

Dissecting India's Coastal Policy

Policy Brief

Introduction

India has a coastline which stretches over 7,516 km of which the mainland accounts for 5422 km, Lakshadweep coast extends 132 km and Andaman and Nicobar Islands have a coastline of 1962 km encompassing a diverse range of ecosystems, from sandy beaches and mangrove forests to rocky cliffs and estuariesⁱ. It is home to nearly 420 million people, with 90 million directly dependent on fishing, agriculture, tourism and other marine-related activities for

Geomorphological Feature	Percentage Coverage
Sandy Beaches	43%
Rocky	11%
Mudflats	36%
Marshland	10%

Source: NDMA, 2022

their livelihoods. Additionally, approximately 330 million live on or within 150 kilometres of

Table 2: A snapshot of the Indian Coastline

Aspect	Details
Geographical	7,516.6 km coastline
Political	9 states, 2 Union Territories (Lakshadweep and Andaman and Nicobar Islands), 66 districts.
Demographic	Home to 171 million citizens (14.1% of the country's population)
Economic	13 major ports, 46 fishing harbours, 187 minor ports

Source: NDMA, 2022

the coastline, indirectly relying on coastal resourcesⁱⁱ. The coastline also plays a crucial role in India's economy, serving as a gateway for maritime trade and transportation, handling approximately 95 % of the country's trade volume and around 65 % of its

trade value, which traverses through its maritime routes. This crucial network is supported by 13 major ports and 187 notified minor and intermediate ports, collectively ensuring efficient sea transportation and commerceⁱⁱⁱ. Despite its rich natural biodiversity and economic significance, India's coastline faces various challenges, including coastal erosion, pollution, habitat degradation and vulnerability to natural disasters such as cyclones and tsunamis. The condition of India's coastline appears more alarming according to a recent report by the National Centre for Coastal Research (NCCR). The report indicates that between 1990 and 2018, 32 percent of the Indian coastline experienced sea erosion, while 27 percent saw expansion. West Bengal emerges as the most susceptible to erosion with 60 percent affected,

Table 3: Coastal Ecosystem Services

Type of Service	Description
Provisioning Services	Food, fibre, timber, fuel, medicines, and other resources
Regulating Services	Freshwater storage, hydrological balance, waste processing, flood/storm protection, erosion control, shoreline stabilisation, regulation of water quality, and carbon sequestration
Cultural Services	Amenity, recreational, and aesthetic nonmaterial benefits, which support people in spiritual, social, and cultural dimensions
Supporting Services	Nutrient regulation, nutrient cycling, soil fertility, and biodiversity conservation
Economic Services	Port facilitating trade, handling 95% of the country's trade volume and 65% of its trade value

Source: NDMA, 2022

Dissecting India's Coastal Policy Policy Brief

followed by Puducherry at 56 percent, Kerala and Tamil Nadu both at 41 percent, Andhra Pradesh at 28 percent, Gujarat including Daman and Diu at 26 percent, Odisha also at 26 percent, Karnataka at 24 percent, Maharashtra at 22 percent, and Goa at 19 percent.^{iv}

Climate change further exacerbates these threats, leading to sea-level rise, ocean acidification and changes in marine ecosystems. An estimate shows between the period of 1901 and 2010, the global sea level rose by 0.19 m. By 2040, the average global sea level is expected to rise by 0.2 m with 2 °C warmings, with 90 percent of the coastal region will experience a more remarkable rise^v. Sea-level rise poses serious challenge to low-lying coastal nations, affecting their entire economies and populations. Therefore, coastal areas in South Asia with dense populations and low-lying elevations are particularly vulnerable to sea-level rise. Beyond environmental concerns, this phenomenon imperils livelihoods, infrastructure and the very fabric of communities, underscoring the urgent need for comprehensive adaptation measures^{vi}.

