

Building Sustainable Governance

Indian Coastal Policy: A Review

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I. Introduction - India's coastline

India has a coastline of about 5400km (mainland) with a total of over 7500km including islands. Nearly a quarter of the country's population lives within 50km of the coast [1]. A wide range of coastal ecosystems such as mangroves, sea grass beds, coral reefs, tidal flats, estuaries, lagoons, sand dunes and salt marshes are found along the coast. The salt marshes of the Rann of Kutch in Gujarat, the mangroves of the Sunderban, the Chilika lagoon, the sea grass beds and coral reefs in the Gulf of Mannar are well known sensitive coastal ecosystems. A number of rivers flow into the Bay of Bengal on the east coast as well as the Arabian Sea on the west coast carrying large quantities of sediment; however while the east coast has large deltas, the west coast has only estuaries and backwaters.

I.1 Major coastal issues

In recent times, the coast has become a conflict zone with multiple activities and stakeholders vying for coastal resources. Traditional activities such as fisheries, salt pans, coastal agriculture and aquaculture exist along with modern industries including steel plants, power plants and various manufacturing industries. Important coastal cities in India include Mumbai, Chennai, Kolkata, Visakhapatnam and Kochi. About 25% of the population of 644 class I cities and class II¹ towns of India inhabits in 87 coastal cities and towns. On an average the water supply in the coastal cities and towns is 144.39 LPCD and the wastewater generation is 5560.99 MLD, which is one third of the wastewater generated by the cities and towns of the country. Out of this only 521.51 MLD of wastewater receives various levels of treatment and the remaining is disposed without any kind of treatment into the coastal waters [2]. This water is from multiple sources including human settlements, industrial wastes and agricultural runoff. Because of the industrialization of coastal areas and to support the growing populations, there have also been a lot of changes in the land use along the coast. For example, dunes have been flattened and built up, mangroves and many coastal water bodies have been cleared and reclaimed. In addition to industries and settlements, coastal tourism is a growing sector in certain areas (see pictures 1 to 3).

In addition to the traditional demands on the coastal space, new threats to the coast and coastal ecosystems are emerging, both from natural and anthropogenic causes. For example, the country-level estimates of urban, rural and total population and land area in a low elevation coastal zone (LECZ) [3] generated by the GRUMP project for India shows that large patches of the east coast and some areas in the west coast fall in the LECZ region and hence are vulnerable to sea level rise (Figure 1). Increased and erratic precipitation levels in many coastal cities have resulted in coastal floods and damage to housing and infrastructure and there have been numerous reports in the press about unexpected seawater intrusions and flooding of coastal hamlets in Andhra Pradesh and Tamil Nadu.

The Ministry of Environment and Forests, Government of India, points out that "most of India's coastal regions are fertile and under paddy cultivation, which is sensitive to inundation and salinization. Coastal infrastructure, tourist activities and onshore oil exploration are also at risk. Variations in climatic patterns are expected to result in an increase in the frequency and intensity of extreme events such as cyclones. These will greatly affect the population in coastal areas and may cause devastation in low-income rural

¹ The Indian official statistics classify cities into 6 categories. The "Class I" groups cities with more than 100 000 inhabitants ; "Class II", towns with more than 50 000 inhabitants

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areas” [4]. These effects have already been seen in the impact caused by cyclones such as Baaz and Fanoos (2005), Sidr (2007), Nargis and Nisha (2008) and Aila (2009).

