated Reef Resources Management' (IRRM) to develop and implement solutions to the identified issues. MRS scientists are learning from the traditional knowledge of fisherfolk, and share their own scientific understanding. Fisherfolk had a big role in identifying the issues to be addressed under IRRM and will have an even stronger role in developing and implementing solutions in the Atoll Area Management Plan process.

In Malaysia, the Department of Fisheries and BOBP are combining fisherfolk knowledge with scientific information—science can verify and bring a better understanding to fisherfolk knowledge and 'lore'. There is often sound scientific justification and reasoning behind customs and lore. Fisherfolk's knowledge can help lead the scientists to a better understanding of how the ecosystem functions and the human impact on the functioning of the ecosystem.

A comprehensive understanding of the issues by the management committee, the government agencies outside of the process, the stakeholders, and the wider public

Scientific characterization of the problems to determine probable causes and effects offers objectivity to both understanding the problems and issues, and development of solutions. People listen to the objectivity of science. When ICAM participants look at an ecosystem's problems, it is not from the view of one pollution problem, nor from one pollution source, but from the multiple impacts of all the human activities.

A comprehensive understanding of the issues is an important and effective element in helping to resolve multi-use conflicts inherent in the coastal zone. The GBNEP ICAM programme used science and public pressure effectively in resolving an important problem. The Galveston Bay has many oil wells and oil processing plants—they discharge 'brine water' which is very harmful to the valuable fisheries of the Bay. The oil companies were a major polluter to the Bay and an important stakeholder to have in the ICAM process. They came into the ICAM process a bit nervously, not wanting to encounter more 'confrontation' than they already had by the public groups, particularly fisherfolk and environmentalists. But they were also eager to change their bad public image. After three years under the GBNEP process, the oil companies voluntarily set zero discharge levels for all their operations in the Bay area.

A combination of factors led the oil companies to set zero discharge levels. First, they wanted to be able to have a voice in eventual decisions that effected them. They wanted to be able to gain the acceptance of their fellow representatives in the ICAM process and the wider public. If they were forced to change their discharge levels either through arbitration or other enforcement actions, they would still have a bad public image. However, the non-confrontational approach of 'partnership' allowed the companies to set a more stringent level than that which would have been imposed on them. They could look better in the public image by making change not after confrontation, (which means they were forced to) but by consensus.

Secondly, GBNEP represented an objective approach that balanced uses of the resource—where they were not 'alone' against the wider public and government regulators but one of several groups that were willing to learn how they could help improve the Bay's ecosystem. The brine water discharges on the Bay, but of overfishing of the shrimp fishery, high occurrence of bycatch in the shrimp fishery, and conversion of coastal habitat for agricultural, urban, industry and transportation purposes. Causes and potential solutions pointed to a commitment for change in actions by everyone, not just the oil companies.

The press and media are important in helping to provide a core comprehensive picture of the issues and ICAM process to the wider public. The press play an important role in leading public opinion. As the 'first reviews' of an opening play can make or break a Broadway show, so does the press affect ICAM. In the Gulf of Guayaquil, Ecuador, before the ICAM program was established, the press polarized the issues—further exacerbating the conflicts. However, after involvement in the ICAM programme, the media learned the depths of the issues and began to portray a clear view to the public. They also wrote about the ICAM process which helped the wider public gain confidence and interest in participating in the approach.

A holistic 'systems-thinking' approach towards management of the issues

An 'ecosystem thinking' approach to problems is the next step of scientific understanding. It is a consideration of ourselves as part of the ecosystem, as stewards having responsibility for the resource and our actions that effect the resource.

As Donald R. Baugh, of the Chesapeake Bay Foundation said of their efforts in a successful ICAM programme in this important Bay "...in order to continue improvements in the bay's water quality, the next phase of the campaign must be bolder, with deeper societal commitment. We have achieved what in many ways is the easiest part of the cleanup, regulating point source discharges. We must now look at changing the way we think and act."

Changing the way people think and act involves creating a sense of stewardship of the resources through awareness and participation in management. Awareness of ecosystem processes and the affect of our actions and interactions is a big part of the content of the public awareness materials ICAM programmes can produce.

An interdisciplinary approach speaks to people of many different backgrounds. While some individuals will understand best from a scientific point of view, others may need a cultural and socio-economic context. People also want to know what the ecosystem is doing for us—and the benefits of managing the ecosystem for sustainability of the resources.

GBNEP applied resource valuation to various uses of the Bay's resources, and found that the benefits of maintaining a healthy environment significantly outweigh the costs of management. Recreational fishing generates approximately US\$790 million in annual revenue (e.g., licences, business profits from recreational uses, etc.). Commercial and small-scale fishing of fish and shellfish brought in more than US\$358 million annually to the Bay. Fisheries and tourism combined generated more than US\$ 8 billion annually in Galveston Bay while the estimated required costs for implementing the GBNEP solutions were US\$2 million.

Determining the quantitative benefits of managing the Pulau Payar Marine Park as habitat enhancement for the conservation and sustained production of the area's reef fishery resources will be an activity under the DOF / BOBP Phase III ICAM project in Malaysia. The project is developing a Special Area Management Plan (SAMP) for the Marine Park and surrounding coastal land and marine areas. Change in the ecological composition of the reef areas and catch of small-scale fisherfolk of the area since the establishment of the Park is being determined under the scientific characterization activities. The draft findings will be presented to the members of the SAMP management committee and wider public. The description of the quantitative benefits will form the basis of outreach materials for fisherfolk and other users of the area's resources.

