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Balancing Development and Conservation: An Analysis of the Coastal Regulation Zone Regime in India

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ABSTRACT

The Coastal Regulation Zone (CRZ) regime in Indian is a policy response of enormous significance and importance in coastal management. To achieve the above objectives, this research analyzes CRZ notifications from the year 1991 to the year 2019 focusing on regulations, amendments etc. It analyses the bio-physical, legal, socio-economic consequences of CRZ policies which include issues of coastal ecosystems deterioration, clash of local economy, and lack of sufficient public participation. Using data derived from comparative assessments of coastal management systems in different countries, suggestions for better practices can be obtained. The research outcomes assert that achieving sustainable borders of India's coasts should be based on balancing environmental regime with economical and communal benefits.

Keywords: *Coast Regulation Zone, Environmental Conservation, India Coastal Legislation.*

I. INTRODUCTION

The coastal zone is always in the foreground of human development and has been the most exploited area of the earth. Its ease of access and copious resources have always attracted human beings. However, the coastal regions are constantly subjected to overuse and mismanagement. The factors contributing to pressure on these regions are the rapid increase in population growth due to urbanization and industrialization along the bank, magpie use of littoral coffer and the loftiest circumstance of natural hazards along the seacoast. ⁴

Coastal zone is the area of commerce between land and ocean, which is told by both temporal and marine terrain. In the land and ocean commerce environment, the coastal belt is outlined as dragging from the littoral downs to the external bite of the international shelves, roughly matching the region that has been alternatively swamped and exposed during the ocean position

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⁴ BiliianaCicin-Sain, 1993. Sustainable development and integrated coastal management.

oscillations of the late quaternary period.⁵ The coastal belt ecosystems, rich in natural coffer and contributing roughly one-fifth of the global primary product, are under austere pressure. Progressions along the seacoast have progressed ad hoc, awkward and unsustainable and have redounded in conflicts over littoral usages and declination of littoral coffer. Indeed, without mortal intervention, littoral necks are dynamic and constantly changing terrain. Mortal convinced pressures in the coastal belt complicate classes of revising and punctuating the want for operation and sustentation of coastal areas by enforcing. ⁶Regulations and able CZM plans. India has a bank of around 7516 km long, and 4198 islets are broadcast along the main seacoast of Andaman & Nicobar and Lakshadweep group.

It has a 2.02 million sq. km Exclusive Economic Zone(EEZ) area. Delta processes dominate the topography of the bank. India's east and west beachfronts comprise a wide variety of territories and ecosystems. These include arms, coral reefs, seagrass beds, mangrove wetlands, creeks, backwoods, lagoons, kudos, escarpments, flaxen, and rocky strands. The different niches and ecosystems have essential functions and aesthetic and profitable value. India's maritime businesses (countries and union homes) hold about 49 per cent of the country's population. Over time, the growth of population, globalization of frugality, technological development, and added competition for the littoral coffer have caused conflicts between resource druggies. Accordingly, programs, regulations, and laws on the coastal zone have been introduced.⁷

II. EVOLUTION OF COASTAL REGULATION ZONE (1991-2019)

(A) Coastal Regulation Zone Notification of 1991

The first notification was issued in 1991. The Coastal Regulation Zone Notification, 1991 (hereafter 'Notification of 1991') was notified exercising the powers conferred under Section 3(1) and 3(2)(v) of EPA and Rule 5 of the Rules. The Central Government has placed certain restrictions on the setting up and expansion of industries, as well as the operation of industries or processes operating in specific locations. Notification of 1991 applies to the coastal stretches of seas, bays, estuaries, creeks, rivers, and backwaters, influenced by the tidal action up to 500 meters from High Tide Line (HTL) and land between Low Tide Line (LTL). It mandated that

⁵ Ocean and Coastal Management, 11e43. Biswas, D., 1996. Environmental legislation and enforcement mechanism. Tech-

Monitor, 16e20. CEC, (Commission of the European Countries), 1999. Towards a European Integrated Coastal Zone Management (ICZM) Strategy-General Principles and PolicyOptions. CEC, Luxembourg.

⁶ Cohen, J.E., Small, C., Mellinger, A., Gallup, J., Sachs, J., Vi-Tousek, P.M., Mooney, H.B., 1997 November 14. Estimates of coastal populations. *Science* 278, 1209e1213.