Population Density within and outside of a 10m Low Elevation Coastal Zone

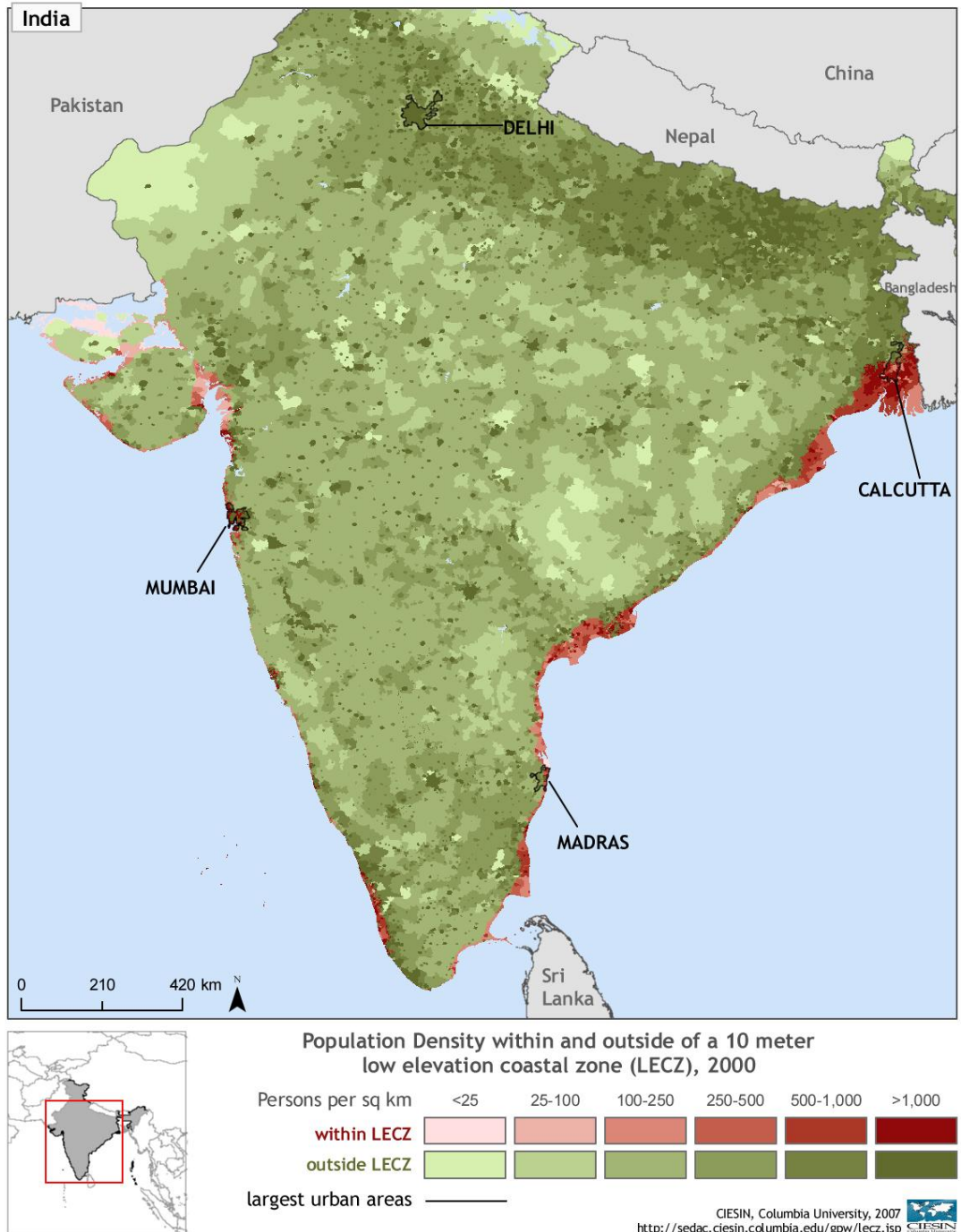


Figure I: Population Density within and outside of a 10m LECZ [3]

Another major problem confronting coastal communities is the setting up of Special Economic Zones in coastal areas. The Special Economic Zones (SEZs) Policy announced in April 2000 intended to make SEZs an engine for economic growth supported by quality

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Picture 1: Illegal settlements in the flood-prone banks of River Adyar, Chennai, India



Picture 2: Illegal construction on sand dunes, India



Picture 3: Severe erosion and illegal construction on the sand dunes along the Puri Beach, Orissa

infrastructure complemented by an attractive fiscal package, both at the Centre and the State level, with the minimum possible regulations. Subsequently, the Special Economic Zones Act, 2005, supported by SEZ Rules, came into effect on 10th February, 2006. These zones, running to thousands of hectares may be developed by any private or government party and over three quarters of those that have been approved are in the coastal states. They call for the displacement and resettlement of many coastal communities and the fishing community has come out strongly against SEZs because forced land acquisitions and destruction of the shoreline have affected their livelihoods [5]. Because they are specially notified, they do not have to go through any public consultations. Protests by the coastal communities have led to the withdrawal of some projects. Goa is so far the only state that has declared a moratorium on SEZ (see box below).