Involvement of the wider public in ICAM activities and decision making

ICAM programmes need to reach out to the wider public to obtain their ideas and support in developing solutions and actions during the ICAM process. Involvement of the wider public is crucial at all levels (i.e., national, state or provincial, and local) of ICAM. However, direct public

involvement is most important in local level programmes. The wider public will determine the amount of local support for initiatives arising from the ICAM process, largely through votes and public pressure for funding and legislative changes. While stakeholder groups have direct representation in the ICAM process, the wider public must also be involved in ICAM activities and decision-making on important matters. The quality of participation is also very important. A well designed public participation strategy will help ensure active involvement in activities and key decision points in the process. Stakeholders should gradually evolve into stewards of the resources, with purposeful roles and responsibilities in ICAM activities. Measurable indicators could include for example, number of people participating in early actions, management projects and implementation, and number of public-initiated activities that are geared towards helping to resolve the issues.

Keeping the public aware of early results and progress in the scientific work of the management approach helps to maintain momentum and morale during a long-term process like ICAM. Products like fact sheets and public events for implementing a management solution generate feedback from the public.

Habitat restoration was identified as a management solution by the fisherfolk of Phang-Nga Bay's villages and through early scientific analysis results of the Bay's problems under the Community-Based Fisheries Management Project, a DOF Thailand / BOBP Third Phase Project. Thailand is using this opportunity to involve the public in the activity. Mangrove reforestation and seagrass planting by the fishing communities is being combined with informal education about the relationship of fisheries habitat to sustainable fish production. This activity not only gets the wider public involved in an ICAM activity, but also increases public awareness of the importance of the ecosystem, and helps bridge the gap between scientists, government and the public.

One of the best ways to understand something is to get out in the field and get first hand experience—it's remembered. People will protect something they care about and they will only care about something they understand. This philosophy was also reflected by the student recommendations at the IRRM Workshop in the Maldives. They asked for school field trips to the coral reefs, to better understand the reef ecology. They asked to organize environmental Clubs in the schools for holding debates and poster competitions on coral ecology. These activities are a part of effective interactive scientific characterization. They are ways to maintain the 'two-way' communication and active involvement throughout the process.

Clear vision, objectives and priorities for management

ICAM is a planning and management approach to comprehensively address coastal resource issues. It is issue-driven. To resolve the issues of the area, ICAM programmes generally go through a series of methodical phases; problem identification and priority setting, scientific characterization (using social and natural science disciplines), solution development and implementation. All phases are guided by a participatory decision-making body that must set a consensus-based vision, objectives and priorities for what is to be achieved in management of the ecosystem.

The vision or goal could range from maintaining current environmental conditions to restoring the ecosystem to a past and more biologically productive condition. Objectives are consensus-based, specific and shorter-term. They represent ways to achieve the vision of the programme. Setting objectives are a central decision of the ICAM programme, and strongly direct the development and implementation of solutions. Objectives should be quantified. For example, a 70 per cent reduction in nutrient loads by the year 2005, a 10 per cent increase in average size of groupers caught by 1999. These objectives also form the basis of the environmental monitoring efforts during implementation.

Consensus-based solutions to the issues and problems are designed to achieve programme objectives. Solutions are prioritized by the participants. Prioritization is essential to organize the seemingly overwhelming tasks of ICAM. Setting milestones and time frames for implementation of each solution are important. In fact, one way to prioritize solutions is to implement first those solutions that are most comprehensive in design. The most comprehensive solutions will address more than one priority problem and will therefore achieve the greatest benefits.

Effective co-ordination

ICAM programmes must coordinate not only across disciplines and between users of the resource, but also between government agencies. Many of the problems in coastal area management stem from overlapping jurisdictions and mandates of government agencies. Each government agency with a major role in governance of the coastal area's identified issues should be represented along with key stakeholder groups and scientists, on the main decision-making body of the ICAM programme. This helps facilitate coordination between the agencies.

Effective coordination makes government run more efficiently and saves government funds. Agencies often find that their roles can complement each other. Through the process of defining problems, setting objectives, and drafting solutions to the problems, the participants work towards defining clear roles and responsibilities of each agency and stakeholder group. Each action should define the commitments of each agency and funding levels. This builds relations between the agencies as they realize their mutual dependence. It also helps in building consensus within the management body.

A sense of 'ownership' of the programme by all the participants will help ensure coordination. Each agency and stakeholder group should share equally in the achievements of the programme. Achievements should be visible. Newspaper articles that cite agencies active in the programme encourage their continued participation and coordination.

National support of local level initiatives

ICAM is perhaps best demonstrated and most effective in showing tangible effects at the community or local level. However, regardless of each ICAM local programme structure, national level support of its process, solutions, and implementation strategy is essential. You do not want an oil well or a deep sea port built right in the centre of your community-managed fishing area. National level support provides the local programme with funding, legislative backing, and harmonization of policy initiatives. Coordination between levels is best established during the process, to prepare for smooth ICAM implementation.

