

Concepts, Approaches and Applications of Integrated Coastal Zone Management in Planning and Management of Indian Coast

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Abstract: The Indian coastal region has a privileged combination of valuable natural resources and unique landscape. That is why living on the coast and utilising these natural resources are as old a process as the origin of civilisation. As per the last census (1991) in India, the coastal areas have become the focal point of rapid development. Livelihood and social structure of coastal residents are directly linked to coastal resource utilization. Therefore, many of the problems encountered in the coastal zone result in conflict between the broader concepts of conservation versus development. The goal of coastal planning and management in India is to achieve a balance between these two.

In order to regulate coastal development and to ensure minimisation of long term problems, a specific coastal legislation namely Coastal Regulation Zone (CRZ) was enacted in the year 1991 defining the various zones.

This CRZ is an environmental legislation attempting to regulate the relationship between people, their activities and the coastal environment. Unfortunately, it has not achieved a balance between the human activities and the environmental interests. Since, no government guidelines and regulation can be successfully implemented without strong public participation, Government of India has initiated a more integrated and balanced approach towards planning and management of coastal zone. This paper highlights the need for implementation of such an Integrated Coastal Zone Management (ICZM) program as a prioritised national program in India.

Keywords: CRZ, ICZM, Concepts.

INTRODUCTION

Coastal zone is the transitional area between land and sea (Fig.1) influenced by both terrestrial and marine environments. About 7500 km long Indian coastline (Table) varies from open sea to semi closed (creeks, lagoons) coastal waters and shows significant diversity in environmental and demographic features. The coastal urbanisation produces a full range of human activities along the Indian Coast including industry and commerce (mostly port activities), fishing, cultivation of mangroves, mining of sands and other minerals, defence operation, research and exploitation of marine reserves (Table). The skewed growth in anthropogenic activities, in the coastal areas has generated tremendous stress upon natural ecosystems and created problems for their proper management. In addition, the Indian coastline needs to be protected from natural hazards, such as beach erosion, sea level rise, storms, cyclones etc. Keeping these facts in view, Government of India, on the recommendation of Ministry of Environment and Forest (MoEF), passed a legislation called Coastal Regulation Zone (CRZ) in the year 1991. Under this legislative act, MoEF demarcates the zones of coastal areas, covering a distance of 500 meters from High Tide Line (HTL) in the open coast and 100 meters in case of estuary and creeks. This legislation

also established the framework for land use plan as well as relationship between the coastal residents and the coastal environment (Pathak and Sinha, 2000).

In recent years, the emphasis of coastal planning and management is on conservation of natural resources for which an integrated approach is essential in conjunction with sustainable use of coastal resources. The Integrated Coastal Zone Management (ICZM) is generally defined as a dynamic process in which a coordinated strategy is developed and implemented for the allocation of environmental, social, cultural and institutional resources to achieve the conservation and sustainable multiple use of the coastal resources (CAMP Network, 1989).

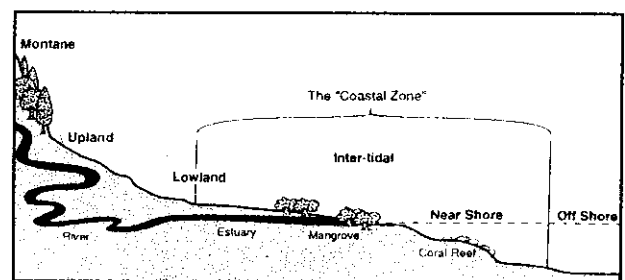


Fig.1 : Coastal Zone

Table: Indian Coastline and Demographic Features

State	Coastal Length in Kms.	Coastal Population in Millions	Growth in Every 10 years
Gujarat	1214.7	32.78	20.80
Maharashtra	652.6	9.40	25.36
Karnataka	280.0	33.99	20.69
Goa		1.16	15.96
Kerala	569.7	23.69	13.98
Lakshadweep	132.0	0.051	28.47
Tamil Nadu	906.9	21.99	14.94
Pondicherry	30.6	0.80	30.60
Andhra Pradesh	973.7	28.65	23.82
Orissa	456.4	15.01	19.50
West Bengal	157.5	14.05	24.53
Andaman and Nicobar islands	1962.0	2.80	48.70
Daman and Diu		0.10	28.43
Total	7516.6	154.381	