1.2 Early thoughts on coastal protection

Till the promulgation of the Coastal Regulation Zone Notification in 1991, the various coastal activities were managed with a sectoral approach. Some of the important legislation with regard to coastal activities include the Indian Fisheries Act, 1897, the Forest Act, 1927, Indian Ports Act, 1902, Wildlife (Protection) Act, 1972, Water (Prevention and control of pollution) Act, 1974, Merchant Shipping Act, 1974, Indian Coast Guards Act, 1974, Maritime Zones of India (Regulation of fishing by foreign vessels) Act, 1981, the Environment (protection) Act, 1986 while the Town and Country Planning Acts of the various states looked at the siting of industries, settlements and so on. India has also signed and ratified several important international conventions including the Convention on Biodiversity (1992), various conventions of the International Maritime Organization, CITES and the Ramsar convention and is a strong participant in major international meetings and

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conferences right from the Stockholm Conference of 1972 (UNCHE) to the 2002 Johannesburg Summit.

Goa Cabinet withdraws SEZ policy Press Trust of India / Panaji - July 24, 2009, 14:27 IST

Goa government today justified their decision to withdraw the Special Economic Zone (SEZ) policy stating that such enclaves would have "put strain on state's resources".

On June, 15, 2009, Goa Cabinet had withdrawn the three-year-old SEZ policy ceasing all the possibility of having these industrial enclaves in the state.

"The Goa government is taking into consideration the fact that setting up of SEZs shall put undue strain on state's resources," Chief Minister Digamber Kamat told the state Legislative Assembly today.

Kamat said that these zones shall put strain on the state's resources such as water and power and on the infrastructure without commensurate benefits.

Goa government is also wary that these zones would trigger large scale migration of people. Kamat said that the decision to withdraw the policy was taken keeping in mind that Goa being a small state, making huge land available for SEZ would adversely affect the future development plan of the state.

Goa had scrapped 12 SEZs while three enclaves which were notified are pending de-notification. The Union Commerce Ministry's Board of Approval is expected to take decision on this matter.

<http://www.business-standard.com/india/storypage.php?tp=on&autono=68794>

2. Evolution of the CRZ

2.1 Prime Minister Mrs. Indira Gandhi's Directive

In 1981, a directive was issued by then Prime Minister Mrs Indira Gandhi asking coastal states to take adequate measures to protect the coastal environment. This was followed by a set of guidelines to protect the country's beaches but since they had no statutory backing, they were not taken seriously. Following up on an in-house consultation, the Ministry of Environment and Forests issued a Notification under the Environment (Protection) Act, 1986. This is the Coastal Regulation Zone Notification, 1991.

2.2 CRZ 1991

Objective: The main objective of the CRZ 1991 was the declaration of coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters, which are influenced by tidal action (in the landward side) up to 500 metres from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and the HTL as Coastal Regulation Zone (CRZ) and imposing restrictions on industries, operations and processes in this zone.

Definitions: For the purposes of the CRZ notification, the High Tide Line was defined to mean the line on the land up to which the highest water line reaches during the spring tide.

Highlights: Annexure I of the CRZ notification provides the coastal area classification and development regulations:

For regulating development activities, the coastal stretches within 500 metres of High Tide Line on the landward side are classified into four categories, namely:

Category I (CRZ-I):

(i) *Areas that are ecologically sensitive and important, such as 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 of outstanding natural*

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beauty/historically/heritage areas, areas rich in genetic diversity, areas likely to be inundated due to rise in sea level consequent upon global warming and such other areas as may be declared by the Central Government or the concerned authorities at the State/Union Territory level from time to time.

(ii) *Area between Low Tide Line and the high Tide Line*

Category-II (CRZ-II):

The areas that have already been developed upto or close to the shoreline. For this purpose, "developed area" is referred to as that area within the municipal limits or in other legally designated urban areas which is already substantially built up and which has been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains.