A local ICAM programme in Buzzard's Bay, Massachusetts, US, found that the national legislation for septic systems was not adequate for the Bay area. Ground water tables in the Bay area are typically very high, as they are in most coastal low-lying areas. Standards for septic systems in coastal areas need to be much stricter than those for inland areas. The Buzzards Bay communities developed their own standards to take into account the high water tables. The state adopted the standards under its Coastal Zone Management (CZM) legislation. This expanded the geographic scope, added enforcement authority and offered incentives for rebuilding old systems to meet the new standards. The national government later used the standards in developing similar national legislation.

National level co-ordination is also crucial in determining the geographic boundary for local management. For example, in developing a SAMP, a community may determine that a source of a problem is in an area outside the state CZM boundary, or that a larger part of the watershed needs protection. The community has several choices. It may ask for support from national programmes to direct their efforts to the source of the problem, and the SAMP and CZM boundary

could remain unchanged. It may also enlarge the SAMP and CZM boundary. For example, Malaysia is considering enlarging the boundaries initially included in the SAMP area under the DOF / BOBP Phase III Project. The project is identifying 'source' reefs¹ outside the Marine Park that influence the biological productivity of the reefs within the Park. The project will then determine whether to give greater protection to these outside reefs by expanding the SAMP boundary—or revising legislation to include these reefs in the Marine Park.

Indicators of Progress in the Outputs of the Governance Process: Ecosystem and Social Changes

Sustainability of the new governance process

Changes within government agencies and the public towards management of the entire coastal ecosystem should be institutionalized or sustained. A form of the governance process that developed the ICAM solutions needs to continue throughout implementation, to maintain momentum and to oversee implementation. During development of the management plans, the governance process must define a strategy and management structure for implementation. The implementation structure is often composed of a smaller core group of decision-makers.

The sustainability of the new approach to management is essential for successful implementation of the solutions. Sustainability largely depends on achievement of indicators within the governance process.

Extent of stewardship within ICAM and the wider public

This indicator involves public stewardship of natural resources and is closely linked with sustainability of the new governance process. Continued responsible governance needs an active and interested public to reinforce accountability and transparency of the ICAM governance process and activities.

An effective ICAM approach brings about a positive attitude and sense of hope among stakeholders towards future management of the resource. It creates a strong constituency among the key stakeholders, wider public, scientists, political leaders and managers. Early work in the Maldives under the DOF / BOBP Project has identified those groups that would benefit most from education and awareness to enable participation in the new governance process. The Project will seek to build stewardship within government agencies. Fisherfolk have historically been strong stewards of the fisheries resources and reef resources in the Maldives. Under IRRM, fisherfolk and government agencies will both need to work closely together to broaden the scope of reef resources issues they will address.

Stewardship evolves throughout the ICAM process—partly through involvement and partly through the exchange of information that enables all participants to become better resource managers. Early successes in actions reinforce and encourage stewardship. Enabled stewards—people more in control of the future of the resource than they were in the past—become good implementors of the solutions.

Adequate financial support for actions

During the process, the programme will secure commitments from participants for implementation. However, ICAM programmes often find that they cannot totally depend on funding from government or existing sources. While coordination of efforts and cost-sharing

1 For more information on the interconnectedness of reef populations through migration and larval dispersal, see Kenchington (1988) and Done (1994).

for ICAM activities can be an efficient means to allocate public funds, the programme must also generate revenue for implementation of actions.

Public stewardship also assists in generating local sources of revenue. Local funding initiatives such as the US\$2 tax per pack of cigarettes sold in Washington state and the Buzzard's Bay tax on pleasure boats all required the support of an active and concerned public. The tax on cigarettes in Washington state helped to fund the PSNEP process and implementation. The pleasure boat tax initiated by the Buzzard's Bay ICAM Programme received a wide margin of votes. Revenues from the tax were able to fund a large part of the programme implementation.

Malaysia is considering introducing visitor fees into the Pulau Payar Marine Park for the first time. Revenue from various funding alternatives is estimated to be able to fully fund SAMP initiatives including beneficial activities for fisherfolk. Charging fees to users of the resource such as tourists who inevitably leave an impact on the area is also a useful way to ensure greater equity in resource allocation and use when the fees are redistributed to assist local management.

Greater equity in resource allocation and use

A central purpose of ICAM is to help resolve the many inequities existing in coastal areas. On a broad scale, the fundamental equity issue for ICAM is the balance between ecosystem protection and human uses of the ecosystem. Solutions strive to achieve some level of sustained use of an ecosystem's services.

But equity issues between the many and varied human uses of coastal ecosystems are in many ways one of the most challenging issues for an ICAM programme. A successful ICAM programme will help resolve the tension caused by the inequity of resource allocations and multi-use conflicts. Management solutions can be designed to allow more balanced resource allocations. These include zoning, fishery and agricultural management measures and effluent limitations, among a host of other tools.