⁷Damodaran, A., 2006. Coastal resource complexes of South India: options for sustainable management. *Journal of Environmental Management*, 64e73.

the State Governments and the Union Territories draw up the Coastal Zone Management Plan (CZMP) to identify and classify the Coastal Regulation Zone within their territories. Powers were also vested under the Notification of 1991 to the State Governments, Union Territories and Local authorities to regulate developmental activities within the CRZ. The Notification of 1991 mandated obtaining the permission of the Ministry of Environment and Forests, Government of India, for specific types of projects, which included the construction activities related to defence requirements, operational constructions for ports and harbours and lighthouses, thermal power plants and any other activities with investment over and above rupees five crores. Coastal areas under the notification were also classified into four zones: CRZ-I, CRZ-II, CRZ-III, and CRZ-IV.

CRZ-I – Ecologically sensitive and essential areas, such as national parks, marine parks, sanctuaries, and other important biologically sensitive areas of heritage or historical significance, including the area between the LTL and HTL. It also laid down a prohibition on any construction within the 500 meters of the High Tide Line. It allowed for constructions for carrying treated effluents and wastewater discharges into the sea, facilities for carrying seawater for cooling purposes, oil, gas and similar pipelines and facilities for essential activities.

CRZ-II – Developed Areas that are developed up to or close to the shoreline are classified under the second category. CRZ-II, however, allowed for the construction and reconstruction of buildings, subject to respective laws and mandated that the buildings be consistent with the surrounding landscape and local architectural style.

CRZ-III – Areas not falling within CRZ-I and CRZ-II are classified under CRZ-III, which are in the rural areas and those areas which are not substantially built up and introduced the 'No Development Zone' up to 200 meters from HTL. It permitted agriculture, horticulture, gardening, pasturing, parks, playfields, forestry, and salt manufacture. However, no new construction was allowed, and only repairs to existing structures were permitted. Between 200 and 500 meters of HTL allowed for hotels and resorts for tourists as provided under Annexure – II to the Notification, construction, and reconstruction of dwelling units with specified measurements, along with alteration of existing authorised buildings.

CRZ-IV – Covered the islands of Andaman and Nicobar, Lakshadweep, and other small islands except those under CRZ-I, CRZ-II and CRZ-III. Restrictions on construction within the 200 meters of HTL imposed and prohibited the use of corals and sand from beaches and coastal waters, as well as dredging and underwater blasting in and around coral formations.⁸

⁸ Coastal Regulation Zone, 1991 MOEF

In one of the landmark decisions, the Supreme Court upheld the demolition of the residential building constructed in violation of the CRZ Notification of 2011. In the case of *The Kerala State Coastal Zone Management Authority (KSCZMA) vs Maradu Municipality*, famously known as *Maradu Apartments Demolition Case*⁹, is a landmark case in which a division bench of the Supreme Court comprising Justice Arun Mishra and Justice Naveen Sinha has ordered the demolition of five apartments, which were waterfront complexes in Maradu Municipality in Kerala, for the violations of CRZ rules.

Maradu is an area that lies just 7 Km from Kochi. A gram panchayat for the area was formed in 1953 for its administration but was later converted into a municipality in 2010. In 2006, the panchayat issued building permits to four companies, namely Alpha Ventures Private Limited, Holy Faith Builders and Developers, Jain Housing and Construction and K.V. Jose, for the construction of five apartment Complexes. The permit was issued without obtaining the mandatory permission of the Kerala State Coastal Zone Management Authority (KSCZMA), which has the power to deal with environmental issues related to the CRZ. KSCZMA found that the construction was taking place in critically vulnerable areas that come under CRZ --III. In the CRZ III area, no construction is allowed within 200 meters of the coast, while in CRZ II zones, the limitation is 50 meters. At that time, the location was classified as CRZ III. Thus, following a directive from the KSCZMA, the gram panchayat issued a showcase notice to the builders, which alleged that they had violated the CRZ Rules as KSCZMA permission is mandatory for any civic body to grant construction permits in areas under the CRZ III category. In response, the builders approached the High Court, praying for an interim stay on the order and allowing them to do the construction. The petition was allowed by the Single Judge Bench of the High Court on the ground that Maradu is well developed in nature and it will come under CRZ II though mistakenly classified as CRZ III. KSCZMA approached the Supreme Court for the alleged violation of the CRZ Rules.

The Apex Court appointed a technical committee to find whether Maradu comes under CRZ II or CRZ III. Based on the technical committee finding that Maradu comes under CRZ III, the Supreme Court found that the permission granted by the panchayat was illegal and void and that no such development activity could have taken place. Because of this finding, the Supreme Court ordered the demolition of the Apartments.