OBJECTIVES OF ICZM

The implementation of ICZM program is associated with the following objectives (modified after, King and Olson, 1988):

- i) to develop the national policy, legislation and standards;
- ii) to ensure integrated approaches to assess and evaluate the sustainability of development policies;
- iii) to create and implement the state/district/taluk policies and plans;
- iv) to develop the local and/or special area management plans that have local focus;
- v) to improve planning and decision making by predicting impacts on the socioeconomic environments and to ensure that the environmental concerns are considered along with economic, financial and technological factors in decision making;
- vi) to identify the existing and projected uses of coastal areas and their interactions;
- vii) to provide the means of information necessary for the reliable prediction of impacts understandable by policy makers;
- viii) to facilitate consideration of cumulative and delayed impacts; and
- ix) to enable the government to enforce decisions based on the results of Environment Impact Assessment (EIA) studies.

With such objectives, ICZM keeps focus on specific environmental problems as well as on large-scale practical

management alternatives. However, under the existing political, economic and social situations, proper implementation of ICZM appears difficult.

CURRENT SCENARIO

Well-intended efforts to develop and diversify the economic activities of coastal areas often inadvertently create new problems, such as, (i) inappropriate land use and management resulting in large scale erosion and sedimentation, (ii) improper siting of industrial or other types of development in coastal areas causing loss of critical habitats and (iii) pollution from domestic, industrial, agriculture and aquaculture sources. Similarly, welfare measures like conservation of natural resources, rehabilitation of coastal residents and their socioeconomic development programs formulated by the government, are also not progressing as desired.

ISSUES MOTIVATING INITIATION OF ICZM PROGRAMS

Generic type of issues, modified after Merion (1987) and presented herein are in fact the motivating factors, largely responsible for initiation of ICZM Programs.

i) Impact problem

Coastal erosion, sea level rise and the discharge of polluted domestic or industrial sewage are the major impact problems, which affect the entire Indian coast. In addition, deterioration of coastal habitats and reduction in recreational opportunities as a result of urbanisation, have been taking place rapidly in the Indian coastal areas.

ii) Organisational problems

As far as the organisational problems are concerned, lack of cohesive interaction between administration and legal institutions, between scientific and management agencies, absence of trained personnel with communicative skills, lack of awareness on the intrinsic and interdependent relationship between the hinterland and coastal zone and overlapping responsibilities among the government units and the public agencies, confusing and contradictory laws and regulations and insufficient resources for adequate coastal management are some of the significant issues (Brown, 1997).

iii) Lack of recognition of the issues

The complex interaction of factors and activities that characterise the coastal zone has not been appreciated either by the government or by the public. Moreover, coastal problems are not considered from an integral or system point of view, but rather from each of the scientific sectors

involved. Coastal management with its inherent complexity, generated by diverse ecosystems and greater resource development opportunities, requires specific set of strategies – innovation in planning and intellectualism in implementing.

iv) Diversion of resources

Many resource-related programs have been diverted either by central or state government agencies under economic and political compulsions to satisfy personal or group interests, by virtue of which a number of policy and planning decisions are often taken for short term economic and political gains (Noronha, 1977) thereby neglecting the long term strategic values of the coastal environments. As the Indian economic policy advocates exploitation of coastal resources with innovative technologies, formulation of an economically viable plan has become imperative and allocation of the coast to a suitable agency, a priority. Thus under the ICZM plan, these problems have been identified and the strategies are being made to minimise such conflicts on the issue of coastal resources. The government officials need to be instructed by their authorities to supervise the coastal environment and to ensure the correct use of these resources.

v) Inadequate information

The scientific information required for the proper implementation of ICZM plan involves marine research which is expensive, especially for the developing countries like India, lack of scientific information on coastal zone comes in the way of implementing the management program. Since marine research data is essential for the prediction of the impact of human activities on coastal resources, it is important to link the administrative measures to rigorous scientific investigations. However, the benefits of these scientific investigations require several years before they become apparent.

Thus, it is obvious that, the enforcement of existing legislation on coastal management is often beset with problems without public participation. Moreover, participatory processes in the realms of planning and progressive information input into the system may operate at different levels and frequencies. As ICZM is built upon five major management elements (IPCC, 1994): integration, coordination, processes, issues and management, interactive coordination amongst government officials, environmentalists, economic planners and public will minimise the problems.

