



Effectiveness of the Indian coastal regulation zones provisions for coastal zone management and its evaluation using SWOT analysis

Jitendra K. Panigrahi*, Pratap K. Mohanty

Department of Marine Sciences, Berhampur University, Berhampur 760007, India

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ABSTRACT

In India provision for Coastal Regulation Zone (CRZ) has been formally introduced in 1991. It relied on the institutional framework that has a supporting legislative, administrative and procedural set up. National, State and District authorities together are sharing the responsibility of its development and management. In this article, firstly an overview of the CRZ provision and background to the CRZ norms in India are presented. It examines the progress made in the CRZ provisions through various amendments since its implementation (1991) and also depicts the key attributes of the new CRZ (2011) notification. A Strength, Weakness, Opportunity and Threat (SWOT) analysis is carried out in this article to identify strategic directions of CRZ practice/system. The analysis reveals that while considerable progress has been made in Indian CRZ provisions through successive amendments such as resource conservation and pollution control, implementation of Integrated Coastal Zone Management (ICZM) programme in various coastal states and greater involvement of corporate sectors in CZM, there are several constraints, ranging from improper scientific basis, guidelines, lack of baseline information and weak social basis, ambiguity in project activities, ineffective implementation and enforcement. The opportunities are realized as increasing public awareness, initiative of environmental groups, and forward thinking to sustainably manage the coastal resources by integrating ICZM to plans and policies. Poor Governance, rapid economic reforms, lack of scientific forecast and undue favors to coastal infrastructure are some of the foreseen threats to the system. Finally recommendations/suggestions are made to improve the effectiveness of the Coastal Zone Management (CZM) and CRZ provision in India.

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1. Introduction

Coastal zone is always on the forefront of civilization and has been by far the most exploited geomorphic unit of the earth. Its easy access and resources have always attracted human activities, but its complexity in understanding has led to misuse and abuse. Several factors are contributing to the increased pressure in the coastal zone. These include the rapid population growth due to urbanization and industrialization along the coastline, indiscriminate use of coastal resources and the highest occurrence of natural hazards along the coast. The coastal zone occupies only about 8% of the earth's terrestrial surface that is habitable but accommodates 37% and 44% of the world's population (as of 1994) within 100 km and 150 km of a coastline respectively (Cohen et al., 1997). In developing nations, the majority of growth in coastal zone population is among the lowest income groups (Sorensen, 2002).

* Corresponding author. Presently at: DHI-NTU Water & Environment Research Centre, Singapore. Tel.: +91 680 2227262.

E-mail address: jitu@scientist.com (J.K. Panigrahi).

Coastal zone is the area of interaction between land and sea, which is influenced by both terrestrial and marine environment. In the context of land–ocean interaction, coastal zone is defined as extending from the coastal plains to the outer edge of the continental shelves, approximately matching the region that has been alternately flooded and exposed during the sea level fluctuations of the late quaternary period (Pernetta and Milliman, 1993). The coastal zone ecosystems which are rich in natural resources and contribute approximately one fifth of total global primary production, are under severe pressure (Mohanty et al., 2008). Developments along the coast have proceeded in an ad-hoc, uncoordinated and unsustainable manner and have resulted in conflicts over coastal uses and degradation of coastal resources. Even without human intervention, coastal zones are dynamic and constantly changing environment. Human induced pressures in the coastal zone exacerbate rates of change and highlight the need for management and conservation of coastal areas by implementing regulations and suitable CZM plans.

India has a coastline of about 7516 km long and 4198 islands are spread along the main coast of Andaman, Nicobar and

Lakshadweep group. It has 2.02 million sq. km area of Exclusive Economic Zone (EEZ). The geomorphology of the coastline is dominated by delta processes. The east and west coasts of India comprise a wide variety of diverse habitats and ecosystems. These include estuaries, coral reefs, seagrass beds, mangrove swamps, creeks, back waters, lagoons to bays, cliffs, sandy and rocky beaches. The diverse habitat and ecosystems have important ecosystem functions and have both aesthetic and economic value. The thirteen Maritime Provinces (states and union territories) of India hold about 49% of the country's population. Over the years, growth of population, globalization of economy, technological development and increasing competition for the coastal resources have caused conflicts between the resource users. Consequently, policies, regulations and laws on coastal zone have been introduced. The late prime minister of India, Mrs. Indira Gandhi first made a directive in November 1981 "to keep beaches free from all kinds of artificial development at least up to 500 m from the high tide mark". Thereafter, increased awareness among coastal managers and government departments of the enormous ecological and economic value of the coastal zone and the realization that a comprehensive and co-ordinated approach to coastal zone management is required led to the promulgation of the first Indian CRZ notification in 1991 (MoEF, 1991). The Ministry of Environment and Forest (MoEF), Government of India, in exercise of the powers conferred by subsection (1) and clause (v) of subsection (2) of section (3) of the Environment (protection) Act, 1986 for the first time on 19th February, 1991 promulgated the CRZ notification 1991 and declared the specific coastal stretches as CRZ and imposed restrictions on industries operations and processes in the CRZ (MoEF, 1991). The prime objective of the notification was to ensure livelihood security to the fisher communities and other local communities living in the coastal areas, to conserve and protect coastal stretches, its unique environment and its marine area and to promote development through sustainable manner based on scientific principles taking into account the dangers of natural hazards in the coastal areas. Since its promulgation in 1991, the CRZ 1991 notification was amended several times after receiving suggestions and objections received from the public and various stakeholders, and at the directions of the High courts and Supreme Court of India. Finally, the new notification, CRZ-2011 was issued on 6th January, 2011.

