

COAST Card Bharat



A place of history, culture, and nature



The Goa Coast Card team and the COAST Card members ventured onto a field visit to one of the largest mangrove ecosystems of Goa: Dr. Salim Ali Bird Sanctuary. This is located along the northern bank of the Mandovi River, and is spread over 1.8 km². The team took a ferry ride to cross the Mandovi River and arrived at the sanctuary. They took the walkway inside the sanctuary and a boat ride arranged by the Department of Forest, Government of Goa to visit the interiors of the sanctuary through small canals to observe the mangrove flora and fauna. Several birds were sighted, and also the Mugger Crocodile inhabiting the sanctuary. The team also observed the traditional fishing methods being practiced in the mangrove area along the banks of the Mandovi River.

After the bird sanctuary, they ventured to Old Goa and the Archaeological Museum of Goa and the Church of St. Francis of Assisi, where sculptures, artifacts, and portraits sketched a picture of Goa's history. A lunchtime visit to a spice farm showed not only a popular tourist attraction, but also displayed the cultural and economic importance of various types of agriculture to the area.

An area of environment, livelihood, and history

The state of Goa is located along the central west coast of India between the Arabian Sea to the west and Western Ghats to the east. Goa has a tropical climate influenced by the southwest monsoons. The state of Goa has a coastline of ~160 km and has several sandy beaches lined with palm (coconut) trees and these beaches attract a wide range of tourists both nationally and internationally. It encompasses several ecosystems such as sandy beaches and rocky inter-tidal habitats all along the coast, coral reefs in the near coastal regions, estuaries and tidal flats lined with thick mangroves, and wetlands. All these ecosystems harbor a variety of flora and fauna making Goa rich in biodiversity. Five major rivers—Chapora, Mandovi, Zuari, Sal, and Talpona—flow from east to west. These rivers, except the Sal, originate in the Western Ghats mountains, flow through the midland region and enter the coastal plain before meeting the



Mangroves bordering Dr. Salim Ali Bird Sanctuary.
Photo Credit: Sidney Anderson

Arabian Sea. The rivers include an intricate system of wetlands, tidal marshes, and cultivated paddy fields interconnected by canals, inland lakes, bays, lagoons and creeks. These rivers are essential for the livelihood of the local population as they sustain a wide variety of artisanal fishery resources such as clams, mussels, oysters, fin fishes, prawns, and crabs. These resources provide livelihood to a large number of artisan fishermen living near the banks of the rivers. All these rivers have large catchment areas and receive increased runoff during the monsoon. Goa experiences pronounced southwest monsoon and this influences the environmental settings of this tiny state. The major portion of Goa's agriculture depends upon the rainfall during the monsoon season. The rainfall also fulfills the requirement of drinking water for almost the entire population through groundwater recharge and holding of rainwater by the construction of dams mainly in the catchment area. The major economies for the region include tourism, mining, fisheries, and agriculture.



Fish impoundment in Dr. Salim Ali Bird Sanctuary.
Photo Credit: Sidney Anderson

Left to right: Farmland; View from Dona Paula Jetty, Sunset on the beach. Photo Credit: Sidney Anderson



Speakers and posters show commitment to Goa's sustainability

Speakers presented on a variety of subjects, including marine ecosystem analysis, tropical conservation strategies, climate impacts on human health, and estuarine microbial dynamics. Whether the talk centered on the impacts to wildlife or the governmental management of fisheries, all made clear that Goa is a biodiverse, beloved, and important ecosystem to be studied, maintained, and conserved. The talks highlighted not only the threats Goa is facing, but also the dedicated and focused work being done by those devoted to mitigating them.