⁹ *Kerala State Coastal Zone Management Authority Member Secretary v. Maradu Municipality & Ors.*, 2022 LiveLaw (SC) 485, MA Nos. 1808-1809 of 2019 in Civil Appeal Nos. 4784-85, 4786-89, 4790-93 of 2019 (Supreme Court of India, May 13, 2022).

On the amount of compensation, a bench of the Supreme Court comprising Justice Arun Mishra and Justice S Ravindra Bhat, via an order dated September 27 2019, directed the State Government to pay a compensation of Rs. 25 00,000/- (Rupees Twenty-Five Lakhs) to each of the flat owners who are being evicted in the case within four weeks. This amount will be recoverable from the Builder/Promoter/ the persons/officials responsible for raising the construction. However, a dispute arose about the reasonableness of the amount as the amount was paid to the builders many years before, and at this time, the value of the apartments has increased. Thus, in another order dated November 22 2019, the Supreme Court ordered the respective builders to deposit a sum of Rs. 61.50 Crores, which is required to be disbursed. In this order, the Supreme Court also clarified that this order should not come in the way of the flat owners filing appropriate proceedings (civil or criminal) for the redressal of their grievances following the law.

Though the Law operates on the principle of prospective effect which means that generally any amendment or change made in law does not apply to the things done and acts committed in the past, it is worth pointing out that the order of demolition of the Apartments was based on the finding by the Supreme Court that the construction was done in violation of the CRZ Rules 1991 and 1996 KCZMA Plan under which the area was classified as CRZ III and not CRZ II. However, the 2011 notification classified the area as CRZ II. This would mean that after the demolition, the buildings can be constructed at the exact location without any violation of the CRZ Rules. Thus, this renders the demolition an exercise based on a technicality.

In another decision of the Bombay High Court in the matter of Goa Foundation vs Goa State Coastal Zone Management Authority,¹⁰ The issue relates to criteria for identifying the High Tide Line, which is a core test for demarcating CRZ. The matter relates to the construction of Goa Marriott Resort, which is located near the Gaspar Dias Beach at Panaji, where the Mandovi River meets the Arabian Sea. A writ petition was filed by the Goa Foundation alleging that the Hotel breached the Coastal Regulation Zone Restrictions. The Authorities claimed that the hotel is within 1.5 km of the High Tide Line while granting permission for the construction. However, the Commissioner's Report shows that the swimming pool is hardly 20 meters from the HTL and the Hotel itself is 30 meters from the river and is coming under CRZ II. Thus, the permission granted in favour of the Hotel has violated the CRZ notification. On the other hand, the Authorities contend that the consent was given as per the CRZ notification, and there is no violation of the same. On the direction of the High Court division bench, they prepared two

¹⁰ Goa Foundation v. Goa State Coastal Zone Management Authority & Ors., 2001(4) BOM CR 226 (Bombay High Court, December 20, 2000).

reports to show that there was no CRZ violation by the hotel. The first of these reports was rejected by the Division Bench of the High Court, and the Second Report has given rise to the present petition.

The second Report added soil erosion as a criterion for determining the high tide line. Such a criterion is not used in Goa or elsewhere. It was contended that the Second Report has also resulted in an absurd situation, which is that the High Tide Line, as per this Report, is now suitable in the water of the river and goes against the very concept of the High Tide Line.

The High Court directed the authorities to draw a line parallel to the High Tide Line from the Light House (a structure nearby), determine whether any construction of the Hotel falls towards the river side of this line, and take necessary actions against the Hotel in case of violation.

The Court stated that the case concerned primarily the facet of the infringement of the CRZ Notification, which is to be tested within the parameters of the CRZ, and it is the primary task of the Authorities which they must perform within the ambit of the law.

The Court observed that it is not a genuine case of missing data, but one where the established principles in this regard have been completely ignored, and an attempt is made to create an artificial situation to introduce a convoluted method to suit one establishment.