The purpose of this article is to review the CRZ provisions of India and highlight the statutory, administrative and procedural arrangements in CRZ provision, report on the progress made from 1991 to 2011, identify areas still requiring attention and recommend ways of improving the effectiveness of CRZ provisions. SWOT (strength, weakness, opportunity and threat) analysis is made to achieve the said purposes.

2. CRZ provision of India (1991–2011)

In developed and developing countries coastal zone management (CZM) programmes and CRZ provisions have been developed in response to crises (Clark, 1991). Indiscriminate use of coastal resources and various conflicts along the coastal zone of Maritime Provinces of India (Fig. 1) led to deterioration and degradation of coastal resources. These activities including development of industries etc. severely affected the communities living along the coastal zone and dependent on coastal resources. In order to check further deterioration and exploitation of coastal resources and to bring harmony among the coastal user community, and to make the development and the resource conservation resilient, the government of India promulgated a notification on the 19th February 1991, called as CRZ notification 1991. Ministry of Environment and Forest (Department of Environment, Forests and Wildlife) is the nodal

ministry which promulgated the CRZ notification and advise the government regarding environmental policy including CRZ and related matters.

2.1. CRZ-1991 notification

CRZ 1991 notification comprises of three parts; (1) Definition and classification of CRZ, (2) prohibited and permissible activities under CRZ and (3) CRZ monitoring and enforcement. The government of India, in exercise of the power conferred under Environment (protection) Rules, 1986, declared the coastal stretches of seas, bays, estuaries, creeks, rivers and back waters which are influenced by tidal action (in the landward side) up to 500 m from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and the HTL as CRZ. The HTL was defined as the line on the land up to which the highest water line reaches during spring tide. A provision was made to demarcate the HTL in all parts of the country by appropriate authorities in consultation with the Surveyor General of India. In case of rivers, creeks and back waters, the distance between HTL and 100 m on both sides and the width of the creek, river or back water whichever is less is also declared as CRZ. The distance up to which development along such tidal influenced water bodies is regulated under CRZ is the distance up to which the tidal effect of sea is experienced in rivers, creeks and back waters CRZ-1991. This CRZ definition created lots of confusion as the tidal influence in a river; creek and back water varies diurnally, seasonally as well as along the cross section. This led to improper CZMP wherein the CRZ was delineated.

2.2. CRZ -1991 classification

The coastal stretches within the 500 m of HTL on the landward side are classified under four categories to regulate the developmental activities, which often degrade the coastal environment. (1) Ecologically sensitive areas like national parks/marine parks, sanctuaries, reserve forests, wildlife habitats, mangroves, corals/coral reefs, areas close to breeding and spawning grounds of fish and other marine life, areas rich in bio-diversity, areas of outstanding natural beauty/historical/heritage areas, areas rich in genetic diversity, inter-tidal areas and other areas which are under the threats of sea level rise due to global warming comes under the category, CRZ-I (Fig. 2). This is the category with most stringent prohibitions. No new constructions within 500 m of the HTL and no constructions are permitted within LTL and HTL except those allowed under permissible activities. Exemptions were made in the case of Sunderbans Biosphere reserve area in West Bengal. (2) Already developed areas within the municipal limits or in other legally designated urban areas which have already substantially built up to or close to the shoreline with drainage and approach roads, water supply and sewerage main facilities are designated under CRZ-II (Fig. 3). Generally coastal areas in cities and towns are consider as CRZ-II and thus prohibitions are less stringent in this zone. Constructions of buildings are neither permitted on the seaward side of the existing road nor on seaward side of the existing authorized structures. However, buildings are permitted on the landward side of existing/proposed road and authorized structures subject to the existing local town and country planning regulations including the existing norms of Floor space Index (FSI) or Floor Area Ratio (FAR). (3) Relatively undisturbed areas in the coastal zone in the rural areas within municipal limits or in other designated urban areas which are not substantially built and those which do not belong to either CRZ-I or CRZ-II categories are classified under CRZ-III (Fig. 4). There are stringent prohibitions within 500 m from HTL in this zone. 200 m from HTL on the landward side is called No Development Zone (NDZ) and next 300 m is known as

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