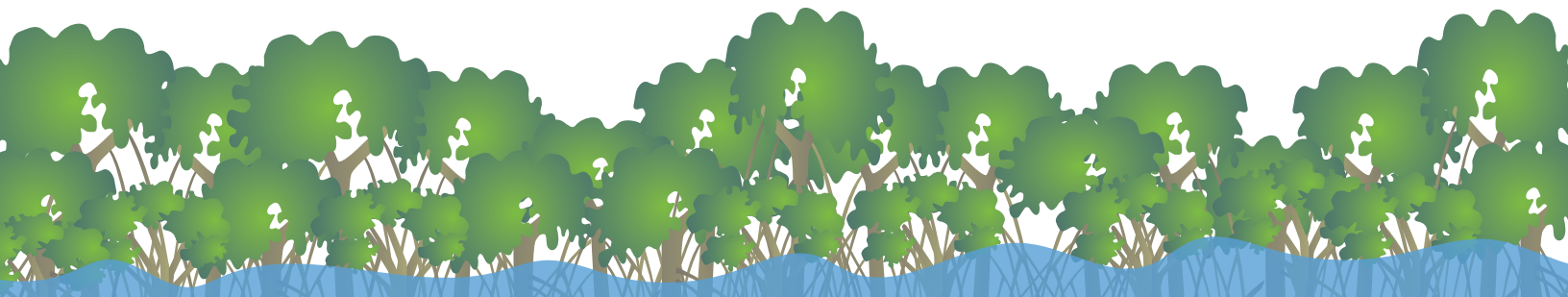


Posters on sustainability made by students. Photo Credit: Dattesh Desai.

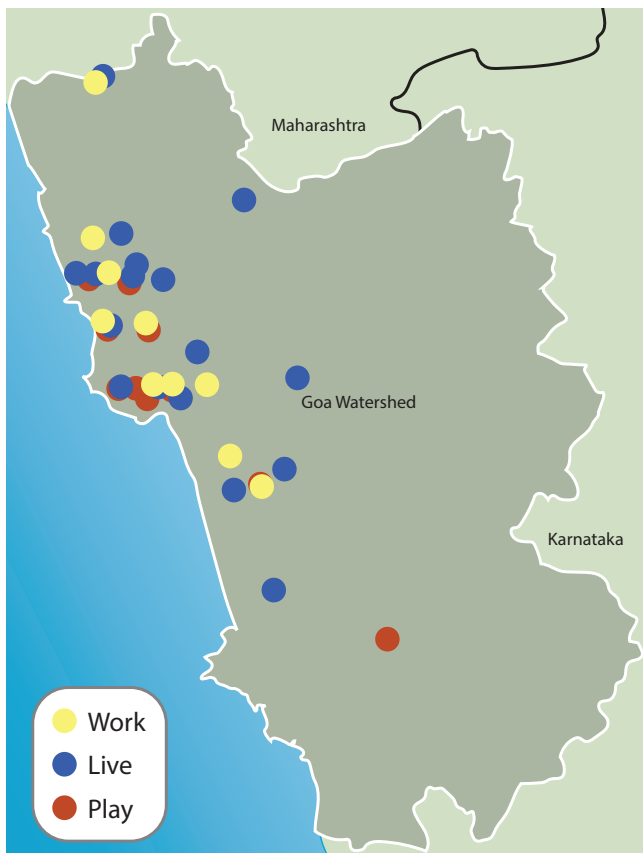
A poster presentation competition was organized for school and college students on the subject of 'Environmental Sustainability of Goa'. Students presented different aspects of environmental sustainability, including soil, water conservation for the future, nature and sustainability, challenges and solutions for sustainability, fauna of different ecosystems, and their conservation. The students highlighted support for sustainable business practices, advocating environmental policies, clean energy initiatives, afforestation, reduction in carbon footprint, recycling and reuse of plastics, electronic items, community involvement, and collective responsibilities towards exploring and improving government policies, etc. are a must for sustainably managing the environment and resources.



Students and professors in attendance at the COAST Card-Bharat meeting. Photo Credit: Dattesh Desai.



Participants provide insight into diverse ecosystem of Goa



In order to get to know the participants and how they occupy the Goa, participants were asked to map where they work live and play, shown on the map to the left. Another component of our COAST card framework is a socio-environmental report card that incorporates social, cultural, economic, environmental, and governance indicators, in order to encompass watershed health through a variety of perspectives. During the listening session, community members shared potential indicators on the Goa coast that are important to them. Another prompt asked them to identify things that they consider as values and threats to their ecosystem, shown on the next page. The respective words are shown in different sizes, with the largest words being identified by multiple participants. Finally, the participants are asked to envision a future that would represent the best possible scenario of the future of Goa. This vision diagram is shown on the next page as an ideal that participants wish to see in their society.