Policymakers at both national and state levels are indeed facing heightened pressure to integrate coastal management policies into their broader climate change and development strategies. This is underscored the growing recognition of the vulnerability of coastal regions to climate change impacts, such as sea-level rise and weather events, which necessitate adaptive measures^{vii}. In response to these challenges, India has implemented various policies and initiatives aimed at conserving its coastal resources, promoting sustainable development, and enhancing resilience to climate change. These efforts include the Coastal Regulation Zone (CRZ) policies, Integrated Coastal Zone Management (ICZM) projects, and initiatives to protect marine biodiversity and habitats. India's coastline not only serves as a vital natural resource but also holds cultural and historical significance, with numerous ports, lighthouses and ancient maritime trading routes dotting its shores^{viii}. Recognizing the importance of its coastal heritage, India strives to balance development with conservation to ensure the long-term sustainability of its coastal ecosystems and communities.

Evolution of Coastal Regulation Policies in India: An Analytical Overview

The ever growing inequality among the different stakeholders, along with the environmental implications of coastal degradation has resulted into the use of legislative tools in monitoring and regulating anthropogenic activities along the coast that are based in sound scientific principles^{ix}. India's coastal policy has undergone significant developments over the years, reflecting upon the dynamic interplay between governance frameworks, environmental

Dissecting India's Coastal Policy Policy Brief

considerations and societal influences. The government's attempt to transition from a regulatory approach to a more flexible, management-oriented framework using Environmental Impact Assessments (EIA) was met with resistance from civil society, leading to a reversion modified regulatory practices^x. This underscores the complex nature of coastal policy, where interests and knowledge from various actors, including NGOs and technical experts, intersect and influence outcomes. The coastal policy of India, particularly the Coastal Regulation Zone (CRZ), has evolved over the past 35 years to address the complex challenges of managing the highly populated and environmentally sensitive coastal regions. To protect these areas from unregulated development, the Ministry of Environment, Forest and Climate Change (MoEFCC) implemented the Coastal Regulation Zone (CRZ) notification in 1991. This notification has been revised several times, with the latest revisions being in 2011 and 2019. The first CRZ notification came into existence in 1991 under the Environmental Protection Act of 1986, with the aim of protecting coastal areas from erosion and preserving their natural resources and was a pioneering step for sustainable coastal management, contributing to ecosystem protection and highlighting the need for continuous adaptation to balance environmental and socio-economic interests^{xi}.

Table 4. Salient features of Coastal Regulatory Zone, 1991

Zone	Description	Restrictions on Development Activities
CRZ-I	Ecologically sensitive areas with high biodiversity value. Examples: mangroves, coral reefs, sand dunes, intertidal zones.	<ul style="list-style-type: none"> • Strictest restrictions. • Only essential activities allowed, such as defense projects, research facilities and traditional fishing activities with minimal ecological impact. • No new construction permitted except for repairs to existing structures.
CRZ-II	Areas with existing developed infrastructure and urban settlements.	<ul style="list-style-type: none"> • Development permitted with specific regulations to minimize environmental damage. • Focus on promoting sustainable tourism and infrastructure projects with minimal ecological footprint. • Reconstruction of existing authorized buildings allowed based on Floor Space Index (FSI) limitations and existing purpose.
CRZ-III	Relatively undisturbed areas with agricultural activity and rural settlements.	<ul style="list-style-type: none"> • Allowed for certain development activities with limitations. • Activities like agriculture, aquaculture, salt mining, and repairs to existing structures permitted. • New construction generally not allowed, with some exceptions for rural housing projects under specific conditions.
CRZ-IV	Shallow coastal waters extending outwards from the coastline.	<ul style="list-style-type: none"> • No new construction of buildings within 200 meters of HTL. • Buildings between 200 and 500 meters from HTL limited to 2 floors (ground plus one) and must not exceed 9 meters in height. • Extraction of sand, corals, and underwater blasting prohibited.