Equally important in resolving conflicts, is the process by which solutions are developed. The consensus approach to decision-making changes user group perceptions of conflicts. ICAM forces user groups to participate (to varying degrees) in the resolution of their own conflicts. In order to help design solutions, users must view conflicts more objectively, using the multitude of tools and information available including natural science, economic valuation and social science. Once user groups participate in the resolution of their own conflicts, users gain confidence in their ability to resolve problems and begin to view issues more objectively and comprehensively. Interaction between groups and reactions to future problems becomes more positive—and participants turn to the ICAM process as the forum for resolution of future issues.

Environmental changes

Perhaps the most 'visible' indicators of the effectiveness of an ICAM programme are the changes to the ecosystem and natural resources—improvements in the health and productivity of the ecosystem—resulting from management solutions. It may seem at first difficult to link the ecosystem changes to the management solutions. However, clear quantitative objectives and milestones of expected programme achievements in the implementation of actions established early in the ICAM process will guide the choice of indicators to monitor ecological change. Knowledge of activities outside the ICAM solutions that may have an effect on the ecosystem are essential in order to isolate effects of the ICAM solutions.

Objectives and environmental indicators vary between ICAM programmes. For example, where programme objectives involve improvements in the health of fisheries habitats and stocks, indicators have included numbers and diversity of target fish species, habitat condition and

increased size of the target fish species. Catch of local fisherfolk can provide good data. A community-based management project in Similon Island, in the Philippines (White 1989) found increases in populations and diversity of the fish species after a marine reserve was set up and managed under an ICAM approach.

Water quality was effecting the health and productivity of the valuable shellfish beds in the Puget Sound, a large Bay in the northwestern US. Sewage, a growing coastal population, and agricultural run-off all led to the closure of the shellfish beds in Puget Sound during the 1970 and 1980s. The Puget Sound National Estuary Programme (PSNEP) set a stringent objective for itself, determined that water quality should be improved for at least one contaminated shellfish bed to reopen each year. Shellfish beds are closed in the US by the Health Department when the bacteria counts in the shellfish gets too high. Roles and responsibilities were assigned to the line agencies; Health, Natural Resources, and Ecology. Health would monitor water quality; Health and Ecology developed the shellfish protection strategy and funding priorities and progress reports; implementation would involve Fisheries, State Parks; Native American tribal governments; Health; Natural Resources; and Ecology. The PSNEP achieved its objective and was one of the first areas in the US to reopen shellfish beds.

Use of the monitoring information to redirect the programme's activities

Monitoring is important and provides information to help revise and redirect the solutions. Stakeholders can have a role in the monitoring—they can often monitor quite frequently, while they are using the ecosystem. When the stakeholders are the ones to apply their monitoring data to activities within the management process, they will most likely collect better quality data. Malaysia will monitor the changing conditions of the resources over time in the SAMP area. Monitoring will help answer whether the broad management objectives have been achieved—whether SAMP actions have been able to increase or simply sustain the fisheries resources and improve fisherfolk livelihood.

The Chesapeake Bay ICAM Programme in the northeastern US has improved its water quality dramatically in the last twenty years. Volunteer monitoring played an important role in achieving this objective. The programme evolved a simple and scientifically valid indicator that came to be known as Bernie Fowler's 'Sneaker Index'. A long-term Senator, by the name of C. Bernard Fowler, was fond of telling the story about when he was a boy fishing in the Chesapeake Bay, he could see his sneakers (i.e., white tennis shoes) when standing in shoulder deep water. Since the 1950s when he was young, excess nutrients in the water from agricultural sources, and urban and rural sediment runoff contributed to the poor Bay water quality of the 1970s and 1980s. The simple and valid indicator of a sneaker allowed more people to participate in monitoring, made science more understandable and less intimidating, and kept a wider public aware of progress towards achieving the water quality objective.

Conclusion

The two broad groups of indicators—those that show progress within the ICAM governance process, and those that show success in the outputs of the ICAM process—are closely interlinked and mutually dependent. Successful implementation of solutions is largely dependent upon the strength and sustainability of the new governance approach.

The indicators described in this paper are broad-based. Each indicator can be used to help guide further development of a set of parameters to quantitatively measure change and progress. They are also not intended to be comprehensive, but to encourage further thinking by practitioners and participants of ICAM governance approaches.

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PRESENTATION 5

The Relevance of International Legal Instruments for Fisheries and Coastal Area Management

by
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1. Introduction

International conventions are becoming increasingly important in the use, allocation, protection and development of marine and coastal area resources. They are numerous and cover a wide range of complex issues. Some comprise 'hard law' (i.e. legally binding) treaties, others comprise 'soft law' (i.e. non-binding) agreements. Following the development and ratification of the United Nations Convention on the Law of the Sea, there is a trend towards such conventions becoming 'hard law', committing National governments to internationally binding standards and practices.

The use and management of the world's coastal areas is increasingly an international, as well as a regional and national concern. The world's coastal areas, along with contiguous marine and inland waters, form part of the environmental common property of human kind. International agreements are needed to prevent the pursuit of narrow immediate gains of one set of users undermining the accrual of wider benefits across human society in both space and time.

The sum total of human activities globally is leading to the impoverishment of the resource wealth in coastal areas worldwide. Overexploitation of resources, physical destruction, and chemical pollution are threatening coastal areas everywhere. Human activities within, or affecting, the coastal area of one nation can have a detrimental effect on coastal areas in other parts of the world.