The Court held that "the burden is on those who seek to construct in the coastal zone to show that their actions are environmentally benign. If the data is not forthcoming, the sequitur is that the project proponent has failed to discharge the burden. Therefore, in the facts of the present case, the absence of a date, if any, cannot ensure the benefit of the Hotel, but the position is against it."¹¹

Expressing both the Court's lack of expertise in identifying the High Tide Line and its distrust of the Respondents – Authorities, the Court entrusted the task of identifying the High Tide Line and the parallel line to the National Centre For Sustainable Coastal Management (NCSCM) Chennai which is an authority under the Ministry of Environment and Forests and is established for the purpose of better protection, conservation, rehabilitation, management, and policy design of the Coasts. The Court set aside the impugned decision of the GSCZMA and, set aside its second Report and directed it to approach NCSM to identify the Tide lines.

To conclude, the Notification suffered from several loopholes as it needed to consider the biological diversity, demographic patterns, and distribution of natural resources. This caused confusion and ambiguity amongst communities in these areas, who are involved in fishing and

¹¹ Goa Foundation v. Goa State Coastal Zone Management Authority & Ors., 2001(4) BOM CR 226 (Bombay High Court, December 20, 2000).

other related activities. Moreover, there needed to be a more straightforward procedure for obtaining the CRZ clearance, monitoring post granting the clearance, or other essential measures to check pollution in and around the CRZ. Therefore, after several amendments to the Notification of 1991, it was considered necessary to consolidate and issue a new notification, which came into force in 2011.¹²

(B) Coastal Regulation Zone Notification of 2011

The notification of 2011 enshrined three main objectives, which focused on protecting the livelihood of traditional fisherfolk communities, preserving coastal ecology, and promoting economic activity. Special provisions were made for several areas like Sundarban Mangroves, Chilka, Gulf of Kutch, Kundapur, and Karwar. It laid down the mandate for establishing the Coastal Zone Management Authority in the State Government and Union Territories, with specific powers and functions. The Notification of 1991 did not initially lay down the establishment of CZMA; however, an amendment was brought in to establish CZMA in respective states. For better implementation of the Notification of 2011, National Coastal Zone Management Authority (NCZMA) and State Coastal Zone Management Authority (SCZMA). The Ministry has already notified the composition, tenure, and mandate of NCZMA and SCZMA of Environment Forests. The District Level Committee's Constitution under the District Magistrate's Chairmanship has been envisaged with three representatives of local traditional coastal communities, including fisherfolk. For the protection of fisherfolks, tribals and communities living around the coastal areas, the Notification of 1991 did not provide for a mechanism to obtain formal approval and regularisation of dwelling units, and the same has been provided under the present notification with certain specific conditions.

Projects which are listed under the Notification of 2011 will also attract the Environment Impact Assessment Notification, 2006. The Notification of 2011 clearly laid down the procedure for obtaining clearance for permissible activities in separate forms. Further, it was consolidated and covered under the Notification of 2011. The CZMA of the State Government or Union Territories must prepare CZMP. The preparation of the CZMP must be done with the full participation of the local communities.

Classification of CRZ has been reviewed, and changes have been introduced[18]. Under the CRZ-I, areas that are ecologically sensitive and geomorphological features that maintain the integrity of the coast have been considered. Apart from those already included in the

¹² Bhatta, R., & Bhat, M. (2013). "Impacts of Coastal Regulation Zone Notification (2011) on livelihoods of fisherfolk in Karnataka, India." *Marine Policy*, 42, 159-166.

Notification of 1991, Habitats of various marine species have been included in the Notification of 2011, including Turtle nesting grounds, Horseshoe crab habitats, Seagrass beds, nesting grounds of birds, salt marshes, etc. CRZ-II, CRZ-III, and CRZ-IV have been retained with little change. The areas requiring special consideration to protect the critical environmental difficulties faced by local communities include regions falling within the Municipal limits of Greater Mumbai, Kerala, including backwaters and backwater islands, and CRZ Goa. The EPA has identified particular areas like the Critically Vulnerable Coastal Areas (CVCA), such as the Sundarbans of West Bengal, and other ecologically sensitive areas.¹³

Another important aspect about areas requiring special consideration for CRZ areas falling within the Municipal limits of Greater Mumbai, Kerala, Goa and the other regions has been incorporated. Areas falling within the limits of Greater Mumbai and facing environmental issues like pollution, degradation of mangroves, waste disposal, and issues like the construction of roads and solid waste sites must be identified. Furthermore, Slum Rehabilitation Scheme in the specified areas have been introduced and the State Government has the duty to implement slum redevelopment schemes through other parastatal agencies. Provisions for fishing and related activities have been given a particular emphasis for the state of Kerala. Areas classified under CRZ-I have No Development Zone, which are habitats for turtles and other species as covered under the Wild Protection Act of 1972.