Source: MoFE&CC, 1991^{xii}

Dissecting India's Coastal Policy Policy Brief

The CRZ notification 1991 remains pioneering step in an attempt to comprehensively regulate development and protect fragile ecosystems along the vast Indian coastline. This classification-based system prioritized ecological sensitivity. By establishing Coastal Regulation Zones (CRZs), the notification differentiated regulations based on the specific zone. CRZ-I, for example, offered the strictest protections for ecologically critical areas like mangroves and coral reefs, while CRZ-III allowed for some development activities in rural areas with limitations. Moreover, the requirement for state-level Coastal Zone Management Plans (CZMPs) fostered a decentralized approach, allowing states to design regulations to their specific coastal contexts.

However, the 1991 CRZ Notification also had limitations. Loopholes and ambiguities regarding permissible activities in certain zones created confusion and hampered compliance. Weak enforcement mechanisms further undermined the effectiveness of the regulations. There was no funding mechanism enabled through the Notification for the authorities to take any proactive measures in the prevention and conservation of the coastal area. Their tasks became increasingly complicated as stakeholders started taking advantage of the unclear terms and definitions in the Notification, which was criticized for not having a scientific approach.^{xiii} Finally, the limited involvement of coastal communities in the planning process could have resulted in a disconnect between coastal management and local needs. Despite these shortcomings, the 1991 CRZ Notification played a crucial role in raising awareness about the importance of coastal protection in India. It initiated a process of increased scrutiny for coastal development projects and kick-started the development of CZMPs, paving the way for further refinements in coastal management practices.

The first CRZ introduced in 1991 had undergone 25 amendments until 2009 to improve environmental quality and sustainably manage coastal resources, incorporating a bottom-up approach and integrating spatial decision-support tools paving the way for another CRZ notification with number of changes in 2011.^{xiv}

The second CRZ came into existence in 2011 after the much debate and in the backdrop of 25 amendments of the several provision of earlier notification. It introduced a bottom-up approach, emphasizing good governance and stakeholder participation in coastal management^{xv}. The CRZ 2011 was implemented with a view to ensure livelihood security to

Dissecting India's Coastal Policy Policy Brief

the fishermen communities and other local communities living along the coast, protect and conserve the coastal ecosystems and to promote sustainable development based in scientific principles and was part of India's broader efforts to implement Integrated Coastal Zone Management (ICM) with the support of spatial decision-support tools and national programmes^{xvixvii}. It is worth pointing out here that the 2011 Notification was based on inputs received from the M. S. Swaminathan committee^{xviii}.

Table 4. Salient features of Coastal Regulatory Zone, 2011

Zone	Description	Restrictions on Development Activities
CRZ-I	Ecologically sensitive areas and geomorphological features including the area between LTL and HTL	<ul style="list-style-type: none"> • No new construction except for specific projects (e.g., Department of Atomic Energy, pipelines). • Conservation measures mandatory. • Activities like exploration and extraction of natural gas, salt harvesting, and desalination plants permitted with safety measures.
CRZ-II	Built-up areas along the coast including towns and cities	<ul style="list-style-type: none"> • Buildings permitted only on the landward side of existing roads or authorized structures. • Reconstruction allowed with Floor Space Index (FSI)/Floor Area Ratio (FAR) restrictions. • Facilities for power generation from non-conventional sources, desalination plants, and storage of non-hazardous cargo in notified ports allowed.
CRZ-III	Rural and relatively undisturbed areas including coastal zones in rural areas	<ul style="list-style-type: none"> • No Development Zone (NDZ) up to 200 meters from HTL. • Limited permissible activities in NDZ (e.g., agriculture, horticulture). • Controlled development between 200 to 500 meters for certain facilities like hotels, resorts, desalination plants etc
CRZ-IV	Water area from LTL to 12 nautical miles on the seaward side, including tidal influenced water bodies	<ul style="list-style-type: none"> • Traditional fishing and related activities allowed. • Strict regulations to manage and prevent pollution from untreated sewage, effluents, and solid waste. • Activities like oil and gas exploration, mining, and boating regulated to prevent pollution.
Islands	Special provisions for Andaman & Nicobar Islands, Lakshadweep, and other similar regions	<ul style="list-style-type: none"> • Restrictions on construction, sand mining, coral collection, etc. • Separate guidelines and management plans to preserve unique ecosystems. • Repair and reconstruction of existing structures in local communities permitted with prior approval.

