

# VOICES FOR THE OCEANS

A Report to  
The Independent World Commission  
on the Oceans

Editor

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Operational Centre

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## **Samudra Manthan**

An abiding and fascinating legend of India is *Samudra Manthan*, the churning of the oceans by the gods and the demons in the heavens. Using a mountain as the churning pole and a serpent king as a rope, they wanted to bring forth Ambrosia, the elixir of immortality, from the oceans. From this churning of cosmic proportions, the legend goes, there emerged many an element: poison, animals, a tree, a gem and even a goddess. The Ambrosia did appear, but only at the end.

IOI India has conducted a *Samudra Manthan* of sorts, a churning of the minds of a group of people in India and in the Indian Ocean Region, inviting them to think about the oceans and come out with their views, concerns, suggestions. This was done through hearings in India and a survey in the Region. The number so reached was only a few hundreds, but they were all people connected with, and concerned about, the oceans - through their work, environmental activism or sheer love for the sea. There was an oceanographer here, a human rights lawyer there, a government official in one place, a grassroots worker in another. All of them came together to have their say in defence of the oceans.

To

**The Independent World Commission on the Oceans**

**IOI India is happy to present**

**VOICES FOR THE OCEANS**

# Message

**EDUARDO FALEIRO**

Vice - Chairman, Independent World Commission on the Oceans

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I must express my deep appreciation for the work done by the International Ocean Institute (IOI) at Madras in organising the hearings all over the country and in conducting the survey in the Indian Ocean Region. Madame Elisabeth Mann Borgese is the spirit behind IOI and she has been able to build this Institute and create an awareness about the problems of the oceans all over the world. This is also the work that is being done by the IOI Centre at Madras and I pray and hope that they will continue to give these very valuable inputs for consideration of the World Commission from the grassroots. We must have inputs from the people who are directly concerned with the oceans, with the economy of the oceans and who live on the coastal areas. Precisely such inputs make up this Report, which IOI India is presenting to the Commission.

Oceans occupy a very vast part of the earth's surface and the economy of mankind has been deeply associated with the oceans. Not just transport, living resources like fisheries, nonliving resources like petroleum, but in the days to come, minerals, even climate changes and quality of life of mankind as a whole depend on the movement of the oceans. And therefore we have this very obvious importance of the oceans in the life of mankind since the beginning of history. About 60% of the world's population, almost three billion people, live in the coastal areas or very near the coast. This percentage of people living by the sea or on the coast may, within the next generation, go up to 75%.

The oceans have been always important, but they are even more important now, because population is increasing and land resources are limited. Consumption patterns are increasing and so the demands of the people are increasing and therefore there is more pressure on the resources. What is very important is that technology is advancing at such a rapid pace that the resources of the sea are now much more within our reach than ever before in history.

What we are dealing with today is the colonisation of the oceans and having experienced the colonisation on land for 20 centuries, the international community will like this new colonisation to be different, with an equitable distribution of the resources and sustainable development of the sea. And it is in this context that we have major path breaking documents produced by the international community and the United Nations. UNCLOS is a document which is of tremendous significance. It determines, for instance, the Exclusive Economic Zone (EEZ) for every country. Now we have a large EEZ for every country, however small and however weak. UNCLOS assures national sovereignty not merely for the strong but for the weak too, even beyond EEZ on the high seas. It is not only the big powers that will take the mineral resources when they become economically viable for exploration and exploitation.

UNCLOS and UNCED should strongly be supported. UNCED's Agenda 21 talks about the plan of action for sustainable ocean development. Environment must be protected and to safeguard environment, alleviation of poverty should also be taken into account. There are some gaps in UNCED and UNCLOS which we have to address. There is also no political will on the part of many countries to implement them. We have to find mechanisms of monitoring the implementation of these particular measures that had been agreed upon by the international community.

The hearings across the country and the survey conducted by the IOI Centre at Madras have given a feedback on what the problems concerning the oceans are. Some problems concern local bodies, some problems state bodies, other problems national bodies and some international bodies. There are different fora to deal with variety of problems. The meeting of the World Commission at Yokohama in Japan precisely stressed on what the state or national administration could do, what the global community could do to protect the oceans and the environment.

I am sure that the World Commission would find this Report an invaluable input to its deliberations. I also hope that individuals, institutions and governments all over this Region, who are concerned about the state of the oceans and the coasts, would consider seriously the views, problems and solutions highlighted in this Report and work towards a peaceful and sustainable use of the oceans. I congratulate IOI India for producing this excellent report.