Notification of 2011 has been able to address various issues specific to different areas which are ecologically sensitive. The idea was to protect the ecologically fragile areas, thereby tightening the norms under the present notification. To review the Notification of 2011, a Six-member Committee was constituted under the Chairmanship of Dr. Shailesh Nayak, Secretary, MoES, to examine the issues of coastal States/UTs relating to CRZ Notification 2011 and to examine the errors and inconsistencies and procedural simplification.¹⁴

(C) Shailesh Nayak Committee Report ¹⁵

During the preparation of the Report, meetings with the State Governments and considering the implications of the Notification of 2011, the Committee has recommended, after examining the issues of the coastal environment, hardship faced by the communities, the need for economic

¹³ Jayakumar, S., & Rajendran, N. (2012). "An analysis of the Coastal Regulation Zone (CRZ) Notification 2011 and its enforcement in India." *Environmental Law Review*, 14(2), 140-156.

¹⁴ Sakthivel, M., & Khan, N. Protection of the Indian Coastal Ecosystem through Coastal Regulation Zone (CRZ) Notifications*: An Analysis. In *The Routledge Companion to Indian Ethics* (pp. 211-222). Routledge India.

¹⁵ Shailesh Nayak, Coastal Regulation Zone Notification 1991 and 2011: A Comparative Analysis, *Indian Journal of Environmental Law*, Vol. 5, No. 3, 2012, pp. 110-130.

development, the following – Concrete proposal must be formulated by the Ministry, as loss of fragile ecosystem causes irreparable damage to ecosystem impacting the local communities.

Ecologically Sensitive Areas under CRZ-I should be identified through scientific assessment, and measures should be drawn up to protect and conserve. Ministry of Culture will identify historical, archaeological, and heritage value structures and areas for protection and conservation. Regulations in CRZ-II & III have impacted the State Town and Country Planning laws, and the States should address those issues.

Issues of overlapping are also found as Notification overrides Town and Country Planning Regulations of the States or Union Territories. New initiatives are to be explored by the Ministry to protect and conserve the coastal ecosystem. Based on these recommendations, a Draft Notification was submitted to the Government. Subsequently, the Central Government issued a new notification to suppress the earlier notification of 2011. After considering the recommendations and objections received from the public, the Coastal Regulation Zone 2019 was notified on January 18 2019.

(D) Coastal Regulation Zone Notification, 2019

The Notification of 2019 has been brought out under the recommendations of the Committee, which has placed a special focus on creating employment opportunities for people in coastal areas. Apart from conserving and protecting the coastal environment, the notification also leads to enhanced activities in the coastal regions, thereby promoting economic growth and resulting in employment generation and a better standard of living. Salient features of the Notification of 2019 are as follows –

As per the notification, CRZs have been classified, and changes to the existing classification have been made. CRZ-I has been further classified as CRZ-I A, which is environmentally most critical. The intertidal zone, i.e., the area between LTL and HTL, has been classified as CRZ-I B. Whereas CRZ-II has remained without any classifications, CRZ-III has been classified into two separate categories under CRZ-III (Rural) have been classified as CRZ-IIIA and CRZ-IIIB. Densely populated rural areas are now granted more opportunities for development by reducing the No Development Zone from earlier 200 meters to 50 meters of HTL, which has been prescribed based on the population density of 2161 per square kilometre. CRZ IV is classified as Water area and further classified as CRZ-IV A, i.e., the area between LTL up to twelve nautical miles on the seaward side and CRZ-IV B water area and the bed area between LTL at

the bank of the tidal influenced water body to the LTL on the opposite side of the bank, extending from the mouth of the water body at the sea up to the influence of tide.¹⁶

Clearance procedures for projects or activities located in CRZ-I and CRZ-IV are to be dealt with by the Ministry of Environment, Forests & Climate Change. Meanwhile, powers for clearance under CRZ-II and CRZ-III have been delegated to the state level with necessary guidance.

Particular importance has been granted to all the Ecologically Sensitive Areas.

Boost for the tourism industry as temporary tourism facilities like shacks, toilets, change rooms, and drinking water facilities have been permitted in the No Development Zone of CRZ-III areas with a minimum distance of 10m from the HTL.

As per the 1991 Development Control Regulation, the Floor Area Ratio had been frozen. As of now, it stands for de-freeze, and the Floor Space Index is permitted for construction projects, which implies a boost for the real estate sector.