- Support for coastal economy
- Law enforcement of conservation, deforestation and garbage disposal regulations
- Government accountability
- Community engagement prior to development
- Participatory appraisals for development

- Skills based trainings
- Technological interventions
- Support for local economy
- Management of industries
- Sustainable fishing practices
- Offshore casinos

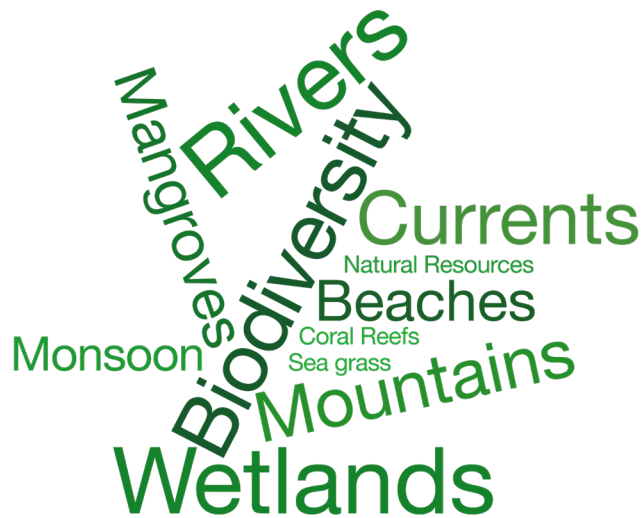


- Water quality
- Biodiversity
- No-development zones
- Contamination
- Average temperatures
- Environmental education
- Waste management training
- Recycling
- Awareness programs

- Environmental education programs
- Celebrations of local culture and festivals
- Preservation of historic cultural practices
- Free education programs for women