New Delhi  
October 1996

**EDUARDO FALEIRO**

Part I

**THE REPORT**

## *Editor's Report*

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200 Participants presenting their views in four Hearings, 200 individuals completing a detailed questionnaire, 35 authors submitting written papers and notes, 80 organisations providing information for a directory - those are the 'Voices for the Oceans'.

This input received by IOI (India) between June and September 1996 is very rich in content, full of valuable ideas and replete with very practical prescriptions for improving the conditions of the oceans, the coastal zones and the coastal communities. Such an input cannot easily be distilled and summarised, but a modest attempt has been made here. The Editor is grateful to Dr. K. Saigal for preparing the draft of this report.

Since the Hearings have so far been held only in India and since the majority of the responses to the questionnaire have come from this country, there are many references to the Indian situation in this report. We do recognise that wide variations exist in the region, sometimes even within a country. At the same time, however, we believe that many of the points raised and discussed here are applicable to many areas of the region and the world.

The 'Voices for the Oceans' are presented here under fourteen sections:

1. Introduction
2. Global and national perspectives
3. Regional blocs
4. Globalisation and its impact
5. Coastal megacities
6. Living resources
7. Marine environment protection
8. Research and development
9. Ocean development and nonliving resources
10. Coastal zone management
11. Laws and regulations
12. Environmental impact assessment
13. Public cooperation
14. Conclusion



## 1. Introduction

This report analyses the issues arising out of the Hearings held in Madras, Bombay, Goa and Delhi; the 200 responses to a questionnaire issued to over 1400 persons in the Indian Ocean Region; the papers and notes submitted to IOI(India); the recommendations of a Seminar organised by the Department of Ocean Develop-

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*The means of exploring and exploiting the vast ocean spaces are largely with the developed nations because of the availability of capital and superior technology. The rich and the powerful will appropriate this "Global Commons".*

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ment in Delhi; the expert presentations made in the Hearings; the discussions on various issues and the conclusions and recommendations emerging therefrom.

The survey of the Indian Ocean Region and the Hearings were held under the overall guidance of Mr. Eduardo Faleiro, Vice-Chairman of the Independent World Commission on the Oceans (IWCO) and former Minister for Chemicals, Fertilizers and Ocean Development, Government of India. In Bombay, the Hearing was arranged by Central Institute of Fisheries Education, while the one in Goa was organised by the National Institute of Oceanography. The Society for Indian Ocean Studies was responsible for the meeting in Delhi. Dr. Krishan Saigal, Executive Director, IOI, Malta, and Prof. R. Rajagopalan, Director, IOI(India), were present at all the Hearings.

## 2. Global and national perspectives

The responses to the questionnaire and the discussions in the Hearings stressed the need to sustainably manage the coastal zone, including the Exclusive Economic Zone (EEZ). The United Nations Convention on the Law of the Sea (UNCLOS) has given to each member country a

200 nautical mile EEZ for exploration and exploitation of resources and conservation and protection of the marine environment. In view of the increasing population pressure on the coastal zone, the sustainable development and management of this zone, which consists of important ecosystems and biodiversity of fauna and flora, is of great importance to the developing countries.

The means of exploring and exploiting the ocean spaces are largely with the developed nations because of the availability of capital and superior technology. The rich and the powerful will appropriate this "Global Commons". UNCLOS has sought to make significant changes in this situation by articulating the concept of the Common Heritage of Mankind. Unless this is followed up with the building of adequate capacity in the developing countries to explore, exploit and sustainably manage the resources of the oceans, the benefits would continue to flow to the advanced nations.

It was noted that though all nations, big and small, have been given exclusive rights for exploration and exploitation of resources in the EEZ, there is inadequate knowledge in developing countries including India, about the living and nonliving resources available in the EEZ. The human resources necessary for attaining such knowledge are also inadequate.

Besides, at the national level, adequate coordinated and coordinated focus on ocean development is lacking because of the dispersion of subjects under various government ministries and departments, both at the central and state level. There is need to tackle this problem by having an integrated institutional structure (like a National Maritime Council), a coordinating policy and steps to acquire knowledge of ocean resources as well as the technology to exploit them. There is also need to make decision makers of the Indian Ocean Region aware of the importance of the oceans as a resource as well as of their intimate links with the climate.