Category-III (CRZ-III):

Areas that are relatively undisturbed and those which do not belong to either Category-I or II. These will include coastal zone in the rural areas (developed and undeveloped) and also areas within Municipal limits or in other legally designated urban areas which are not substantially built up.

Category-IV (CRZ-IV):

Coastal stretches in the Andaman & Nicobar, Lakshadweep and small islands, except those designated as CRZ-I, CRZ-II or CRZ-III.

Section 2 of the notification lists prohibited activities in the CRZ which include setting up/expansion of new industries except those of the Department of Atomic Energy and those directly requiring foreshore facilities, land reclamation, discharge of untreated wastes, mining, dressing or altering of sand dunes etc.

Section 3 is about the Regulation of Permissible Activities. Here also clearance is to be given only for those activities requiring shorefront and also lists various activities that require environmental clearance from the Ministry of Environment and Forests.

The Ministry of Environment and Forests of the Government of India comprises of two wings, namely, Environment and Forests & Wildlife.

The Environment Wing consists of 12 divisions, one of which is Impact Assessment. The function of Impact Assessment Division includes:

- Policy matters relating to Environmental Impact Assessment and its implementation.
- Appraisal of projects
- Research and Training in the area of Impact Assessment

Under Policy Issues, the division is concerned with the implementation of the provisions of the Environment (Protection) Act, 1986 as it applies to Environmental Impact Assessment. This includes identification, delineation of the areas which are ecologically fragile and where projects need to be appraised from environmental angle, taking up studies to assess the carrying capacity of different areas so that development plans can be formulated taking into account the availability of Natural Resources, technological options and the potential for the region to assimilate the waste. The Division appraises projects in the area of industry and mining, irrigation and power, transport and communication and tourism related projects. It also regulates development activities in coastal areas falling within the Coastal Regulation Zone. The projects are appraised for their environmental compatibility and accorded environmental clearance. The IA division deals with issues related to the CRZ.

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It is mandatory for all developmental projects to undergo an environmental appraisal. Guidelines for these are available on the MoEF website. Projects that are located in coastal areas require additional clearance on CRZ status. The sequence of events for obtaining clearance of projects which fall in the CRZ area or have a component in the CRZ area is outlined in the figure. The district coastal zone management authority headed by the district collector receives the applications, processes them and then forwards them to the State Coastal Zone Management Authority. For projects with investment less than Rupees Five Crores, decisions can be taken at this level itself. For larger projects, the decision making authority is the MoEF's Expert Appraisal Committee on CRZ. The approximate route and time taken for appraisal of development projects is given in Figure 3.