Access rights to marine resources and rights of sea use are also international concerns which affect coastal areas. Entire economies and industries depend on the shipment of resources such as food, oil and manufactured goods around the world. The transport of goods by sea is the central beam supporting the superstructure of the global market place. The shipment of goods across the world's oceans can have major impacts on coastal areas, by causing chemical pollution (such as oil spills) and by transporting exotic species between regions. As a short-term cost saving exercise, industries and societies worldwide use the coastal and other marine areas for dumping waste products. However, the use of the seas for such waste disposal is incurring unknown, but potentially heavy, future costs. Biological, chemical and radioactive wastes dumped into the sea have long-term impacts which are still poorly understood.

As they deplete their own resources, and as resources in coastal areas of other nations increase in value, many interest groups are seeking access to coastal resources in other parts of the world. International laws of significance to coastal areas cover:

- Marine Environmental Protection and Preservation, including protection from pollution from vessels (12 per cent of all marine pollution); dumping (10 per cent of all marine pollution), pollution from seabed activities within national jurisdiction; pollution from the development of deep seabed mineral resources beyond national jurisdiction; pollution from

land-based sources (44 per cent of all marine pollution); and pollution from or through the atmosphere (33 per cent of all marine pollution).

- Protection, Conservation and Management of Marine Living Resources (including resources within national jurisdiction, resources which straddle and migrate between international waters and national jurisdiction, and resources in international waters).
- Navigation (concerning the safety at sea, working conditions, and the right to 'innocent passage').
- Scientific research.

2. Development of International Law

International laws and treaties governing the use of, and access to, the sea and its resources have a long history. However, over the last five decades, and effectively within the last three decades, international laws governing the use of coastal areas have taken some significant steps forward.

The United Nations Convention on the Law of the Sea (UNCLOS), signed in 1982 and ratified in 1994, provides a legal and institutional framework for all aspects of marine use. It also defines the fundamental obligations of all States which are parties to it, the nature of their obligations to implement international rules and standards, and defines dispute settlement processes. Its development has involved processes combining both 'hard' and 'soft' law; and developing soft law 'general legal principles' (or 'generally recommended practices') recognized by nations. These include general principles of law, grounded in basic morality, which guide nations as they do individuals. UNCLOS thus refers to the importance of customary practices, which can also be said to be law if it is adhered to consistently and acknowledged as binding.

As widely endorsed soft laws begin to shape state practice, they create a presumption in favour of that practice as 'generally recommended'. Such generally recommended practices can also precipitate consensus on binding standards.

- development of international customary laws, established through international organizations which have adopted policy resolutions recommending how governments should behave. They cover issues of sovereignty, recognition, consent, good faith, freedom of the seas, international responsibilities and self-defence. This process has involved combining aspects of both 'soft' and 'hard' laws.
- establishing legally binding ('hard law') treaties, concluded between States in written form, and governed by international law. UNCLOS thus relates to the Charter of the United Nations, which is both a multilateral treaty and a constituent instrument of the UN.

2.1. Environmental Law

UNCLOS combines elements of both modern International Environmental Law and more classical aspects of International Law. The former differs markedly from the classic model of International Law, where a few agreed norms guide how independent sovereign States act to establish their own rules and keep their national territories safe by a balance of power.

The paradigm of Environmental Law provides rules which are based on ecology and other sciences: the 'laws of nature' exist quite apart from the will of sovereign States. Environmental rules cut across all artificial national borders, just as oceanic currents and weather patterns do. Environmental Law functions wherever nature's systems are found, and adapts human behaviour to work within the constraints of the environment.

A basic rule of classic international law is that States are sovereign entities and that they may conduct their business as they please. Environmental law qualifies this by emphasizing the common property nature of global resources within sovereign territories.

Thus, a fundamental principle of modern International Marine Law is that States have the right to exploit their own natural resources pursuant to their own environmental policies, but have a duty to protect and preserve the marine environment.

This aspect is expressed most coherently in the Convention on Biological Diversity—a legally binding agreement signed at the Earth Summit in Rio de Janeiro in 1992, to which there are currently some 150 Parties:

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies” (Article 3), but also: “States have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond the limits of national jurisdiction” (Principle 21).

2.2. Enforcement and Opting Out

As there is no effective international law enforcement body, international laws have to be based on self-interest. Individual States therefore take the responsibility to adhere to mutually agreed laws, and each nation has the right to adopt such measures as it sees fit.

Thus, France was not a party to the Nuclear Test Ban Treaty of 1963, which prohibited the testing of nuclear weapons on the high seas and on land. Iceland, Norway and Japan chose to exercise their legal right to continue some harvesting of whales against the policy preferences of the International Whaling Commission. There was little the rest of the world could do to stop France carrying out nuclear tests in the Pacific, or to prevent the whaling activities of Iceland, Norway and Japan—other than exert diplomatic pressures.

3. International Marine Law

Defining the Coastal Zone

UNCLOS defines the coastal area according to specified baselines, which define the outer boundaries of internal waters, the limits of the territorial waters (“not exceeding 12 nautical miles, measured from baselines”), and the area of the Exclusive Economic Zone (EEZ—“not extending beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured”). UNCLOS also specifies a contiguous zone which may extend up to 24 miles from the baseline.