## 3. Regional blocs

In recent years there has emerged a large number of regional economic arrangements. T





are now 98 regional groups in the world and 33 of them were formed between 1990 and 1994. Some of these arrangements have worked and some have not. For a regional group to be successful, the countries should have similarities in trade and GNP figures. Proximity and political commitment are also important.

There is scope for a trading bloc in the Indian Ocean Region. This Region is rich in resources like oil, diamonds and gold. The transportation costs are low and there is also skilled labour available. For India, one advantage is the presence of Indian ethnic population in many of the countries of the region with such groups engaged in trade, manufacturing and services. But political will is necessary to bring together the differing systems of the Region. The primary objective of joining a regional group has to be the furtherance of national interests. If a country is strong, every bloc in the region would invite it. But no one wants any weak country as a member. Hence the countries of the Region should develop dynamism, confidence and credibility.

It is said that in 20 years there will exist only 3 conflicting blocs: United States, European Union and Asia. There is a regional integration going on in East and South-East Asia. It will next expand to the Indian Ocean Rim and this Asianization will reach India in about 10 years. The question is whether the countries of the Region are ready for this situation.

#### 4. Globalisation and its impact

The question of economic globalisation and its impacts generated a lot of discussion. While the consensus was that the process of globalisation could not be halted or slowed down, an urgent need was expressed for ensuring that adverse impacts of such globalisation were minimised. Globalisation is not entirely a benign process. Capital movement is short-term and transitory. Global capital is rapacious, interested in quick gains, undermines regulations.

Globalisation is impacting on the coastal zone and the coastal sea by leading to intense industrial activities, increasing multinational invest-

ments, novel industries in unusual places, rural areas getting urbanised and/or depopulated and the supersaturation of urban areas or the growth of megacities. The impact of globalisation could be seen not only on the coastal zones but also on the seaward side. The concentration of industries in the coastal zone is due to the availability of cheap water, transport for building materials, raw materials and finished products. Besides, the sea provided unlimited supplies of water and a dynamic medium for disposal of waste material.

While the concentration of industries and the growth of urban sprawls is beneficial from the individual industrialist's point of view, its effects on the local population is adverse, *inter alia*, due to their:

- competing for scarce groundwater resources with the local populations, which in turn led to adverse impacts on the vulnerable and poorer sections of the community;
- discharging sewage and industrial wastes into the ocean leading to declining fish stocks and disruptions of the economies and livelihoods of traditional fisherfolk;
- promoting the depopulation of villages and a migration into urban slums and shanty towns;
- necessitating the building of coastal highways with consequent adverse effects on sand dunes etc.

Globalisation has also led to conflicts between the modern and traditional sectors, e.g., those in favour of aquaculture and fisherfolk, between

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deepsea fishermen and coastal fishermen, between growth enthusiasts and environmentalists. Many of these conflicts have ended up in the courts. All this can be avoided if an integrated view is taken, decision-making is made transparent and posts of independent Environmental Ombudsmen are created to arbitrate disputes.



Another area of concern is the draw-off of water from the ground water aquifers by industries and urban conglomerations created by globalisation. This is leading to intrusion of sea-water into aquifers and to the possibility of buildings sinking (as had been the case in Shanghai). There is obvious need for having an integrated water management policy for the coastal zone including the desalination of ocean

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water by using renewable energy sources - wind, wave and solar, for example.

In India, globalisation is not only exerting tremendous pressure on ocean resources and the coastal infrastructure but also on oceanic biodiversity. Systematic inventories of ocean biodiversity are yet to be made. It is however known that unique coastal and ocean genetic wealth such as mangroves, sea grasses, coral reefs, dugongs and whales are under various degrees of threat. Besides damage to oceanic biodiversity, there is also a national loss as transnational corporations are patenting much of the knowledge of indigenous people in the area of biodiversity.

An integrated programme is therefore necessary so that the ecological security of the coastal zone and the livelihood security of coastal communities can not only be protected but also become mutually reinforcing.

A multi-pronged strategy to safeguard the biodiversity-rich areas would have the following elements:

- The genuine livelihood needs of the people in coastal areas including fisherfolk will have to be addressed. The conservation strategy would be people-centred, so that the concerned human population develops an economic stake in conservation.