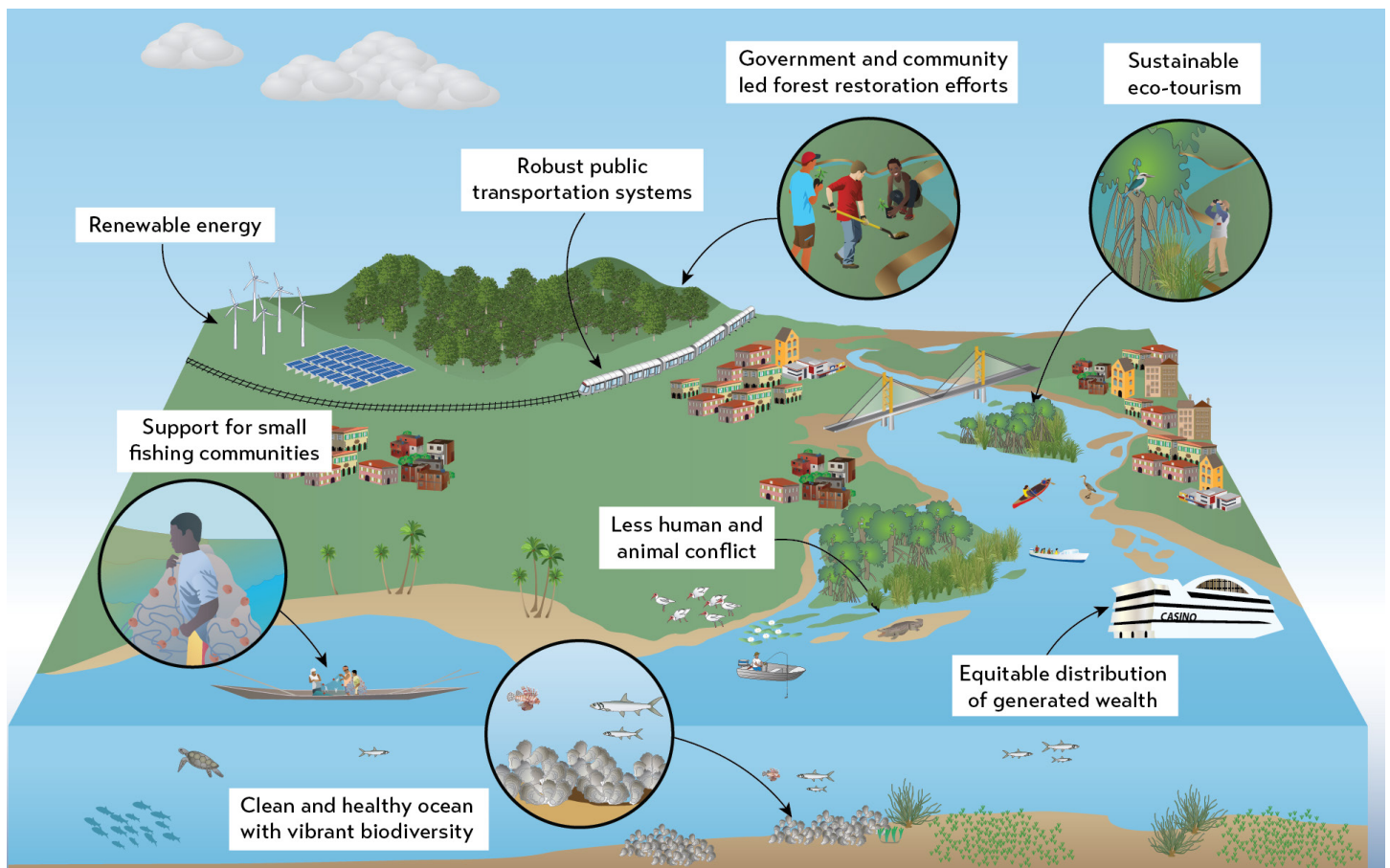


Participants values and threats



Word clouds represent the main values and threats from all participants at the Listening Session. Word size corresponds to how common the value or concern is, with larger words valuable or concerning to more people than smaller words. Graphic credit: Lili Badri.

Participants envision an ecosystem of equity



A biodiverse but threatened landscape

The state of Goa encompasses several ecosystems such as mangroves, beaches, khazan lands, wetlands, rivers and estuaries, coral reefs, mud flats, forests, etc. which sustain a wide variety of flora and fauna making it a biodiversity hot spot. The major environmental features considered important for Goa are rich biodiversity, artisanal fishery resources, forests, mangroves, different types of beaches and shores, monsoons, and seasonal reversal of currents. There are several major threats that might put the environment and the social well-being of the state at risk, such as mining of the ore in the watershed area and the sand mining in the rivers, coastal hypoxia, climate change, increased frequency of cyclones, expanding tourism, increased urbanization and industrialization, and overfishing of natural resources. Goa experiences pronounced southwest monsoon leading to runoff from mining areas. Mining is a major industry of the region, occupying 14% of the land area of Goa.

The state of Goa is an important tourist destination, and the statistics indicate that on average around three million tourists visit this state. Although the population of Goa is low relative to the rest of India, the population is increasing rapidly in this region. The increase in the density of the urban population will put pressure on transportation, river navigation, sanitation, and waste management, and can be considered a major threat to social and environmental well-being.

Need dialogue on ocean conservation, says WRD minister

TIMES NEWS NETWORK

Panaji: To emphasise the critical role of stakeholders' engagement in achieving sustainable development and ocean conservation, minister for water resources, Subhash Shirodkar, stressed on the need for a two-way dialogue between researchers and society.

He was speaking at the third Belmont Forum COAST (Coastal Ocean Assessment for Sustainability and Transformation) at Dona Paula.

The event, an international collaboration between Japan, Norway, Philippines, the US, and India, focused on coastal ocean assessment for sustainability and transformation, intending to produce comprehensive reports on the matter.

One of the key discussions revolved around the mechanisms to develop report cards

for the waters around Goa.

Drawing experiences from the above countries, Dr Dattesh Desai and Dr Lidita Khandeparker from NIO, along with Prof Pal Davidson of Norway, devised a framework for Spatial Decision Making for the Zuari estuary. This framework considers the influence of physical processes on the distribution of organisms.

International participants provided detailed insights into their case studies and methodologies employed to develop report cards. The discussions covered a range of topics, including the water budget of Mahadayi, the impact of climate change in Goa, the functioning of estuarine ecosystems, the relevance of changing environments on community health, fisheries in Goa, and the intersection of climate change and wildlife.

Article written about the COAST Card- Bharat meeting held in Goa, India.