Normally, the baseline is the low water line, and internal waters landward of the low water line include certain bays as well as rivers, estuaries and ports. In specific geographic situations, baselines may be drawn that encompass quite extensive (and often vulnerable) marine areas within internal waters.

For islands on atolls or with fringing reefs, the baseline is seaward of the low water line of the reef. Where the coastline is deeply indented or if a fringe of islands runs near the coast, straight baselines joining appropriate points are permitted.

Supporting International Organizations and Instruments

The development and implementation of UNCLOS requires the support of several international institutions and international instruments. These encompass two basic functions:

- promoting and facilitating the formulation of supplementary ocean law agreements, through global and regional bodies, which articulate more specific international rules and standards or recommended practices and procedures, and tackle new issues; and
- fostering international law—through regional and global initiatives on marine research, monitoring, data management, environment assessment, and the exchange of information, and through programmes that strengthen national capabilities to manage sustainably the use of the marine environment and its resources.

Core support is provided by the Convention secretariat, the Division for Ocean Affairs and the Law of the Sea (DOALOS) in the UN Office of Legal Affairs in New York. The nature of the Convention's framework makes it essential that international agencies supporting UNCLOS implementation are kept up to date.

- As far as dispute settlement is concerned, UNCLOS establishes four optional forums for compulsory, binding settlement:
- the International Court of Justice (a statutory UN body);
- the International Tribunal for the Law of the Sea (based in Hamburg, Germany);
- an arbitral tribunal; and
- a special arbitral tribunal, the scope of which is limited to disputes regarding fisheries, protection and preservation of the marine environment, marine scientific research and navigation. Its members are drawn from lists of experts in each field, as opposed to a list of persons with more generalised experience in maritime affairs.

Flag States, Coastal States and Port States

In defining the responsibilities and jurisdiction of Parties to UNCLOS with regard to the activities of vessels at sea, three sets of States are specified:

- the flag State—where the vessel is registered;
- the coastal State—which has jurisdiction over the waters through which a vessel is sailing; and
- the port State, where a vessel voluntarily enters its ports, or docks at one of its offshore terminals.

The three States also have different rights to enforce the provisions of UNCLOS and related Conventions:

- Port State enforcement is not limited to violations in areas subject to that State's jurisdiction, does not involve physical interference with navigation at sea and is restricted to violations of applicable international discharge standards.
- This restriction of Port State enforcement to discharge standards is based on the fact that violations of other standards endure regardless of where the vessel is located—whereas discharge violations are location specific.

If the violation has taken place in the waters under another State's jurisdiction, either that State or the Flag State, or a State damaged or threatened by the discharge violation, must request the Port State to intervene.

Coastal State enforcement refers to the right of the State within whose waters any violation may have occurred to take action against the offending vessel. Thus, any (Coastal) State may take enforcement action for violations when the vessel is in its ports, internal waters, or territorial sea. For discharge violations outside national jurisdiction or in the EEZ, without Port State enforcement, it would be difficult to initiate action.

The further offshore the violation, the more limited the Coastal State's enforcement authority. The more serious the incident, the greater the Coastal State's enforcement authority. In the contiguous zone, the Coastal State may exercise the control necessary to prevent and punish any infringement of its customs, fiscal, immigration, or sanitary laws and regulations which has taken place within its territory or territorial sea (Article 33).

Agenda 21, Rio de Janeiro, 1992

Agenda 21 is a programme of action for sustainable development adopted at the UN Conference on Environment and Development (UNCED) in June 1992. Agenda 21 recognizes UNCLOS as the international legal basis for the protection and sustainable use of the marine and coastal environment and their resources.

The Ocean's Chapter of Agenda 21 set in motion three inter-governmental initiatives, two of which relate to the implementation of UNCLOS:

- A Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, convened under the auspices of the United Nations. This has resulted in a Convention which opened for signature in December 1995.
- A conference on the protection of the marine environment from land-based activities, convened under the auspices of the United Nations Environmental Programme (UNEP). Land-based sources of marine pollution are a major threat to the coastal and wider marine environments. Land-based sources contribute some 44 per cent of all marine pollution resulting from human activities. Parties to the conference adopted a Global Programme of Action to prevent, reduce and control marine pollution from land-based activities. Of particular concern are 'Persistent Organic Pollutants' (POPs), and the Programme of Action calls on Parties to negotiate and implement a legally binding instrument to address the issue of production and consumption of POPs.

Inter-governmental follow up to Agenda 21 within the UN system is undertaken by the UN Commission on Sustainable Development, which reports through the UN Economic and Social Council to the General Assembly. There is also a follow-up to Agenda 21 at the inter-agency level, co-ordinated by designated UN Committees.

The International Maritime Organization (IMO)

The IMO is a specialized UN agency, created to provide the machinery for co-operation in establishing technical regulations and practices in international shipping, to adopt the highest standards for maritime safety and for navigation, and to discourage discriminatory practices in international trade and unfair practices by shipping concerns.

The IMO develops 'generally accepted international rules and standards'. Many of these have become widely accepted international treaty law. For example, the International Convention on the Prevention of Pollution from Ships and its 1978 Protocol (MARPOL.73/78) has established

minimum rules for all nations that are party to UNCLOS, even if they are not party to the specific pollution treaty establishing the standard.