- Captive breeding of endangered fauna and flora would be initiated where necessary.
- Anticipatory research centres should be developed in the Indian Ocean Region for the purpose of generating novel genetic combinations capable of conferring tolerance to sea water intrusion. These should be fused with the traditional wisdom of local communities and thereafter operationalised.
- A cadre of Conservation Promoters would be trained from among the youth of fisher families and from other coastal communities. Such young women and men can help to spread awareness among their own people about the vital importance of preserving coastal biodiversity and utilising genetic resources in a sustainable manner.
- An integrated coastal area conservation and development strategy needs to be developed and implemented.

## 5. Coastal megacities

There is need for greater public awareness of the problems of coastal megacities. We have to find ways of reducing and redirecting the migration to these cities. New conglomerations are coming up and we have no laws to control them. We must know how many cities the coastline can support and sustain.

Coastal cities like Bombay and Madras are facing severe problems. The earlier plans for Bombay emphasized relocation of industries and factories to new areas. But the new plan for 1996 - 2011 focuses on the development of Bombay as a financial centre on the model of Hong Kong. This total reversal of approach is placing a tremendous pressure on the coastal zone. For example, for the sake of reclamation for the Bandra-Kurla complex, mangroves are being destroyed. All along the Bombay coast there is large scale illegal clearing of mangroves. Power projects are coming up along the coast



without any proper EIA. These projects cover areas rich in fishery resources where thousands of families are engaged in fishing.

Ninety-five per cent of Bombay's sewage is discharged untreated into the sea. A new World Bank project proposes to shift the point of discharge 3.5 kms into the sea but again without any treatment. Providing drinking water to cities like Bombay is already becoming difficult. Bombay gets some of its water from a distance of 120 kms. To feed a megacity like Bombay, new dams may have to be built upstream, often at the cost of local communities. Sea level rise may have a major impact on Bombay considering that even 6 inches of rain paralyses the city.

Madras alone expects an investment of Rs.40 billion during the next 5 years. This would put a heavy pressure on the system. Highways and roads linking Madras to nearby places and tourist spots are affecting the coastline, e.g., sand dunes have been levelled on the Madras-Mahabalipuram Road.

The water table is going down alarmingly in the megacities and seawater ingress is taking place. This is important since it is an irreversible process. Cities like Shanghai in China are sinking and large volumes of water are now being pumped into the aquifers. One solution is to tax anyone taking ground water.

## 6. Living resources

In a recent study made by the International Centre for Living Aquatic Resources Management (ICLARM) regarding the likely global food scenario in 2020 the need was expressed for marine resources being exploited on an urgent basis if a major crisis was to be avoided. Thus tapping of the food resources of the oceans has to be one of the major parameters of integrated coastal zone management. ICZM has also to provide adequate livelihood patterns to the coastal communities.

Regarding living resources in India, as against an MSY of 2.6 million tonnes, only 1.7 million tonnes of fish are being caught. The declining stocks are thus more due to pollution than any overfishing. At present, 90% of the fish upto depths of 50 mts is being fished. Attempts have

been made to encourage deepsea fishing through joint ventures, charters and licensing. But recently there has been organised opposition from the coastal fishermen, putting the deep sea fishing industry in a state of turmoil. A role has to be found for both traditional and deep sea fishing industry in view of the globalisation of the economy and the advancement in technology in various areas of fishing. There is need for a comprehensive deep sea fishing regulation. At the same time the interests of coastal fishermen and their employment in the fishing industry have to be protected.

There is poaching by foreign vessels in important fishing grounds like sandheads and so the legal provisions with regard to poaching should be made foolproof. The need to develop modern technologies for storage, processing and marketing of fish is also urgent. Inadequate infrastructure like roads from fish landing centres to major marketing centres in the country is one of the factors responsible for the fishermen not getting a proper price for their catch.

The importance of remote sensing technologies for identifying potential fishing zones and dissemination of such information to the coastal fishermen was also highlighted. Provision of adequate financial credit and banking facilities for fishermen is also necessary for upgrading their technology and improving their economic position. Not much has been done in this area even

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though similar efforts have successfully been undertaken in the areas of agriculture, dairy, poultry and animal husbandry. It is also necessary to provide alternative means of livelihood to



the family members of fisherfolk so that the pressure on coastal fishing does not further increase.