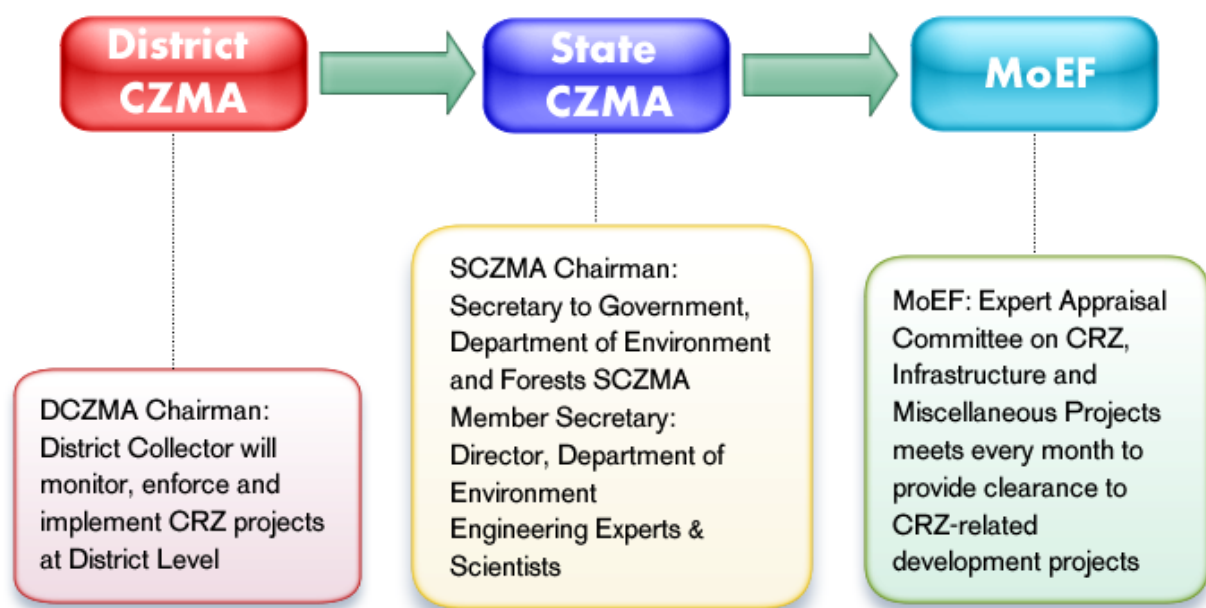


Figure 2: Outline of Clearance Process for CRZ Projects

Problems in implementation of the CRZ

Two major problems can be seen to have confronted the CRZ implementation since the notification was issued in 1991. One is the number of times the notification has been amended (25 amendments) [6] and the other is the lack of enforcement of the notification which can be related directly to the number of violations of the notification.

The main reason for difficulty in enforcement is the demarcation of the High Tide Line which is the basis of determining whether an area falls into the CRZ and if so, of what class. The MoEF has identified seven Central and State government agencies for demarcating the HTL. However, the definition given for the HTL in the notification (*the line on the land upto which the highest water line reaches during the spring tide*) has led to varied interpretation of the HTL. This has meant that the lack of a notified HTL demarcation has resulted in maps prepared by the different agencies being interpreted differently with significant variation in the line drawn by different agencies. The second requirement is the non-availability of coastal zone management maps identifying the CRZ areas.

The maps that were initially prepared by the various state governments were reportedly full of errors. The revised maps have not been submitted by any state government which makes it difficult for the project proponent and the MoEF to ensure that violations have not taken place. For example, in Tamil Nadu, only 10 of the 31 maps have been approved and the HTL

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for only 100km has been demarcated. The State Coastal Zone Authorities do not have sufficient enforcement power to ensure that their recommendations are carried out. It is therefore not surprising that violations on a small scale are rampant – and includes agriculture, shrimp farms and constructions (of roads, houses). There is no recent estimate of violations of the CRZ notification available. A study carried out in 1998, seven years after the notification was put in place counted 732 violations after partial surveys in eight coastal states. The maximum number of violations was in Kerala whose entire coast was mapped [7].