MARPOL deals specifically with pollution from ships. It reinforces UNCLOS by permitting Parties to apply its requirements to the ships of non-parties to ensure that non-parties do not receive more favourable treatment. MARPOL establishes practices and norms for the shipment of potentially harmful substances, and is guided by a precautionary approach to environmental protection from disposal and incineration of wastes and other matters (whereby appropriate measures are taken when there is reason to believe that substances or energy introduced in the marine environment are likely to cause harm even when there is no conclusive evidence to prove a casual relation between inputs and their effect).

Contracting Parties to MARPOL also acknowledge the principle of 'Polluter Pays' as a cost allocation instrument. MARPOL covers five main areas:

- Prevention of Pollution from Oils;
- Control of Pollution of Noxious Liquid Substances in Bulk;
- Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Forms, in Freight Containers, Portable Tanks or Road and Rail Wagons;
- Prevention of Pollution by Sewage from Ships; and
- Prevention of Pollution by Garbage from Ships.

The IMO has also been responsible for developing the London Dumping Convention. One of the principles of the Dumping Convention is that Contracting Parties, whenever dumping wastes or other matter at sea, have to issue a permit for such dumping. Permits are issued by a designated authority, according to agreed criteria.

The Convention on Biological Diversity

The Convention on Biological Diversity is a legally binding agreement signed at the Earth Summit in Rio de Janeiro in 1992. Its objectives are:

- the conservation of biological diversity (biodiversity).
- the sustainable use of its components; and
- the equitable sharing of benefits derived from genetic resources.

The Convention recognizes "the importance of biological diversity for...maintaining life sustaining systems of the biosphere". It acknowledges that "conservation and sustainable use of biological diversity is of crucial importance for meeting the food, health and other needs of a growing world population". The Convention also deals with the transfer of genetic resources.

The Conference of Parties (COP) of the Convention, at its second meeting in Jakarta in 1995, adopted the 'Jakarta Mandate'. This outlines a Programme of Action for implementing the Convention with respect to marine and coastal biodiversity, thus developing the Biodiversity Convention as a legal tool for the conservation of marine and coastal biodiversity, and the sustainable use of living marine and coastal resources.

Parties to the Biodiversity Convention are obliged to act within their National jurisdiction to protect marine and coastal biodiversity. National jurisdiction refers to the definitions established by UNCLOS. The Parties are also committed to applying the Biodiversity Convention to all activities and processes under their jurisdiction that occur within their jurisdiction or on the high seas. Thus, Parties are responsible for vessels flying their flags while they are in the maritime zone under their jurisdiction or on the high seas. They also have some responsibility for their flagged vessels in the waters of other Parties' jurisdiction.

The Biodiversity Convention also relates to other international instruments that are likewise linked to UNCLOS (e.g. the UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, UNEP Global Plan of Action for the Protection of the Marine Environment from Land-based Activities, and Chapter 17 of Agenda 21).

The Jakarta Mandate identifies five critical areas for action:

- Institute integrated coastal area management, including community-based coastal resource management, and including prevention and reduction of pollution from land-based sources.
- Establish and maintain marine protected areas for conservation and sustainable development.
- Use fisheries and other living resources sustainably.
- Prevent, control or eradicate harmful alien species.
- Identify priority components of biodiversity and monitor status and threats.

Important Conventions, Agreements and Institutions

- United Nations Convention on the Law of the Sea (signed 1982, ratified in 1994).
- UNEP Regional Seas Conventions: draft legal instruments pending for South Asia. Regional agreements constitute conventions in their own right. They cover pollution from ships, marine pollution, emergencies, protected areas and species, dumping wastes management, and land-based sources of marine pollution.
- Agenda 21 - Chapter 17 (The Oceans Chapter), 1992.
- United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks. Ready for signature, 1995.
- UNEP Conferences on the Protection of the Marine Environment from Land Based Activities: The 1995 Washington Conference, agreement on a Global Programme of Action and an agreement to produce a legally binding Convention on Persistent Organic Pollutants.
- The Jakarta Mandate, 1995. A programme of Action to implement the Convention with regard to marine and coastal biodiversity
- The International Convention on the Prevention of Pollution from Ships, 1973, with 1978 Protocol.

- The London Dumping Convention, 1972.
- International Convention on Civil Liability for Oil Pollution Damage (Civil Liability Convention), 1961.
- International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (IOPC), 1971.
- Convention on Wetlands of International Importance (Ramsar Convention), 1971.
- Convention Concerning the Protection of the World Cultural and Natural Heritage (World heritage Convention), 1972.
- UN General Assembly Drift Net Resolution (46/215), 1991

Also notable are:

- UNESCO Biosphere Reserve Programme, as well as specific programmes in coastal zone management.
- Inter-governmental Oceanographic Organization of UNESCO
- The Food and Agricultural Organization (of the UN), responsible for some regional fisheries arrangements, aquaculture, and related programmes in coastal area development.
- World Meteorological Organization, responsible for research and monitoring programmes relating to air/sea interactions, and climate and weather.
- United Nations Industrial Development Organization (UNIDO), whose programmes include efforts to abate industrial wastewater pollution.
- United National Development Programme (UNDP) manages technical assistance funds, and works closely with the Global Environmental Facility (GEF).