Whatever effort was now being made towards exploration and exploitation of fish is only confined to available resources. There is a great need to develop new resources through sea ranching and mariculture in enclosed and semi-

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enclosed water bodies. Unless the net harvestable potential is increased by increasing the biomass and the fishstock through modern technologies, the attempts at exploitation of the existing resources would meet a dead end very soon. The ocean system is dynamic. Topographical changes lead to changes in the currents and in turn to the disappearance of species from an area. The same species may then turn up elsewhere.

Instead of dumping unwanted bycatch, it should be brought to the shore and converted into fish feed for aquaculture, etc. It can also be processed as human food. Such processes are available but they have not been exploited. The extension work in this regard is poor. There is also need to build up consumer acceptance of the products.

Considerable work on aquaculture had been done in India, but that has been ignored and technology brought in from abroad. This has had disastrous socio-economic and environmental impacts. There is still scope for sustainable aquaculture. It is capital intensive, hence cooperatives are needed. The problems of aquac-

ulture are not only due to the big companies. There is no regulatory authority and our own entrepreneurs have spoiled the system.

## 7. Marine environment protection

The coastal zone, which constitutes some of the world's most productive areas providing valuable marine resources is very important to the national economy. The increasing population is imposing considerable stress on the coastal and marine environment. A proper approach to effectively manage the coastal and marine environment requires detailed information with regard to water quality, sediment quality and biological characteristics of the intertidal and nearshore coastal waters.

The Coastal Zone Regulations issued in India under the Environmental Protection Act by the Ministry of Environment and Forests have not proved to be adequate to address the problem of marine environment management. There is an immediate necessity to have long term ecosystems monitoring and an evaluation of the assimilative capacity of the coastal seas in various areas of the Indian Ocean.

The environment in developing countries has to be understood in the context of overall development and well being of the people. Development should not be viewed as being anti-environment. A proper symbiotic relationship should be built between environment and development. If a development scheme does not meet the environmental standards, the proper answer is to look for alternative approaches and not to give up the scheme altogether.

While it is recognised that the organised industry is slowly disciplining itself in following proper environmental standards, it is the effluents from unorganised and small scale industry in sectors like chemicals, leather, textiles, etc. and the huge quantity of domestic wastes from municipal corporations and other local bodies which are posing a threat to the coastal and marine areas. There is need for adequate political and administrative will to enforce discipline in these sectors.

Effluent treatment should not be regarded as an isolated activity taken at the end of the produc-



tion chain. Instead it should be integrated into the production technology itself so that the generation of effluents can itself be properly addressed. It is noticed that some of the technologies are not suitable for small scale industries. Such industries need to be removed from the small scale sector list.

The Pollution Control Boards have raised the issue of public interest litigation. They point out the serious flaw in the legal framework which prevents them from directly approaching the High Courts or the Supreme Court. Trials of environment related offenses, therefore, take a long time and the Boards have to go through the entire hierarchy of the judicial system to get justice. There should be provision for compounding of cases by payment of heavy penalties instead of only resorting to conviction and imprisonment.

Millions of tonnes of oil moves through the Indian Ocean and we have no resources or mechanism to tackle the possible disasters. Port-State control for preventing pollution is very important. There are already four arrangements (Paris, Chilean, Asia-Pacific and Caribbean MoUs). Yet there has been no initiative in the Indian Ocean Region. It is the aim of IMO to have port-state control in the whole world by the year 2000.

## 8. Research and development

Research and development (R&D) would need to underpin ocean development. Research on the oceans tends to be costly and so it should be integrated and interdisciplinary, involve networks of institutions, be focused and undertaken in mission mode. Research also needs to be relevant to the real needs of the people and its results need to be widely disseminated. The government and the R&D laboratories are generally unwilling to share the data which would help the people and NGOs to argue their cases. There is a general lack of information.

International/regional cooperation in ocean resources development is very poor due to stress on security issues; cooperation is needed in economic and R&D terms. Regional R&D is neces-

sary otherwise the developing countries will be exploited by the richer ones. We have to network the existing coastal institutions.

There is an urgent need for interdisciplinary and integrated R&D programme involving physical and social scientists - R&D should not only be for carrying out research activities related to technology development but also for tackling socio-economic problems. Ocean research is costly and different institutions should pool their resources to carry out concurrent research and exchange data. Collective effort is needed for documenting the resources of the Indian Ocean.