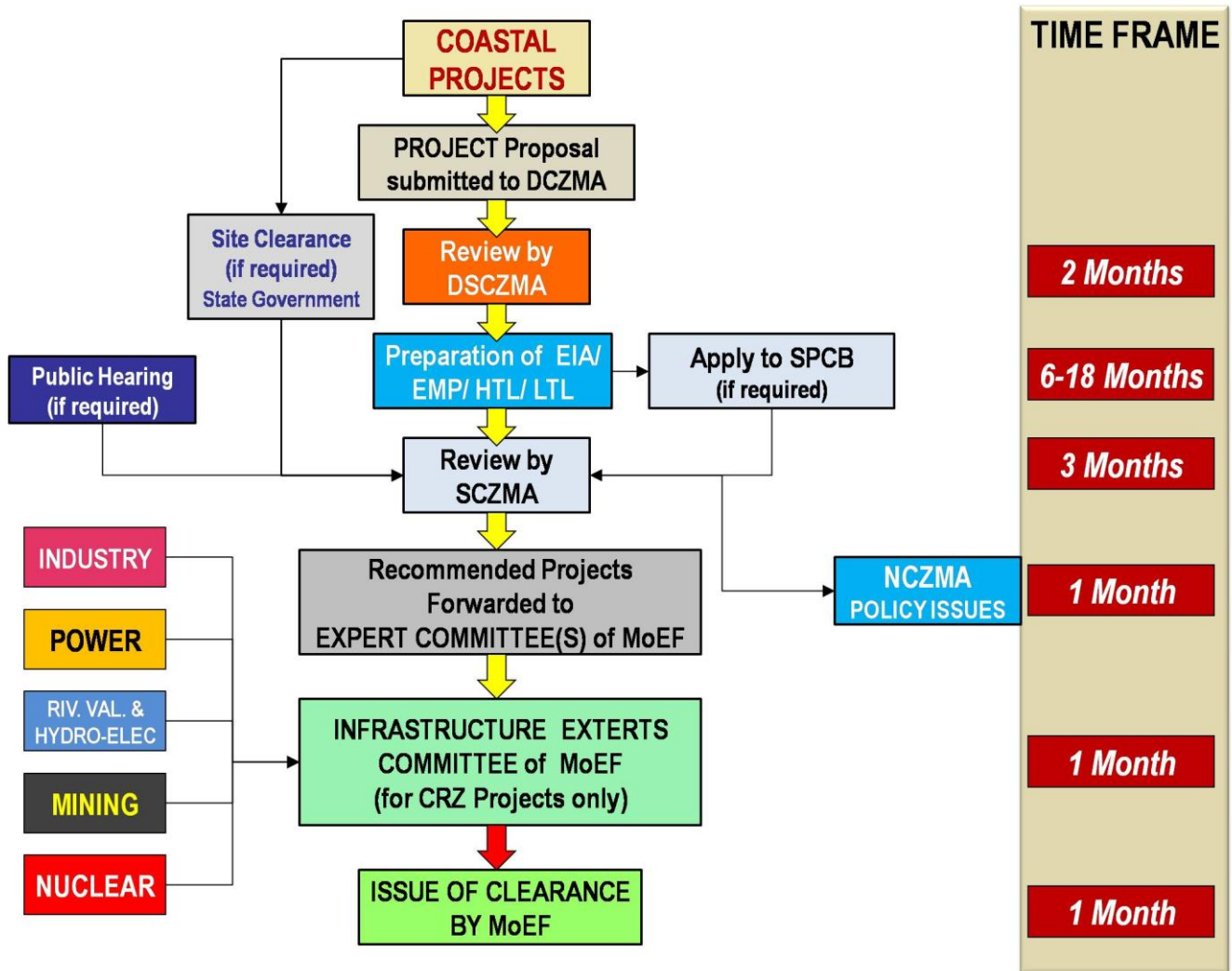


Figure 3: Flow chart with approximate time line for approval of coastal development projects in India

3. Changing World Paradigm – ICZM

December 26, 2004 – The coastlines of a dozen countries in the Indian Ocean were devastated due to the tsunami generated by an undersea earthquake off Sumatra, Indonesia. India was one of the worst affected countries with the entire coast of Tamil Nadu and Pondicherry and part of Andhra Pradesh and Kerala being affected. The Andaman and Nicobar islands were, in addition, affected by the earthquake as they were closer to the epicenter. The death toll for the Indian subcontinent was estimated at 10749. The total number of missing persons was ~5640 of which 5554 were from A&N Islands, who are feared to be dead [8].

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The sheer impact of the tsunami and the widespread destruction in a narrow area clearly showed the vulnerability of the coast. Cyclones and storm surges are well known but the destruction caused by these as well as problems of pollution along the coast, and the threat of sea-level rise is increasing and can be traced to the unplanned development along the coast.

The threats to the coastal area are not in India alone. Worldwide, there is a problem of unplanned or improperly planned development along the coastal areas which has increased the vulnerability of the coastal populations. Many countries in the world therefore have taken up Integrated Coastal Zone Management (ICZM), sometimes also referred to as Integrated Coastal Management (ICM) or Integrated Coastal Area Management (ICAM).

ICZM has been defined as **“a continuous and dynamic process by which decisions are made for sustainable use, development and protection of coastal and marine areas and resources”**[9]. Integration includes inter-sectoral, intergovernmental, spatial, science-management and international integration. Integrated management of the coastal area addresses the basic needs of the coastal population including safety against hazards, development needs and cultural values. Chapter 17 of Agenda 21 stressed that new approaches that are **“integrated in content and precautionary and anticipatory in ambit”** are required. Subsequently a number of countries have adopted ICZM practices at various levels.