Treatment facilities for coastal areas have been allowed under CRZ-I B to abate pollution.¹⁷

The recently notified Regulations have emphasised the development of coastal areas. The Notification has tried to address several issues regarding the land use. The creation of infrastructure for the development of the coastal regions has been the focus of the Notification. While provision for the conservation efforts specifically mentioned, opening the coastal areas may threaten the fragile ecosystem for unabated commercial activities, jeopardising the ecosystem and ultimately destroying it.¹⁸

III. IMPACT ON COASTLINES¹⁹

The CRZ III has been again subdivided into CRZ III A and CRZ III B based on population. According to the notification provisions in areas falling under CRZ III, while houses are not permissible, resorts and hotels may be built towards the land side of highways and other major roads. It is something that draws widespread opposition because there is no permit for local people living in those areas, though resorts and hotels are permitted.

¹⁶ "Environment Ministry notifies CRZ Regulations 2019; replaces CRZ norms of 2011". jagranjosh.com. January 23 2019.

¹⁷ Anand, A. (2021, December 21). Proposed amendments to the CRZ Notification, 2019 and its implications. The Leaflet. Retrieved November 13, 2023, from <https://theleaflet.in/proposed-amendments-to-the-crz-notification-2019-and-its-implications/>

¹⁸ Muhammed, I., & Arya, P. B. (2020). Coastal regulation zone notification: a scanty regime.

¹⁹ De Souza, G. (2023, February 7). NGT will hear pleas challenging CRZ 2019 notification and seek the government's reply. *Hindustan Times*. <https://www.hindustantimes.com/cities/others/ngt-to-hear-pleas-challenging-crz-2019-notification-seeks-government-s-reply-101675749136674.html>

Another matter that draws attention is the 20-meter No Development Zone (NDZ) on Backwater Island. This provides greater chances for major commercialists to buy lands for economic gain belonging to local citizens. The environmentalists and fisher folk made a lot of objections as soon as the government informed the new regulations, as they firmly believed that this regulation would lead to the degradation of the coastline by encouraging commercialization. The 2019 notification contains specific terms which need more clarity. For example, terms like "strategic purposes", "public utilities", and "eco-tourism" are not clearly defined. This permits a wide variety of activities to be allowed near coasts, which may be even undesirable. In the 2011 notification, those strategic and defence projects exempted from applying CRZ rules were clearly specified, whereas the new notification needed more clarity. It was open for the government to make decisions on whether a particular project was strategic or not, and hence, it could even open the CRZ-I areas for developmental activities.²⁰

The provision permitting temporary tourism facilities on the seaward side wherever there is a national or state highway in CRZ –III is detrimental, with no definition of what constitutes temporary, and with many of these being quasi-permanent structures. In addition, increased tourism activities in the coastal areas would increase the groundwater intake from fragile coastal aquifers. The development that the 2019 notification is expected to achieve is one-sided and destructive. Although the Government says the new changes have been incorporated to ensure affordable housing for the local communities occupying the coasts, they, in fact, concentrate on the promotion of tourism without paying the required attention to the needs of local people. Clearly, the rules have been framed to favour the tourism sector.

The result would be disastrous, and developmental activities along the coast would cause damage to the coastal environment, coral reef, and mangroves. In addition, with the development of private beaches and resorts adjacent to the beach, ordinary people in the country are prevented from accessing the beach. These luxury resorts will drive away fishermen from the beaches. Unfortunately, beach tourism will bring about great trouble for fishermen and other marginalized communities. These developments are going to take place at an enormous cost. Though the CRZ 2019 notification will boost tourism and infrastructure, these developments will adversely affect the environment. The interests of the powerful economic actors have been prioritised over the need to protect and conserve the coastal ecosystem and secure the livelihood of poor coastal communities that depend on the coastal resources. The notification has been prepared without considering the interest of those whose lives are directly affected by this. The

²⁰ Chowdhury, S., & Law, L. (2022, February 21). Live law. Live Law. <https://www.livelaw.in/top-stories/supreme-court-coastal-regulation-zone-crz-notification-2019-bombay-hc-192467>

grievances raised by the coastal communities were never paid attention to, and the whole process took place without proper public consultation and policy deliberation.²¹

IV. COASTAL MANAGEMENT SYSTEMS IN DIFFERENT COUNTRIES

Coastal management is a crucial issue on a global scale, as coasts face many pressures due to climate change, urbanization, industrialization and population growth. Countries have adopted different coastal management frameworks that reflect their unique geographic, socio-economic and environmental contexts. This study examines coastal management systems in the United States, Australia, the Netherlands, Japan and the United Kingdom, highlighting their main features, strengths and challenges.