There is a difference of view as to whether research funds should be drawn from private industry. One view is that such a linkage is necessary for technologies to be operationalised. The counter opinion is that it might bias the view of research institutions regarding environmental impacts in favour of industries. Besides, technologies suitable for the poor would not be generated.

The possible sea level rise and its impact on the coastal zone and its economic activity needs to be considered and the physical, ecological, socio-economic and legal/institutional effect of sea level rise and its impact on coastal zone activity evaluated.

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There is, however, difference of opinion about the degree of sea level rise in a fixed time span and its immediate threat to the coastal population. The threat posed by human activities in the coastal and marine areas is considered to be much more immediate than a possible sea level rise, the latter being long term in nature.

To have a good quantitative understanding of the oceanic processes within the coastal zone so



as have sustainable exploitation, it is necessary to do research on:

- the system of coastal currents and its link with large-scale circulation;
- sediment transport and its impacts;
- the transport of carbon and other biogenic elements in the coastal water column and sediments;

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*The water table is going down alarmingly in the megacities and seawater ingress is taking place. This is important since it is an irreversible process.*

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- exchange of matter between the coastal zone and the open ocean;
- role of the coastal zone in regulating chemical composition of the atmosphere;
- impact of human activities on the natural biogeochemical cycles; ways of increasing marine food production to its optimum capacity through mariculture.

Instead of individual coastal regions, the unit of study should be a whole body of water, eg., the Bay of Bengal or the Arabian Sea. Such studies have been made on the Mediterranean and the Baltic Seas. The carrying capacity of such areas must be worked out. This would also encourage regional cooperation.

## **9. Ocean development and non-living resources**

The need is for awareness of the oceans as a combined opportunity, challenge and threat to development. The inherent conflicts in the use of oceans and its resources are between the environment and human activity, and between the users for the limited ocean resources available within the same sector as in the case of traditional and modern fishermen. The basic problem is thus one of allocating scarce coastal oceanic resources among competing ends or demands.

As economies liberalise and attract private investment powerful economic forces are unleashed. There are implications of such developments for the coastal areas.

Modern technologies are available for exploration and exploitation of living and non-living resources and energy from the oceans. These technologies should be indigenously developed. This would make the technologies developed socio-economically relevant, unlike the technologies imported for aquaculture which had produced disastrous impacts on traditional fishermen.

The most important fields in which technology development is essential are offshore oil exploration and exploitation, exploration of mineral resources in the EEZ and deep sea, and generation of power from wave energy, tidal energy and thermal gradients in oceanic water. India which has rich mineral resources in the offshore and in the deep sea has initiated various technology development programmes for exploration and exploitation of these resources. The experience of restricted regimes emerging in the world for protecting critical technologies in the areas of atomic energy and space should lead to a country like India increasing its efforts in indigenisation of important and critical ocean technologies for the country's benefit.

Apart from exploitation of resources, technology development is essential for proper management of the coastal zone by undertaking proper anti-erosion measures, tranquillity for harbours, pollution control and creation of a proper disaster warning system. Development of mathematical models to predict the degree of inundation due to storm surges is another important aspect of technology development.

## **10. Coastal zone management**

In the context of the large and increasing population living in the coastal zone, and the addition of large areas in the form of the EEZ, there is obvious need for integrated coastal zone management (ICZM).

However, many authorities have jurisdiction in the coastal zone including the EEZ. In India,



there is the Central Government, 10 States (Gujarat, Maharashtra, Goa, Karnataka, Kerala, Pondicherry, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal), 2 island territories (Andaman and Nicobar, and Lakshadweep) and a host of local authorities including panchayats, municipal corporations and port authorities. Besides, functionally, the work in all these authorities is fragmented into various ministries and departments.

ICZM thus faced many problems of an institutional nature. To meet this problem the following measures are suggested:

- A Commission or Task Force should be established by the Central Government in consultation with the concerned States to hold dialogue with all concerned and thereafter make recommendations regarding the institutional and other steps necessary to optimise development of the coastal zone and the EEZ. The recommendations of the Commission could thereafter be considered by the National Development Council.
- A National Institute for Coastal Zone Management could be set up to continuously develop ideas based on the oceanic, technological, managerial and other research being carried out in the country.
- We should have a national registry of events like accidents which happen on the Oceans and the Coastal Zone.
- Long stretches of the coast could be placed under one authority so that strategic planning for the concerned zone takes place.
- A National Coastal Mapping Agency should be set up to bring out standard maps of coastal zones, including EEZ, regarding topography, resources etc. This Agency should coordinate the work of Survey of India, Geological Survey of India, National Institute of Oceanography etc.
- Strategic planning is necessary for coastal zone as a unit. Projects should be considered together for a zone and not individually.