3.1 The ICZM Plan

The 2004 tsunami's effects added impetus to the MoEF which had commissioned a report to bring about a change in the approach to the way coastal areas were being managed by bringing in concepts of coastal zone management. The Swaminathan committee chaired by the eminent scientist Prof. M.S. Swaminathan had been commissioned in July 2004 to carry out a comprehensive review of the CRZ 1991 notification and suggest suitable amendments to make the regulatory framework consistent with well established scientific principles of coastal zone management. The committee submitted its report in 2005 and made a series of recommendations including suggesting the use of a hazard line based on the vulnerability of the coast to natural and manmade hazards, quite similar to overarching principle of *“Reduce the vulnerability of coastal communities to natural hazards by establishing a regional early warning system; and applying construction setbacks, greenbelts and other no-build areas in each nation, founded on a science-based mapped “reference line”* formulated in Cairo [10] after the 2004 Indian Ocean tsunami.

Subsequently, the MoEF issued a draft notification called the “CMZ Notification” to replace the 1991 CRZ Notification. It was published in the gazette on 22nd July 2008 as a draft notification. The objective of the notification was “protection and sustainable development of the coastal stretches and marine environment through sustainable coastal zone management practices based on sound scientific principles taking into account the vulnerability of the coast to natural hazards, sustainable livelihood security for local communities, and conservation of ecologically and culturally significant coastal resources”. Instead of the CRZ, the coastal stretches were classified into four Coastal Management Zones.

The primary basis of the draft notification was the use of the ‘**hazard line**’ which is a line demarcated along the coast based on its vulnerability to sea-level rise, flooding and shoreline changes as per guidelines given in the appendix to the notification which states that *“For the purpose of mapping the vulnerability of the coast, four parameters are taken into account: elevation, geomorphology, sea level trends and horizontal shoreline displacement (erosion or*

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accretion)”. This is a scientific way of creating a hazard line compared to the earlier methodology followed in the CRZ notification as the 500m CRZ boundary is drawn at a radial distance uniformly from the HTL and runs parallel to the coast and the measurement of the 500m boundary does not take into account the elevation of the land. The new notification also extended the boundary of the ‘management’ zone to include the ocean realm including seabed on the seaward side of the shoreline, and the administrative boundary of the area in question on the landward side.

Subsequently, after a series of public hearings held by the Centre for Environment Education (CEE) and a Parliamentary Committee led by Dr V. Maithreyan in response to a series of protests about the draft CMZ notification, a report was presented in July 2009 by a committee once again chaired by Prof M.S. Swaminathan which advised that the draft CMZ notification be allowed to lapse and the CRZ Notification be strengthened. It is believed that a new notification retaining most of the original CRZ notification’s contents but supported by the demarcation of a hazard line rather than an arbitrary 500m line will be put in place in the near future. Hence it is of interest to understand the process of demarcating the hazard line on scientific principles, even though it may currently be considered to be more of an academic exercise.

4.0 Introduction of Scientific Understanding of the Demarcating the Hazard Line

The proposed hazard line is to be derived based on natural hazards, specifically shoreline erosion and coastal flooding. It is well known that coastlines are dynamic and the extent of processes such as erosion or flooding is constantly changing. Hence it is more meaningful to adopt a *hazard zone* concept. This zone, defined with reference to dangers from flooding and erosion, would be quite distinct a mere Setback Line. The Hazard Zone would not imply a regulatory prohibition on development (setback). Instead it would help in the identification of sections of the coast which are at higher risk to natural hazards which are currently not included as part of the ‘CRZ’, as well as show up those areas that are at relatively low risk because of factors such as elevation even though they currently lie within the regulated zone. There would be, nevertheless, a strong presumption against any future development in the hazard zone without adequate flood or erosion defenses. In other words, if the State Government decided that a future development area must be located within the Hazard Zone, for reasons of economic or social necessity, then such development must be provided with appropriate defenses. There would be no compunction on people already living in the Hazard Zone to relocate, but they should be made aware of the dangers of flood and erosion. The Integrated Coastal Zone Management Plans, once developed, would then incorporate measures to lower the vulnerability of these people to flood and erosion. This could be by offering to provide coastal defences, but more appropriately the ICZM Plan would provide for flood warning systems, cyclone shelters, better access roads for evacuation and safer structures.