(A) United States: Coastal Zone Management Act (CZMA), 1972²²

The Coastal Zone Management Act (CZMA) of 1972 focused on balancing economic development and environmental protection in the coastal regions of the United States.

The law enables states to design coastal management programs that help to fulfill specific needs, with financial assistance from the government to support these initiatives. According to the CZMA, states must create coastal zone management plans incorporating land use, resource management and environmental protection policies. The need of effective public participation in decision-making process is highlighted in the act. This is to ensure local communities are involved in developing coastal policies. It also deals with various issues such as water quality, habitat protection and the development of coastal resources, including fisheries and tourism. CZMA allows states to develop their coastal management programs, leading to more localized and appropriate strategies considering environmental factors and economic conditions.

Federal oversight and funding encourage compliance with established management plans, resulting in effective enforcement of coastal regulations. One of the main challenges is the conflict between state and federal authorities, especially regarding offshore energy development, such as oil drilling and wind power projects. These conflicts can prevent timely decision-making and project implementation. Although federal assistance is available, states often need help to obtain adequate funding and resources to implement their coastal management plans effectively.

²¹ Pti. (2022, February 21). SC notice to Centre on plea challenging constitutional validity of CRZ Notification, 2019. *The Economic Times*. <https://economictimes.indiatimes.com/news/india/sc-notice-to-centre-on-plea-challenging-constitutional-validity-of-crz-notification-2019/articleshow/89729335.cms?from=mdr>

²² National Oceanic and Atmospheric Administration. (2021). Coastal Zone Management Act (CZMA) overview. NOAA. <https://coast.noaa.gov/czm/>

(B) Australia: Integrated Coastal Zone Management (ICZM)²³

Australia uses an Integrated Coastal Zone Management (ICZM) framework, which involves collaborating between federal, state and local governments. This framework emphasizes ecologically sustainable development, intending to integrate environmental, social and economic considerations into coastal planning. The ICZM approach is focused on coastal planning processes that include environmental assessments, community engagement and risk management plan of action. The Australian Government has established various policies and guidelines to support coastal management, such as the National Coastal Policy and the Coastal Management Act in multiple states. These policies aim to address issues such as coastal erosion, habitat protection and sustainable development.²⁴ The ICZM system helps the different levels of government work together to address and solve coastal problems and better allocate resources. Rigorous environmental assessments are essential to the planning process, ensuring that developments consider ecological impacts. Public participation helps strengthen community ownership of coastal management initiatives.

Climate change is a significant challenge in Australia, especially the rising sea level, which threatens infrastructure and coastal ecosystems. Rapid urbanization in coastal areas creates conflicts between development and conservation goals, making balancing economic growth and environmental protection difficult.

(C) Netherlands: The Delta Program²⁵

The purpose of the Delta Program in the Netherlands is to safeguard low-lying deltaic regions from the effect of climate change, which is rising sea levels and extreme weather events.

This approach combines advanced engineering solutions, such as levees, storm barriers and natural coastal defences, such as dunes, with sustainable land use and water management planning.

The Delta program ensures that the Netherlands can adapt to future climate challenges. It also emphasizes cooperation between actors, including government agencies, local communities and environmental organizations. The Netherlands is globally recognized for its innovative flood

²³ Australian Government Department of Agriculture, Water and the Environment. (2020). National coastal policy. Department of Agriculture, Water and the Environment. <https://www.environment.gov.au/protection/coastal-management/national-coastal-policy>

²⁴ McKenzie, L. J., McCluskey, C. H., Yoshikawa, T., & Cribb, A. (2016). Integrated coastal zone management in Australia: A review of policy and practice. *Coastal Management*, 44(4), 313-329. <https://doi.org/10.1080/08920753.2016.1176498>

²⁵ Klijn, F., & Schweckendiek, T. (2018). The Delta Programme: A new strategy for water management in the Netherlands. *Water Policy*, 20(6), 1025-1042. <https://doi.org/10.2166/wp.2018.023>

control measures and infrastructure, successfully reducing flood vulnerability. By planning ahead, the Delta program helps the country to be prepared for future climate hazards. Nevertheless, sustaining and upgrading these water management systems is extravagant and burdens the government financially. As the weather pattern changes persist, the fracture will need efficient updates.