FUTURE OPTIONS

An integrated coastal zone management system is considered effective as it leads to better decision-making about the utilisation, preservation and maintenance of

coastal regions as well as using its resources in a planned manner. Broad scale sectoral planning is effective as a coastal management strategy to integrate the socioeconomic activities such as fisheries, tourism, industrial set up, public services etc. This planning in combination with resource management, capital investment, infrastructure development and land use planning is particularly appropriate for areas where conflicting uses and developments are restricted by the physiographic and geomorphological features such as rock cliffs, berm crest, narrow coastal stretches etc (Pathak and Sinha, 2000).

Similarly, the planners must recognise that modification of land areas has a potential for adverse effects on lagoon, estuaries and littoral resource system (Mulkey et al., 1982). Therefore, economic planners in their efforts to devise policy mechanism for using coastal resources need to adopt a systematic approach with the environmentalists. Economic growth and associated environmental impacts often cause major problems to be addressed in coastal planning efforts. Therefore, as a practical approach, the economic planners must be concerned with those economic activities upon which habitats of coastal areas mainly depend (Pathak et al., 2000). The ideal integrated infrastructure planning is one of the strongest environmental management tools in the jurisdiction of Central Government that will provide adequate environmental protection while minimising the adverse economic impacts of public policies. The following three basic integrated approaches may be adopted:

- a) a set of public policies;
- b) a framework of procedures for carrying out these policies; and
- c) a set of organisations or agencies which implement these policies;

Many of the basic elements of a coastal management plan exist, but they are mostly uncoordinated and ad hoc in nature. Therefore, under the ICZM scheme, it should be made possible to achieve coordination in coastal management through improved and focussed communication and application of existing powers within already recognised boundaries. The greatest opportunity for improvement seems to lie in refinement of the existing procedural framework. Jurisdiction over the coastal areas for the purpose of managing specific issues or resources is somewhat fragmented among some institutions in India.

The offshore activities, under the new coastal development plan, present a more complex policy issue as these may exist within a few kilometers of the shore or may extend out to several kms on the outer continental shelf. Government jurisdiction here will vary depending on the distance from the shore. As offshore activities like oil and mineral explorations increase along the coastal waters of India, the benefits of economic activity come into conflict with environmental issues (Price, 1987). It also continues

to raise political issues, especially among many local interests who view the environmental risk more seriously than the economic benefit to the local region. For the offshore activities, the economic planners are using the shore as the most preferred and desirable location. It is expected that the involvement of local public agencies will concentrate their attention near and on the shoreline, although it is conceivable that local government or port authorities can be involved in operation and regulation of the offshore site itself. For seaport, the jurisdiction is often limited to land in proximity to the harbour, although a port may own land outside the immediate harbour area.

The ability of government to influence offshore activities depends primarily on their integrated management plans, which involve the basic decision on land use, site selection and environmental risk by comprehensive planning and assessment. In addition, the ICZM will be helpful in solving some of the important issues like conflicts between the environmentalists and the economic developers.

CONCLUSION

The crucially important aspect of all efforts in integrated coastal area management is the need for good communications among the participating agencies and the public (Lowry, 1993). Consensus building, information transfer and public education are, therefore, important ingredients for the success of any coastal zone program. To make the coastal management program effective and efficient, it must be issue based. The coastal management

program in India will have the first opportunity to test its applicability through the experience gained from similar program proposals implemented by other nations. However, information on the following topics will make the program implementation easier.

- i) a brief history of coastal states on the distribution of existing and projected human population and changing patterns of their activities as well as the impact of those activities upon living and nonliving resources;
- ii) the economic & environmental relationship of the coastal states to the existing larger ecosystem;
- iii) the environmental characteristics of the province, including climate, soils, vegetation and fresh water quantity and quality;
- iv) known resources of states and their potential economic significance; and
- v) anticipated long term and short term development plans for each of the coastal states and analyses of negative, positive and neutral impact of these developments upon the economic, social and cultural resources of the region and the ecosystem. This exercise will help in identifying the sustainable level of use.

In conclusion, the integrity of the entire ICZM process depends on the equitable balancing of views of government officials and the coastal residents. The crucial point to be recognised is that the issues of ICZM programs are to be addressed primarily by social, political and economic forces, rather than by technical solutions alone.

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