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International Maritime Organization. *MARPOL 73/78 Consolidated Edition*, 1991.

Global Marine Biological Diversity: A Strategy for Building Conservation into Decision Making. Ed. Elliott A. Norse. Island Press, USA, 1993.

The Law of the Sea—The United Nations Convention on the Law of the Sea. United Nations, New York, 1983.

Addendum VIII

GUIDELINES FOR GROUP DISCUSSIONS ON FISHERIES AND COASTAL ZONE INTERACTIONS

Please read through all the questions before you begin your group discussion!

1. What would you consider to be the boundaries of the 'landward' and 'seaward' parts of the coastal zone?
2. What are the important human activities (e.g. tourism, agriculture, fishing) undertaken in the coastal zone as defined by your group?
3. What are the important natural habitats in the zone (e.g. mangroves, flood plains, etc.)?
4. List the important natural processes (e.g. tidal flow, river deposition, etc.) and natural resources (fish, water, wildlife, etc.) in the coastal zone.
5. List some important negative impacts of the human activities on natural habitats, processes and resources mentioned.
6. State some important measures which could be taken to avoid or minimize these negative impacts.
7. Which of the measures mentioned in 6 above would require changes in institutional and legal arrangements? What are these changes at different levels (e.g. village, State, nation, etc.)?

What should be the specific role of fishworkers' organizations in 6 and 7? What alliances with other organizations or occupational groups may be needed to achieve effective coastal zone management? How could these alliances be formed?

Addendum IX

EVALUATION FORM

South Asian Workshop on Fisheries And Coastal Area Management

26 Sept—29 Sept 1996, Madras

We would greatly appreciate if you would kindly fill up this evaluation form and return it to us lunch time today (Sunday, 29 Sept 1996). You need not write your name.

	V. Good	Good	Fair	Poor
1. Pre-workshop Information from the Secretariat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Accommodation, Food and Other Arrangements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Usefulness of Background Material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Overall Coverage of the Workshop on Topics Related to the Subject of Fisheries and Coastal Area Management (CAM)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please give us your feedback on the main presentations:

	V. Good	Good	Fair	Poor
JOHN KURIEN				
Content of Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Method and Style of Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relevance of Contents to Your Own Concerns <i>vis-a-vis</i> Fisheries/ Aquaculture and CAM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ROLF WILLMANN				
Content of Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Method and Style of Presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Relevance of Contents
to Your Own Concerns
vis-a-vis Fisheries/
Aquaculture and CAM

CHANDRIKA SHARMA

Content of Presentation

Method and Style of
Presentation

Relevance of Contents
to Your Own Concerns
vis-a-vis Fisheries/
Aquaculture and CAM

PANEL ON AQUACULTURE

Content of Presentation

Method and Style of
Presentation

Relevance of Contents
to Your Own Concerns
vis-a-vis Fisheries/
Aquaculture and CAM

PANEL ON INSTITUTIONAL/LEGAL/POLICY ISSUES:

Content of Presentation

Method and Style of
Presentation

Relevance of Contents
to Your Own Concerns
vis-a-vis Fisheries/
Aquaculture and CAM

6. State the most important positive feature about the Workshop as a whole in relation to your concerns in your work back home:

7. State one aspect of the Workshop where your expectations have NOT BEEN MET:

The Madras CAM Workshop and Symposium

Fishworker organizations the world over are concerned about the degradation of coastal habitats vital to fishery resources. This concern was articulated in the first-ever Conference of Fishworkers and their Supporters in Rome in 1984, and, subsequently, in all the three conferences organized by ICSF since 1986. In the conference in Cebu in 1994, for instance, the impact of coastal area degradation on the livelihood of the artisanal and small-scale fishery sector was discussed at length. It was recognized that fishworker organizations need to look systematically into major coastal resource management issues and draw up action programmes that would, at the outset, address fisheries issues in the littoral area. This could eventually be expanded to animate fisheries sector institutions to defend the interests of fishing communities in the coastal zone against marginalization by other user-groups and interested parties.

There has, therefore, been a strong emphasis on issues related to the coastal environment in the activities and programmes of ICSF. In addition, a specific request from Indian fishworkers for a session to help them develop a framework to examine such issues, provided the impetus for the workshop and symposium on fisheries and coastal area management, held in Chennai (then called Madras), India, from 26 September to 1 October 1996. The focus was on countries in the South Asian region, i.e. Bangladesh, Sri Lanka, Maldives and India, which often share rivers and seas, while also facing similar issues of coastal area degradation and management.

This publication is the official record of the proceedings of the Madras workshop and symposium. Apart from a detailed summing-up of the various sessions held over the six-day period, it contains country reports as well as accounts of presentations by experts.

ICSF is an international NGO working on issues that concern fishworkers the world over. It is in status with the Economic and Social Council of the UN and is on ILO's Special List of Non-Governmental International Organizations. It also has Liaison Status with FAO. Registered in Geneva, ICSF has offices in Chennai, India and Brussels, Belgium. As a global network of community organizers, teachers, technicians, researchers and scientists, ICSF'S activities encompass monitoring and research, exchange and training, campaigns and action, as well as communications.