(D) Japan: The Coastal Law of 1956 and Subsequent Reforms²⁶

The Coastal Law, enacted in 1956, oversees Japan's management system, which highlights the difference between disasters and environmental protection.

Since Japan is susceptible to cyclones and typhoons, the coastal law is essential to developing robust disaster preparedness and response systems. This includes the design of buffer zones, early warning systems and public education campaigns on disaster risks.

Japan has eased its coastal management policies to address environmental degradation and sustainable development issues in the last few years. These reforms aim to strengthen ecosystem protection and guarantee the safety and sustainability of coastal communities. Japan's proactive approach to disaster preparedness, including advanced warning systems and infrastructure, has significantly reduced loss of life and property during natural disasters. Recent reforms emphasize the importance of preserving coastal ecosystems, recognizing their role in mitigating the impacts of disasters and supporting biodiversity.- Public awareness campaigns and community engagement in disaster preparedness have strengthened local resilience. Rapid industrialization and urbanization in coastal areas pose a threat to fragile ecosystems, leading to the loss of 'habitat and an increase in pollution. Managing the competing demands of economic development and environmental protection remains a complex challenge in Japan's coastal management.²⁷

(E) United Kingdom: Marine and Coastal Access Act, 2009²⁸

The Marine and Coastal Access Act (MCAA) 2009 provides a framework for marine and coastal management in the United States Environment of the Kingdom. The law emphasizes public access, marine conservation and sustainable development. It establishes a new marine planning system that integrates land and sea management and includes provisions for creating marine protected areas. The MCAA also aims to improve public access to coastal areas,

²⁶ Ministry of Land, Infrastructure, Transport and Tourism. (2021). Overview of the Coastal Act. MLIT. <http://www.mlit.go.jp>

²⁷ Takahashi, T. (2019). Disaster risk reduction in coastal areas: The case of Japan. *Natural Hazards Review*, 20(2), 04019005. [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000360](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000360)

²⁸ UK Government. (2009). Marine and Coastal Access Act 2009. UK Legislation. <https://www.legislation.gov.uk/ukpga/2009/23/contents>

recognizing the importance of the recreational and cultural values associated with the coast. It promotes the sustainable use of marine resources while ensuring respect for environmental protection. The MCAA provides a comprehensive marine and coastal planning framework, facilitating coordinated management efforts across all sectors. An emphasis on public access rights ensures that coastal areas remain accessible for recreation and enjoyment, fostering a sense of community stewardship. Creating marine protected areas improves biodiversity conservation and helps conserve fish populations and other marine resources. Balancing economic activities such as maritime transport, fishing, and tourism with environmental protection presents challenges critical for coastal management. Limited funding for marine and coastal management initiatives may prevent implementing the MCAA and related objectives effectively.

Coastal management systems vary considerably between countries, depending on their geographic, environmental and socio-economic context. The US CZMA emphasizes state empowerment and public participation, while the Australian ICZM promotes cooperation between different levels of government and rigorous environmental assessments. The Netherlands stands out for its innovative infrastructure and long-term planning, while Japan's emphasis on disaster preparedness and environmental protection reflects its vulnerability to natural disasters. The UK MCAA emphasizes the importance of public access and marine conservation. Despite their strengths, these systems face challenges linked to climate change, economic pressures and the balance between development and environmental protection. Coastal areas continue to evolve, and it is essential to constantly adapt and innovate to meet new challenges and ensure sustainable coastal management practices on a global scale. Each country's experience provides valuable lessons for developing effective coastal management strategies that withstand time and environmental change.

V. CONCLUSION

Natural disasters along the Indian coast cost the country 80 billion dollars between 1998 and 2017, according to a UN International Strategy for Disaster Reduction report. Although coastal erosion is a natural phenomenon caused by tides, tidal and coastal currents, and deflation, these factors are intensified by land reclamation, harbour dredging, navigation channels, tidal inlets, jetty development, and other coastal structures. National Centre for Coastal Research found rising pollution levels in coastal waters. Ammonia and phosphate levels are high in all 24 monitored areas, which is attributed to the dumping of untreated waste into the ocean. The

Report states, "Increasing nutrients in coastal water will result in ecological disruptions that affect the processes and services of the coastal ecosystem."²⁹

²⁹ The National Centre for Coastal Research under the Ministry of Earth Sciences, Seawater Quality Monitoring (1990-2015)

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