Source: MoEF&CC, 2011^{xix}

Dissecting India's Coastal Policy Policy Brief

The CRZ provisions have been supported by an institutional framework involving national, state and district authorities, with the 2011 notification marking a significant shift towards resource conservation, pollution control, and greater involvement of corporate sectors in coastal zone management (CZM)^{xx}. One of the major deviation from the earlier provision were evident with some major changes which provided more flexibility in permissible activities, such as allowing certain tourism-related developments in CRZ-III areas under specified conditions, thus promoting sustainable coastal tourism, which stood contrary to earlier notification. However, on the positive note the new notification gave greater emphasis on engagements with local community members in the decision-making process for coastal zone management plans, fostering greater inclusivity and participation, provision for the formation of district level committees in this effect was seen as inclusive and participatory approach.

However, the implementation of CRZ rules has faced constraints such as lack of scientific basis, ambiguity in project activities, and ineffective enforcement, which are juxtaposed against opportunities like increasing public awareness and initiatives by environmental groups^{xxi}. Moreover, the CRZ 2011 was critiqued for not making satisfactory provisions related to coastal development and communities, and its complexity and lack of clarity in defining regulatory zones and permissible activities. The notification introduced multiple categories (CRZ-I to CRZ-IV) with varying restrictions, which are often difficult to interpret and apply uniformly across different coastal regions. Some coastal states felt the regulations were too restrictive, hindering development. Within the few years of the notification it received wider criticism from across the country from different stakeholders.

This has led to confusion among stakeholders, including developers, local authorities and enforcement agencies, resulting in inconsistent implementation and compliance issues, eventually leading to the formation of the Shailesh Nayak Committee in 2014 and the subsequent CRZ rules of 2019 on the basis of findings submitted by the committee, which aimed to address sustainable development based on scientific principles^{xxii}

Dissecting India's Coastal Policy Policy Brief

Table 4. Salient features of Coastal Regulatory Zone, 2019

Zone	Description	Restrictions on Development Activities
CRZ-I A	Ecologically sensitive areas (ESAs) including mangroves, corals, sand dunes, etc.	<ul style="list-style-type: none"> No activities generally permitted except for eco-tourism activities in approved areas, laying of public utility pipelines, construction of roads on stilts and specific strategic or public utility projects with environmental safeguards.
CRZ-I B	Intertidal zone (area between Low Tide Line and High Tide Line)	<ul style="list-style-type: none"> Regulated activities such as foreshore facilities, erosion control measures, maintenance of channels, non-conventional energy sources, and certain infrastructure projects. Activities like land reclamation, bunding, and transfer of hazardous substances from ships to ports are permitted under specific conditions.
CRZ-II	Developed land areas up to or close to the shoreline within existing municipal limits or legally designated urban areas	<ul style="list-style-type: none"> Construction of buildings only on the landward side of existing roads or authorized structures, subject to local town and country planning regulations. Development of vacant plots for tourism projects, temporary tourism facilities on beaches, and regulated reconstruction of authorized buildings. No new construction seaward of new roads built on the seaward side of existing roads.
CRZ-III	Relatively undisturbed areas including rural areas	<p>CRZ-III A:</p> <ul style="list-style-type: none"> No Development Zone (NDZ) up to 50 meters from HTL, otherwise 200 meters if CZMP is not approved. Permissible activities include repairs or reconstruction of existing authorized structures, agriculture, horticulture, facilities for local fishing communities, and temporary tourism facilities. <p>CRZ-III B:</p> <ul style="list-style-type: none"> NDZ up to 200 meters from HTL. Permissible activities include agriculture, horticulture, gardens, construction of public utilities, and temporary tourism facilities. Groundwater extraction within 200 meters of HTL is prohibited, except for local community use.
CRZ-IV A	Water area and sea bed area from Low Tide Line up to 12 nautical miles on the seaward side	<ul style="list-style-type: none"> Traditional fishing and allied activities, land reclamation for specific purposes like ports and defense projects, measures for erosion control, maintenance of waterways, non-conventional energy projects, exploration and extraction of oil and natural gas and storage of non-hazardous cargo in notified ports.
CRZ-IV B	Water area and bed area between Low Tide Line on tidal influenced water body to the opposite bank's Low Tide Line	<ul style="list-style-type: none"> Similar restrictions as CRZ-IV A, with a focus on preserving the ecological integrity of tidal influenced water bodies. Activities permitted include traditional fishing, certain types of land reclamation, erosion control measures, non-conventional energy projects, and exploration and extraction of oil and natural gas.
CVCA	Critically Vulnerable Coastal Areas such as Sundarbans, Gulf of Kutch, etc.	<ul style="list-style-type: none"> Managed with the involvement of local communities. Specific measures to protect critical coastal environments and support sustainable livelihoods of local communities.