Summary

The coastal zone is one of the most active and economically important parts of the country. While it is difficult to determine the exact economic value of the area, it can be estimated as representing as much as one third of the national economy. A variety of activities ranging from traditional fishing and shipping to aquaculture, ecotourism and power plants vie for space on the coast. All these sectors have an array of associated activities and impacts ranging from accelerating investment, employment and land values, to the alteration and pollution of the physical environment. The coast also has high intrinsic importance because

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of the range of critical ecosystems that serve as the habitat for a variety of flora and fauna and a crucial natural barrier to tidal surges from cyclonic storms, apart from having cultural, recreational and aesthetic value.

Coastal policy making in India faces one of the toughest challenges worldwide. It must combine consideration of the wellbeing of an enormous and growing coastal population with high, and often competing, demand for coastal space. It must balance immediate interest in development which contributes to the fast past of India's economic growth, with responsibility for ecosystem protection and sustainable use of India's coastal resources.

As noted in this paper, loss of India's ecosystems to date is substantial, partly driven by the rapid and extensive developments in the coastal zone. Some scientists have even assigned the loss of vital coastal ecosystems, such as mangrove and reefs, to exacerbating the devastating impacts of events such as the 1999 Supercyclone that hit Orissa and the 2004 tsunami where it was clearly shown that communities shielded by mangroves and coastal dunes were less impacted. As a result, there is renewed interest and political commitment to regeneration of coastal habitat and protection of bio-shields with large scale planting of casuarinas along many vulnerable coastal areas.

One of the key findings of The Millennium ecosystem assessment was the acknowledgement that reversing ecosystem degradation, whilst meeting increasing demand for their services, will involve significant changes in policy, institutions and practices. The 2004 tsunami has initiated some change in policy and practice, and perhaps given greater visibility to the human nature of vulnerability at the coast, not just the threat of environmental harm.

Debates on climate change and prospects for adaptation have furthered development of policy and coastal adaptation measures to try to mitigate risk. However, this has to be balanced with the drive and political desire for strengthened and sustainable economic growth, a drive which is particularly fierce in light of the global recession.

Here, we turn our attention again to the wellbeing of India's population – not just coastal, but national. Economic growth can bring prosperity to India's people: This scenario fits with another of the MEA's findings: that gains and losses from ecosystem change has contributed to gains in human wellbeing and economic development in India. The MEA warning 'But, these gains have been achieved at growing costs that will substantially diminish benefits that future generations obtain from ecosystems' is particularly relevant for Indian policy makers.

How to govern its coastal zone to secure the wellbeing of its future coastal users and inhabitants? Of concern is the balance of uses in the coastal zone and question over beneficiaries of large scale economic growth – who loses and who wins from coastal development. It is within the realm of ICZM research to start tackling these difficult, and politically challenging questions.

This is one of the reasons why the Swaminathan committee (2004) advised the setting up of an institution to focus on coastal zone management. The MoEF is being supported by the World Bank in this endeavour and the 'Centre' is being set up in the Anna University Chennai campus. The focus would be an institution that builds up a detailed knowledge base of the Indian coast including using technologies like satellite imagery and GIS; promote research to address emerging issues; interface and build partnerships with the coastal communities, especially fishing communities and the various stakeholders and coastal users; develop capacity for coastal management at various levels and promote and pilot techniques and technologies that promote conservation and preservation of coastal ecosystems and

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coastal areas. The Centre would serve as an advisor providing scientific inputs into the development of coastal policy and would be autonomous in nature.

India is the world's largest democracy and has a strong civil society active in environmental protection and human rights. These strengths make India an important scene in which to follow ICZM development and how it is negotiated amongst and between different governing actors. The success of ICZM policy and practice ultimately will hinge on the ability of different actors, with different needs and concerns, to deliberate, negotiate and find common ground on which to advance good change. Interactive governance has potential to contribute to sustainable coastal policy in India by increasing visibility of the plurality of actors involved in governance, and by supporting those actors to agree on common principles on which to base a governance process. The wellbeing of the human coastal population is one such 'common principle' held by natural and social scientists, policy makers and civil society.

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