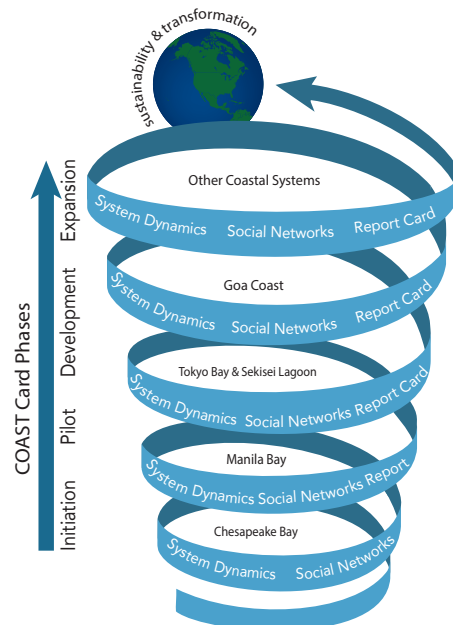
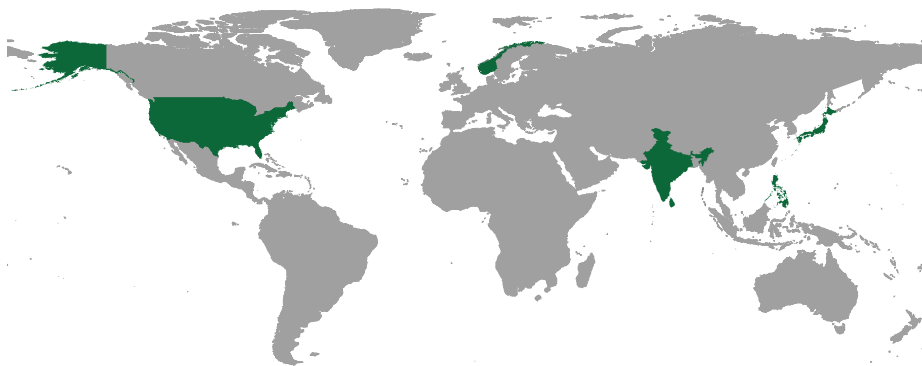
From left to right: Photo of fishing boat on a beach; Historic structure at the Archaeological Museum of Goa; Dock at the Dr. Salim Ali Bird Sanctuary. Photo Credit: Roshni Nair-Gonzalez.



A New Generation of Report Cards

The Coastal Ocean Assessment for Sustainability and Transformation (COAST) Card project is a transnational and trans-disciplinary research program funded through the Belmont Forum, a funding partnership that supports transnational and trans-disciplinary research that seeks to understand, mitigate, and adapt to global environmental change. The COAST Card project brings together researchers from the United States, the Philippines, Norway, India, and Japan. COAST Card merges three tools:

1. Stakeholder identification and societal guidance through socio-ecological network analysis.
2. Status assessment using a socio-environmental report card.
3. Prioritized and linked actions identified with system dynamics models.



Acknowledgments

Thank you COAST Card team, India for organizing COAST CARD – BHARAT 2024, the third workshop of the project. We thank the Minister for water resources, Government of Goa for gracing the occasion during the inaugural ceremony of the workshop. We thank all the COAST Card team members who attended the workshop in-person and online. Thank you to all the invited speakers of the session who presented different aspects of Goa's environment and provided insights into the vision for Goa. We thank all the school and college teachers and students who participated in the poster competition on 'Environmental Sustainability of Goa' and presented the posters during the session. The Chicalim Biodiversity Management Committee, members of the Goa Waste Management Corporation, Department of Science and Technology, Government of Goa are acknowledged for attending the workshop and providing valuable insights during the open house and listening sessions. Members of the press are thanked for providing the publicity in the news media. We thank the Ministry of Earth Sciences, Govt. of India for funding the COAST Card, India project and facilitating the workshop.

Front page photos: Archaeological Museum of Goa, PC S. Anderson (top left); Group photo at the Sahakari Spice Farm, PC D. Desai (top center); Poster session, PC S. Anderson (top right); Mangrove forest, PC S. Anderson (middle left); Opening remarks of the COAST Card Bharat meeting, PC S. Anderson (middle center); Beach view from CSIR-NIO, PC S. Anderson (middle right); Opening ceremony of the COAST Card Bharat meeting, PC S. Anderson (bottom left); Group photo at the Dr. Salim Ali Bird Sanctuary, PC: D. Desai (bottom middle); Listening Session at COAST Card Bharat, PC S. Anderson (bottom right).



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