Source: MoEF&C, 2019^{xxiii}

Dissecting India's Coastal Policy Policy Brief

The new notification, formulated in response to committee recommendations, emphasizes the creation of employment opportunities in coastal areas through sustainable development practices. Beyond its core objective of conserving and safeguarding the coastal environment, the notification aimed to stimulate economic activities such as tourism, fisheries, and port infrastructure development. To meet the needs of a growing population, the 2019 Notification has lifted the freeze on the Floor Space Index (FSI) that was in place since the 1991 notification. This change allows for an increased FSI, facilitating the redevelopment of coastal areas^{xxiv}. By encouraging these sectors, it envisioned to bolster economic growth in coastal regions, thereby contributing to increased employment opportunities and enhancing the overall standard of living for local communities.

The major focus of the new notification has remained on opening avenues for sustainable tourism. In this direction government has argued the new CRZ notification will lead to enhanced activities in the coastal regions thereby promoting economic growth while also respecting the conservation principles of coastal regions. It will not only result in significant employment generation but also a better life and add value to the economy of India. However, the latest notification further categorises CRZ-1. It allows “eco-tourism activities such as mangrove walks, tree huts, nature trails, etc.” in eco-sensitive areas, demarcated as CRZ-IA. Sea links, salt harvesting and desalination plants and roads on stilts are also allowed in CRZ-IA. The *raison d'être* of carrying out recreational and tourism activities in the vulnerable areas amid rising tensions on the water resources is unknown. What societal benefit can these supposedly altruistic development activities offer when they ultimately contribute significantly to long-term environmental damage, considering the current vulnerability of our planet's climate^{xxv}. Thus, diluting the very principles of earlier notification which kept these areas under restricted zone as far as tourism construction were concerned.

The new notification has made an attempt to boost tourism by tweeking the earlier notifications such as reduction in the regulated and no-development area, allowing eco-tourism, mining of rare minerals, salt harvesting, waste treatment in eco-sensitive areas, relaxed building stipulations in urban areas and temporary tourism facilities in no-development zones. These dilutions were cheered by the real estate, tourism and construction sectors but have received massive criticism from environmentalists, activists and NGOs'. Hence, policymakers are to tread with extra care and therefore consider and envision the varied ramifications of different

Dissecting India's Coastal Policy Policy Brief

policies in the environmental domain. An inclusive process taking the views and concerns of all the stakeholders connected with the CRZ is the need of the hour.^{xxvi}