## 11. Laws and regulations

In 1981, the Indian Prime Minister Indira Gandhi declared a distance of 500 metres from the coastline as a 'no development' area. This directive was generally ignored and unregulated development was allowed all along the coast. In 1991, the Ministry of Environment issued the Coastal Regulation Notification and all the states were to submit their coastal zone management plans. The Coastal Zone Regulation is nothing more than a piece of legislation passed in the year 1991. There is a lack of commitment on the part of the government agencies to implement it. An Amendment made in 1994 made it even less effective. In April 1996, the Supreme Court has struck down some of the amendments and a final judgement of the Court is awaited.

One view is that the restriction on setting up of industries in the coastal zone mentioned in the Coastal Regulation Notification is negative. In fact, all the states feel the CRZ itself is negative. They feel that its focus should be more on planning and development. However, environmentalists and others feel that negative laws are also essential.

We have laws but these are not implemented and the government agencies themselves violate the rules. We cannot implement any regulation unless we get rid of corruption. Only the courts are now coming to our rescue.

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*There is need for a comprehensive deep sea fishing regulation. At the same time the interests of coastal fishermen and their employment in the fishing industry have to be protected.*

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Many committees to protect the Oceans and the environment have been set up by Government and other agencies. The membership of these committees keep changing often and as a result they become ineffective.



A long stretch of coast should be placed under one authority. Strategic planning necessary for coastal zone as a unit. Projects should be considered together for a zone and not individually. There is need for an integrated framework for coastal zone.

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*Considerable work on aquaculture had been done in India, but that has been ignored and technology brought in from abroad. This has had disastrous socio-economic and environmental impacts.*

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## 12. Environmental impact assessment (EIA)

EIA must be mandatory for any development in the coastal zone. ISO 9000 type of certification should be insisted upon so that clean and pure industries are set up in the coastal zone. The statutory environmental audit is often done by ignorant persons. Any audit should also point out why a given practice is wrong.

The pollution control boards are ineffective and the EIA done through Ministry of Environment is also unsatisfactory. There is distortion in development. When the EIA is against the setting up of an industry, the industry simply moves to another state.

Industries should be made to internalise the costs of the environment. In all projects, the social and environmental costs must be included at the initial planning stage itself. We need common effluent treatment plants. These plants can also monitor whether the factories follow the rules.

## 13. Public cooperation

The coastal zone is inhabited by a large number of coastal communities practising fishing, agriculture, arts and crafts etc. No sustainable development would be possible without involving such communities and getting their cooperation. Laws, regulations, EIAs etc., only impact organised sectors. But unless the masses under-

stand the importance of sustainable development, and their stake in it, environmental degradation will continue.

For the public in any area to be induced to cooperate, there has to be awareness of what is going on in the area and how the proposed measures will benefit the people. The measure has to be presented in the language and idiom of the masses and one has to show how it solves the problems of the area. The benefits to the people have to be tangible and not be seen as just leading to environmental stabilisation. They have to be provided with feasible alternative solutions regarding livelihood and resources.

Local populace should be made aware of the results of R&D institutions and the data should be available to the public for reference purposes. Research is to be demystified and brought to a common level to change the common man's concept of R&D. Results of research activities should be published in regional languages and distributed to the common public.

There should be a database on coastal regulation zones, Law of the Sea, Agenda 21 etc. We can then create an awareness of the intricacies of coastal zone management and disseminate the information to proposers of new projects and to the policy makers.

The role of NGOs is important. The Scientist - NGO - People combination is vital for Coastal Zone Management. There is also a need for the education of scientists by the NGOs and the public. Campaigning for public awareness through NGOs and government is necessary. For example, the education of the public with regard to the importance of the mangroves is needed. NGOs may be encouraged to carry out research activities and to look into the environmental issues.

## 14. Conclusion

Finally, after the hearings, the discussions, the papers, the questionnaires, what is ringing in one's mind are the words of a participant at one of the hearings:

*We must remember that  
we are not the creators of the oceans,  
we are mere users of this resource.*