Discussion and Way forward

The uniqueness and fragility of the Indian coastal environment, along with its pivotal role in the economic development of the country, is widely acknowledged by both the government and civil society, as well as by the scientific community specializing in coastal environments. The government's focus so far has been on issuing one new notification after another. However, the failure to address the core issue is evident. This notification has the dubious distinction of being amended 35 times and re-notified twice, the most amended notification to date. A deeper analysis of these new notifications reveals a focus on enhancing tourism sector for generating new employment opportunities. This is done to allow commercial activities in sensitive zones, supposedly to promote "economic growth." However, this puts the ecology and vulnerable communities in these areas at risk which should not be compromised. The ineffectiveness of CRZ provisions in India can be attributed to the prioritization of economic development over conservation and protection concerns, leading to irreparable losses. To address these issues, CRZ now operates through a comprehensive framework involving statutory, administrative, and procedural measures at central, state, district, and village panchayat levels, aiming to achieve integration across all levels. However, there remains a notable absence of meaningful engagement of the scientific community in governmental and inter-governmental programs and projects. Effective public awareness and human resources are crucial prerequisites for initiating and successfully implementing both local and national Integrated Coastal Zone Management programs. It is imperative to prioritize the formulation and finalization of CZMP through extensive consultation with stakeholders, including coastal communities, to ensure the long-term success of CRZ Notification implementation. Instead of issuing endless notifications and amendments, the government should prioritize the sincere and rigorous implementation of existing provisions. Addressing the identified lacunas in the current CRZ notification, policymakers should consider introducing dedicated legislation for coastal zone protection, incorporating punitive measures that are conspicuously absent in the current framework.

Dissecting India's Coastal Policy Policy Brief

ENDNOTES

-
- ⁱ Venkataraman, K., Sharma, G., & Banerjee, D. (2020). Faunal diversity of India. In *Topics in biodiversity and conservation* (pp. 71–92). https://doi.org/10.1007/978-981-32-9174-4_4
- ⁱⁱ Senapati, A. (2021, August 17). A third of India's coastline underwent erosion in 28 years, Bengal worst affected. *Down To Earth*. <https://www.downtoearth.org.in/news/environment/a-third-of-india-s-coastline-underwent-erosion-in-28-years-bengal-worst-affected-78514>
- ⁱⁱⁱ George, C. C., & Rengamani, Dr. J. (2019). Sagarmala: A Beacon of development in the Maritime Horizon of India. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(2), 1183–1187. <https://doi.org/10.35940/ijrte.b1831.078219>
- ^{iv} NDMA. (2022). *National Policy on Mitigation and Rehabilitation Measures for People Displaced by Coastal and River Erosion 2022*. New Delhi: National Disaster Management Authority. Retrieved from https://ndma.gov.in/sites/default/files/PDF/National_Policy_on_MRM_CRE.pdf
- ^v Church, J. A., & Clark, P. U. (2013). *Sea Level Change*. Geneva: IPCC.
- ^{vi} Spencer, T., Schuerch, M., Nicholls, R. J., Hinkel, J., Lincke, D., Vafeidis, A., Reef, R., McFadden, L., & Brown, S. (2016). Global coastal wetland change under sea-level rise and related stresses: The DIVA Wetland Change Model. *Global and Planetary Change*, 139, 15–30. <https://doi.org/10.1016/j.gloplacha.2015.12.018>
- ^{vii} Roy, A. (2019). Making India's Coastal Infrastructure Climate-Resilient: Challenges and Opportunities. ORF. https://www.orfonline.org/wpcontent/uploads/2019/08/ORF_Occasional_Paper_207_Coastal_Resilience.pdf
- ^{viii} Dhiman, R., Tirodkar, J., & Inamdar, A. B. (2016). Integrating Sustainable Coastal Development Initiatives along Maharashtra Coast, using ICM Guidelines. In Sahyadri E-News (Issue 63, sec7). WGBIS Centre for Earth Science Studies, Indian Institute of Science. Retrieved from https://wgbis.ces.iisc.ac.in/biodiversity/sahyadri_ews/newsletter/Issue63/article/ewrg/sec7.html
- ^{ix} Sorensen, J. (2002). Baseline 2000 background report: The status of integrated coastal management as an international practice. Urban Harbors Institute Publications. Retrieved from <http://core.ac.uk/download/pdf/229325946.pdf>
- ^x Sundar, A. (2014). From Regulation to Management and Back Again: Exploring Governance Shifts in India's Coastal Zone. *Conservation & Society/Conservation & Society*, 12(4), 364. <https://doi.org/10.4103/0972-4923.155580>
- ^{xi} Ramachandran, A., Enserink, B., & Balchand, A. N. (2005). Coastal regulation zone rules in coastal panchayats (villages) of Kerala, India vis-à-vis socio-economic impacts from the recently introduced peoples' participatory program for local self-governance and sustainable development. *Ocean & Coastal Management*, 48(7-8), 632-653. <https://doi.org/10.1016/j.ocecoaman.2005.03.011>
- ^{xii} Ministry of Environment, Forest and Climate Change, Government of India. (1991). *Coastal Regulation Zone Notification, 1991*. Retrieved from <https://environmentclearance.nic.in/writereaddata/SCZMADocument/CRZ%20Notification,%201991.pdf>

Dissecting India's Coastal Policy Policy Brief

- ^{xiii} Swaminathan, M. S., Desai, B. H., Ramachandran, S., Baba, M., Sankar, U., Kanki, B., A., Mohan, J. (2005). Report of the Committee chaired by M.S. Swaminathan to review the Coastal Regulation Zone Notification 1991. New Delhi, India.
- ^{xiv} Krishnamurthy, R.R., DasGupta, R., Chatterjee, R. et al. Managing the Indian coast in the face of disasters & climate change: a review and analysis of India's coastal zone management policies. *J Coast Conserv* 18, 657–672 (2014). <https://doi.org/10.1007/s11852-014-0339-7>
- ^{xv} Ibid.
- ^{xvi} *ibid.*
- ^{xvii} Panigrahi, J. K., & Mohanty, P. K. (2012). Effectiveness of the Indian coastal regulation zones provisions for coastal zone management and its evaluation using SWOT analysis. *Ocean & Coastal Management*, 65, 34-50. <https://doi.org/10.1016/j.ocecoaman.2012.04.023>
- ^{xviii} Sakthivel, R., & Khan, N. (2024). Protection of the Indian coastal ecosystem through coastal regulation zone (CRZ) notifications. In *Coastal Ecosystems* (pp. 250-270). Taylor & Francis. <https://doi.org/10.4324/9781032638478-19>
- ^{xix} Ministry of Environment, Forest and Climate Change, Government of India. (2011). Coastal Regulation Zone Notification, 2011. Retrieved from <https://moef.gov.in/wp-content/uploads/2017/08/CRZ-Notification-2011-1-1.pdf>
- ^{xx} Panigrahi, J. K., & Mohanty, P. K. (2012). Effectiveness of the Indian coastal regulation zones provisions for coastal zone management and its evaluation using SWOT analysis. *Ocean & Coastal Management*, 65, 34-50. <https://doi.org/10.1016/j.ocecoaman.2012.04.023>
- ^{xxi} *ibid.*
- ^{xxii} Yadav, C. L. (2023). Coastal Zones and its legal management in State of Gujarat, India. *Multidisciplinary Science Journal*, 5. <https://doi.org/10.31893/multiscience.2023ss0318>.
- ^{xxiii} Ministry of Environment, Forest and Climate Change, Government of India. (2019). *Coastal Regulation Zone Notification, 2019*. Retrieved from https://environmentclearance.nic.in/writereaddata/SCZMADocument/CRZ_Notification2019.pdf
- ^{xxiv} Press Information Bureau. (2018). *Press Release*. Retrieved June 16, 2024, from <https://pib.gov.in/PressReleasePage.aspx?PRID=1557592>
- ^{xxv} Sakthivel, R., & Khan, N. (2024). Protection of the Indian coastal ecosystem through coastal regulation zone (CRZ) notifications. In *Coastal Ecosystems* (pp. 250-270). Taylor & Francis. <https://doi.org/10.4324/9781032638478-19>
- ^{xxvi} Munton, R. (2003). Deliberative democracy and environmental decision making. In F. Berkhout, M. Leach, & I. Scoones (Eds.), *Negotiating environmental change: New perspectives from social science* (pp. 109-136). Edward Elgar.